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10 CFR 50.73

December 18, 2003

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

Dresden Nuclear Power Station, Unit 2
Facility Operating License No. DRP-19
NRC Docket No. 50-237

Subject: Licensee Event Report 2003-005-00, "Unit 2 Main Steam Isolation Valve Leakage Exceeds Technical Specification Limit"

Enclosed is Licensee Event Report 2003-005-00, "Unit 2 Main Steam Isolation Valve Leakage Exceeds Technical Specification Limit," for Dresden Nuclear Power Station, Unit 2. This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications."

Should you have any questions concerning this report, please contact Jeff Hansen, Regulatory Assurance Manager, at (815) 416-2800.

Respectfully,



R. J. Hovey
Site Vice President
Dresden Nuclear Power Station

Enclosure

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Dresden Nuclear Power Station

IE22

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|--|--------|---------------------------------------|---------------|---|---|--------------------|------------------------------|----------------------|------------------------------|---|------|
| NRC FORM 366 (7-2001) | | U.S. NUCLEAR REGULATORY COMMISSION | | | APPROVED BY OBM NO. 3150-0104 EXP 7-31-2004 | | | | | | |
| LICENSEE EVENT REPORT (LER) | | | | | Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection. | | | | | | |
| 1. FACILITY NAME Dresden Nuclear Power Station Unit 2 | | | | 2. DOCKET NUMBER 05000237 | | | 3. PAGE 1 of 4 | | | | |
| 4. TITLE Unit 2 Main Steam Isolation Valve Leakage Exceeds Technical Specification Limit | | | | | | | | | | | |
| 5. EVENT DATE | | | 6. LER NUMBER | | | 7. REPORT DATE | | | 8. OTHER FACILITIES INVOLVED | | |
| MO | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV NO | MO | DAY | YEAR | FACILITY NAME | DOCKET NUMBER | |
| 10 | 19 | 2003 | 2003 | 005 | 00 | 12 | 18 | 2003 | N/A | N/A | |
| 9. OPERATING MODE | | 5 | | 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) | | | | | | | |
| 10. POWER LEVEL | | 000 | | 20.2201(b) | | 20.2203(a)(3)(ii) | | 50.73(a)(2)(ii)(B) | | 50.73(a)(2)(ix)(A) | |
| | | | | 20.2201(d) | | 20.2203(a)(4) | | 50.73(a)(2)(iii) | | 50.73(a)(2)(x) | |
| | | | | 20.2203(a)(1) | | 50.36(c)(1)(i)(A) | | 50.73(a)(2)(iv)(A) | | 73.71(a)(4) | |
| | | | | 20.2203(a)(2)(i) | | 50.36(c)(1)(ii)(A) | | 50.73(a)(2)(v)(A) | | 73.71(a)(5) | |
| | | | | 20.2203(a)(2)(ii) | | 50.36(c)(2) | | 50.73(a)(2)(v)(B) | | OTHER Specify in Abstract below or in NRC Form 366A | |
| | | | | 20.2203(a)(2)(iii) | | 50.46(a)(3)(ii) | | 50.73(a)(2)(v)(C) | | | |
| | | | | 20.2203(a)(2)(iv) | | 50.73(a)(2)(i)(A) | | 50.73(a)(2)(v)(D) | | | |
| | | | | 20.2203(a)(2)(v) | X | 50.73(a)(2)(i)(B) | | 50.73(a)(2)(vii) | | | |
| | | | | 20.2203(a)(2)(vi) | | 50.73(a)(2)(i)(C) | | 50.73(a)(2)(viii)(A) | | | |
| | | | | 20.2203(a)(3)(i) | | 50.73(a)(2)(ii)(A) | | 50.73(a)(2)(viii)(B) | | | |
| 12. LICENSEE CONTACT FOR THIS LER | | | | | | | | | | | |
| NAME George Papanic Jr. | | | | | TELEPHONE NUMBER (Include Area Code) (815) 416-2815 | | | | | | |
| 13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT | | | | | | | | | | | |
| CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX | | |
| | | | | | | | | | | | |
| 14. SUPPLEMENTAL REPORT EXPECTED | | | | | | | 15. EXPECTED SUBMISSION DATE | | MONTH | DAY | YEAR |
| YES (If yes, complete EXPECTED SUBMISSION DATE) | | | | X | NO | | | | | | |

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On October 19, 2003, at 1658 hours (CDT), with Unit 2 shutdown for Refueling Outage D2R18, it was discovered that the combined leak rate for all Main Steam Isolation Valve leakage paths exceeded the Technical Specification Surveillance Requirement 3.6.1.3.10 allowed value of 46 standard cubic feet per hour.

The root cause of the Main Steam Isolation Valve leak rate was determined to be a loss of line contact at the valve seat/disk interface. The valves were repaired and the as-left leakage was within Technical Specification limits. The corrective actions to prevent reoccurrence are: (1) inspect all Main Steam Isolation Valves and if required, repair with the single point cutting tool method within two operating cycles, and (2) the Main Steam Isolation Valve repair procedure will be updated to require machining valve seats instead of lapping.

The safety significance of this event was minimal. The total as-found primary containment leakage including Main Steam Isolation Valve leakage was 209.7 scfh and is below the total allowable leakage of 432.3 scfh assumed in accident analyses. Thus, the total as-found primary containment leakage would have resulted in exposures during a postulated Design Basis Accident that did not exceed 10 CFR 100 limits for offsite dose or General Design Criteria 19 limits for control room dose.

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| Dresden Nuclear Power Station Unit 2 | 05000237 | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | 2 of 4 |
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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

Dresden Nuclear Power Station Unit 2 is a General Electric Company Boiling Water Reactor with a licensed maximum power level of 2957 megawatts thermal. The Energy Industry Identification System codes used in the text are identified as [XX].

A. Plant Conditions Prior to Event:

| | | |
|---|------------------------|------------------------|
| Unit: 02 | Event Date: 10-19-2003 | Event Time: 1658 CDT |
| Reactor Mode: 5 | Mode Name: Refueling | Power Level: 0 percent |
| Reactor Coolant System Pressure: 0 psig | | |

B. Description of Event:

On October 14, 2003, Dresden Nuclear Power Station Unit 2 was shutdown for Refueling Outage D2R18. Technical Specification Surveillance Requirement 3.6.1.3.10 requires that the combined leak rate for all Main Steam Isolation Valve (MSIV) [V] leakage paths be less than or equal to 46 standard cubic feet per hour (scfh) when tested at greater than or equal to 25 pounds per square inch gauge.

Dresden Nuclear Power Station Unit 2 has four Main Steam [SB] lines, A, B, C and D; and two MSIVs per Main Steam line, 2-0203-1A (1A), 2-0203-2A (2A), 2-0203-1B (1B), 2-0203-2B (2B), 2-0203-1C (1C), 2-0203-2C (2C), 2-0203-1D (1D) and 2-0203-2D (2D). During D2R18, leak rate testing was performed on all MSIVs. The results of the individual MSIV leak rate testing were as follows.

| Main Steam Line | A | A | B | B | C | C | D | D |
|------------------|------|-----|-----|-----|------|---------------|------|------|
| MSIV | 1A | 2A | 1B | 2B | 1C | 2C | 1D | 2D |
| Leak Rate (scfh) | 39.7 | 0.2 | 1.1 | 9.7 | 57.1 | Indeterminate | 35.9 | 42.3 |

The leakage rate for MSIV 2C could not be measured due to its leak rate exceeding the 200 scfh measuring capability of the test equipment. The leak rate for each MSIV leakage path was determined from the individual MSIV leak rate test results and are as follows.

| MSIV Leakage Path | A | B | C | D |
|-------------------|-----|-----|------|------|
| Leak Rate (scfh) | 0.2 | 1.1 | 57.1 | 35.9 |

This resulted in an as-found combined leak rate for all MSIV leakage paths of 94.3 scfh. On October 19, 2003, at 1658 hours (CDT), it was determined that the combined leak rate for all MSIV leakage paths exceeded the Technical Specification Surveillance Requirement 3.6.1.3.10 allowed value of 46 scfh.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications."

MSIVs 1A, 1B, 1C, 2C, 1D and 2D were repaired.

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The as-left leakage test results are identified below and resulted in an as-left leakage rate for the total MSIV leakage path of 12.2 scfh.

| | | | | | | | | |
|------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Main Steam Line | A | A | B | B | C | C | D | D |
| MSIV | 1A | 2A | 1B | 2B | 1C | 2C | 1D | 2D |
| Leak Rate (scfh) | 0.8 | 0.2 | 8.2 | 9.7 | 1.6 | 1.6 | 0.1 | 0.1 |

C. Cause of Event:

The root cause of the event was a loss of line contact at the seat/disk interface of the MSIVs.

The Dresden Nuclear Power Station, Unit 2 MSIVs are Crane Company Y Pattern Globe valves [V], model number DR34289-20. The original design of the MSIVs includes a seat/disk interface that had a line of contact. The in-body seat was originally manufactured with a 36-degree angle, while the disk has a 34-degree angle. This provides a line of contact between the knife-edge of the seat and the flat surface of the disk. The benefit of this knife-edge is that the stresses are very high with the reduced contact area, providing an extremely good seal when the knife-edge is intact. However, when the knife-edge is degraded, there is less ability to seal.

MSIVs 1A, 1B, 1C, 2C, 1D and 2D were opened for inspection and all the valves were noted to have a degradation of the knife-edge on the valve seat, which would cause a loss of line contact at the seat/disk interface. The valve disk is out of the steam flow path when the valve is open, thus most of the wear that caused the loss of line contact would be on the in-body valve seat. This was verified when a runout check was performed on the 2D MSIV disk when it was removed and no degradation, low spots or wear were noted.

The loss of line contact at the seat/disk interface was due to a combination of factors, including normal steam flow wear on the seat knife-edge, bore concentricity or plug/seat engagement tolerances and past maintenance practices for MSIV repairs. Past practices relied on a repair method that involved seat lapping and had inherent flaws in the alignment process that resulted in small imperfections on the valve seat. A more precise repair method is a single point cutting tool, which removes a minor amount of material to re-establish the seat knife-edge profile and the valve's leak tight seat/disk profile.

D. Safety Analysis:

The safety significance of this event was minimal. The total as-found primary containment leakage including Main Steam Isolation Valve leakage was 209.7 scfh and is below the total allowable leakage of 432.3 scfh assumed in accident analyses. Thus, the total as-found primary containment leakage would have resulted in exposures during a postulated Design Basis Accident that did not exceed 10 CFR 100 limits for offsite dose or General Design Criteria 19 limits for control room dose. Therefore, the consequences of this event had minimal impact on the health and safety of the public and reactor safety.

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

E. Corrective Actions:

MSIVs 1A, 1B, 1C, 2C, 1D and 2D valve seats were repaired with the single point cutting tool method. Additionally, a new designed MSIV internal liner assembly was installed in MSIVs 1A, 1B, 1C, 1D and 2C. The new design removed a Belleville spring that was susceptible to failure.

All MSIV will be inspected and if required, repaired with the single point cutting tool method within two operating cycles.

The MSIV repair procedure will be updated to require machining valve seats instead of lapping.

F. Previous Occurrences:

A review of Dresden Nuclear Power Station Licensee Event Reports (LERs) and operating experience over the previous five years found the following similar occurrences.

Dresden Nuclear Power Station Unit 3 LER 2000-005-01, "Technical Specification Non-Compliance due to Primary Containment B Inboard and Outboard Main Steam Isolation Valves Exceeding Local Leak Rate Test Allowable Limits," describes an event with MSIV leakage exceeding a Technical Specification leakage limit. The cause of the event was wear on the main seating surfaces and the manipulation of the valves during the outage that closed the valves prior to testing using air pressure and spring force.

Dresden Nuclear Power Station Unit 2 LER 98-004-001, "Supplement to Main Steam Line Isolation Valves 2-203-2B and 2-203-2D As Found Leakage Rates Exceeded Technical Specification Limit," describes an event with MSIV leakage exceeding a Technical Specification leakage limit. The cause of the event was attributed to normal wear on the valve seat and lapping repaired the seat.

G. Component Failure Data:

N/A