U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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 50-237; 50-249

 License Nos:
 DPR-19; DPR-25

Report Nos:

50-237/98010(DRS); 50-249/98010(DRS)

Licensee:

Commonwealth Edison Company

Facility:

Dresden Nuclear Generating Station Units 2 and 3

Location:

Dates:

March 10 - 12, 1998

Morris, IL 60450

6500 North Dresden Road

Inspector:

Approved by:

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00237 PDR Martin J. Farber, Reactor Engineer, RIII

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EXECUTIVE SUMMARY

Dresden Nuclear Generating Station, Units 2 and 3 NRC Inspection Reports 50-237/98010(DRS); 50-249/98010(DRS)

This inspection was a follow-up to the Maintenance Rule Baseline Inspection conducted May 5 - 7, 1997, which examined the licensee's implementation of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." The report covers a three-day on-site inspection by one regional inspector.

The inspector concluded that while the maintenance rule program at Dresden Station was properly implemented as of May 1997, responses to audits and self-assessments significantly improved the program.

Maintenance

- The licensee properly addressed a violation involving failure to include the reactor vessel level indication function of the control rod drive hydraulic system within the scope of the program. A detailed review of the current scoping list did not identify any omissions. The violation was closed.
 - The licensee properly addressed an unresolved item involving classification of structures, systems, and components when the only reliability criterion was no Maintenance Preventable Functional Failures. Performance criteria for assessing the effectiveness of preventive maintenance on (a)(2) systems/functions had been extensively revised and were more conservative, thorough, and informative. The unresolved item was closed.
 - Weaknesses in the Delphi risk determination process, regarding weighting of operating and accident mitigation factors, and in the lack of availability of systems' performance criteria status were corrected.

Quality Assurance

- Corrective actions taken to resolve the February 1997 findings of Quality Assurance audit QAA 12-97-17 were acceptable. The associated inspection follow-up item was closed.
 - A maintenance rule implementation self-assessment, conducted in January 1998, provided valuable input for improvements in the program.

Report Details

Summary of Plant Status

Unit 2 was shut down for refueling and Unit 3 was operating at full power.

Introduction

This inspection was a follow-up to the Maintenance Rule Baseline Inspection (report number 50-010/237/249-97011(DRS)), conducted May 5 - 7, 1997, which examined the licensee's implementation of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." This report covers a three-day on-site inspection by one regional inspector.

II. Maintenance

M1 Conduct of Maintenance (62706)

M1.1 Scope of Structures, Systems, and Components Included Within the Rule

a. Inspection Scope

The inspector did a detailed review of a "Dresden Maintenance Rule Expert Panel Scoping Results," table that evaluated each system/function against 10 CFR 50.65 and industry guidance.

b. Observations and Findings

The scope of the Dresden maintenance rule program included both safety-related and non-safety-related structures, systems, components, and functions. Scoping lists had been revised because of a February 1997 audit and industry experience; several functions were added as a result. No omissions were identified by the inspector although exclusion of some functions of shutdown cooling, emergency air breathing, low pressure coolant injection, and neutron monitoring were questioned. The licensee provided appropriate justifications for these exclusions.

c. <u>Conclusions</u>

The inspector concluded that SSCs and functions were correctly scoped into the maintenance rule program. No omissions were identified.

M1.2 Performance Criteria

a. Inspection Scope

The inspector reviewed the following documents:

- "Maintenance Rule Performance Criteria," March 5, 1998
 - Calculation DRE 98-0021, "PSA Basis for Dresden Maintenance Rule Availability Performance Criteria," Revision 1, March 6, 1998
 - Calculation DRE 97-0241, "PSA Basis for Dresden Maintenance Rule Reliability Performance Criteria," Revision 1, February 16, 1998

The inspector met with the Station Maintenance Rule Owner, various system managers, probablistic safety assessment engineers, and corporate maintenance rule staff to discuss the changes in performance criteria.

b. Observations and Findings

Following the May 1997 baseline inspection, the licensee continued resolution of the findings of the February 1997 quality assurance audit. Among the findings and recommendations specified by the audit were several that related to performance criteria (this audit was discussed in the baseline inspection report referenced earlier in this report). Based on this, Dresden maintenance rule staff began a complete overhaul of the performance criteria. Subsequently, information from the Quad Cities baseline inspection and a January 1998 self-assessment was factored into the program.

Overall, the unavailability performance criteria were based on the probabilistic safety assessment values, although a few were somewhat larger. The licensee did a standard sensitivity analysis to determine the impact on core damage frequency of these unavailability performance criteria. The result was a 154% increase in the core damage frequency, from 3.38E⁴ to 8.60E⁴, an increase of 5.22E⁴. This was considered acceptable.

For reliability performance criteria, the licensee used the Electric Power Research Institute methodology outlined in Technical Bulletins 96-11-01, "Monitoring Reliability for the Maintenance Rule," (November 1996) and 97-3-01, "Monitoring Reliability for the Maintenance Rule – Failures to Run," (March 1997). The licensee also used a five percent confidence level with that methodology to determine allowable functional failures. The licensee's approach, therefore, was considered appropriate. No reliability performance criteria were set higher than the results from this approach.

Reliability criteria were changed to consider functional failures rather than maintenance preventable functional failures because functional failures more closely approximated assessment reliability factors than did maintenance preventable functional failures. Criteria were primarily established at the train level for most systems and at the channel level, where appropriate. Where trains and systems had redundant components, criteria were established at the component level. Although questions were raised concerning criteria for functions of the control rod drive, reactor protection, and shutdown cooling systems, the licensee had acceptable bases for these criteria.



c. <u>Conclusions</u>

Performance criteria were appropriately established to gauge system and function performance; no inappropriate performance criteria were identified.

M1.3 (a)(1) Goals and Corrective Action Plans

a. Inspection Scope

The inspector reviewed the goals and corrective action plans established for the following (a)(1) systems/functions:

Anticipated Transient without Scram Site Structures High Pressure Coolant Injection Fire Protection Instrument Air Main Turbine & Auxiliaries Main Generator & Auxiliaries AC Distribution Emergency DC Lighting Intermediate Range Monitors Condensate/Condensate Booster Circulating Water Offgas Control Room HVAC. Standby Gas Treatment Primary Containment Isolation Valves

The inspector also noted that goals and corrective action plans were under development for the following systems/functions:

Average Power Range Monitors Pumpback N₂ Compressors Reactor Feed Pump HVAC Process Radiation Monitoring Fuel Building HVAC Feedwater Level Control Local Power Range Monitors Containment Atmospheric Monitoring Reactor Water Cleanup

b. Observations and Findings

The inspector reviewed the established goals and corrective action plans for current (a)(1) systems/functions and discussed them with both the Station Maintenance Rule Owner and the assigned System Manager. While there were no questions on the goals established or the direction of most of the corrective action plans, the inspector had questions regarding the corrective action plan for AC Distribution. The corrective action plan seemed to focus on General Electric Magnablast breaker problems and did not address or acknowledge the Merlin Guerin contact block problem that resulted a dual unit shutdown in April 1997. Before this inspection, the licensee had recognized the need to broaden the scope of the AC Distribution corrective action plan and was in the process of upgrading the plan. The inspector also had questions on the monitoring status of the Intermediate Range Monitor, Local Power Range Monitor, Emergency DC Lighting, and the Anticipated Transient without Scram systems. Discussion with system managers clarified the status; the inspector determined that the monitoring status of these (a)(1) systems/functions was acceptable.

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c. <u>Conclusions</u>

Goals established for (a)(1) systems/functions were appropriate. Corrective actions, except for the plan for AC Distribution, seemed thorough and appropriate to correct the problem. This corrective action plan was undergoing revision at the time of the inspection.

M1.4 Baseline Inspection Programmatic Weaknesses

a. Inspection Scope

The inspector examined the station's corrective actions for two weaknesses identified during the May 1997 baseline inspection:

- Weakness in the Delphi methodology for risk evaluation where weighting of operating factors was higher than for accident response factors
- Weakness in lack of retrievability of performance criteria status

b. <u>Findings and Observations</u>

The inspector discussed resolution of these weaknesses with the Station Maintenance Rule Owner and reviewed the applicable documents. To correct the problems with the Delphi risk determination methodology, the corporate maintenance rule procedure has tripled the values associated with accident mitigation factors. This significantly altered the weighting, assigning a greater value to accident mitigation than to normal operating factors. To address the weakness in lack of retrievability of performance criteria data and status, the licensee revised the maintenance rule administrative procedure to require that system managers evaluate maintenance rule performance for their assigned systems monthly.

c. <u>Conclusions</u>

The two weaknesses identified in the maintenance rule baseline report were adequately addressed.

- M7 Quality Assurance in Maintenance Activities (40500)
- M7.1 Licensee Self-Assessments of the Maintenance Rule Program
- a. <u>Inspection Scope</u>

The inspector reviewed Quality Assurance audit report, QAA 12-97-17, February 1997, which discussed the licensee's implementation of the maintenance rule. The inspector also reviewed a maintenance rule self-assessment conducted by the corporate maintenance rule staff on January 19 - 23, 1998.





b. <u>Findings and Observations</u>

Items examined by the inspector included the audit report itself, the corrective actions taken in response to the findings and recommendations, Corrective Action Requests emergent from the audit, and the associated Nuclear Tracking System items. The inspector also verified the implementation of a sample of the commitments through examination of documents or discussion with system managers and members of the station and corporate maintenance rule staff. No discrepancies or omissions were identified.

The self-assessment was an excellent, in-depth examination of the station's maintenance rule program implementation. The assessment covered procedures, scoping, performance criteria, goals, corrective action plans for (a)(1) systems/functions, functional failure identification, and resolution of issues from QAA 12-97-17. The audit, conducted by three people for a one-week period, was detailed and provided valuable input for improving what was already an adequate program.

c. <u>Conclusions</u>

Resolution of the issues identified in QAA 12-97-17 was properly implemented. The January 1998 self-assessment was an excellent, in-depth examination of the station's maintenance rule program implementation.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) VIO 50-237/97011-01(DRS): 50-249/97011-01(DRS): reactor vessel level indication system modification scoping

The inspector reviewed the licensee's docketed response to the violation, the changes to the program intended to correct the problem, and discussed those corrective actions with the Station Maintenance Rule Owner. The root cause for the violation was identified as a program deficiency where modifications and design changes were not evaluated for maintenance rule applicability. The commitments specified in the licensee's response were completed. The licensee placed the reactor vessel level indication system modification in the scope of the rule. Further, the licensee modified the administrative procedure for maintenance rule program implementation and the engineering procedures for modifications and design changes to ensure these activities were evaluated for impact on maintenance rule systems/functions. The changes seemed adequate to correct the problem. This item is closed.

M8.2 (Closed) URI 50-237/97011-02(DRS): 50-249/97011-02(DRS): classification of structures, systems, and components when the only reliability criterion was no maintenance preventable functional failures

A complete review of the licensee's performance criteria and bases was conducted. This review was discussed in section M1.2. Based on the conclusions in that section, this item is closed.



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M8.3 (Closed) IFI 50-237/97011-03(DRS): 50-249/97011-03(DRS): resolution of findings from maintenance rule audit QAA 12-97-17

The inspector reviewed the audit and associated documents, and interviewed members of the licensee staff to evaluate the adequacy of audit responses. This review was discussed in section M7.1. Based on the conclusions in that section, this item is closed.

V. Management Meetings

X1 Exit Meeting Summary

The inspector discussed the progress of the inspection with licensee representatives on a daily basis and presented the inspection results to members of licensee management at the conclusion of the inspection on March 12, 1998. The licensee acknowledged the findings presented. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary; none were identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

- G. Abrell, Regulatory Assurance
- D. Ambler, Regulatory Assurance
- S. Barrett, Operations
- J. Dawn, Downers Grove
- R. Freeman, Site Engineering Manager
- K. Ihnen, Quality & Safety Assessment
- A. Javorik, Component Maintenance
- R. Johnson, Probabilistic Safety Assessment
- L. Jordan, Training
- L. Licata, Performance Monitoring
- J. Loynes, Consultant
- M. Pacilio, Work Control
- C. Richards, Quality & Safety Assessment
- J. Royer, Structural Engineering
- M. Sharma, Station Maintenance Rule Coordinator, LaSalle
- C. Sibley, Corporate Maintenance Rule Coordinator
- F. Spangenberg, Regulatory Assurance
- M. Strait, Downers Grove
- P. Swafford, Station Manager
- J. Tietz, Plant Engineering
- R. Whalen, Performance Monitoring
- D. Winchester, Quality & Safety Assessment
- P. Wojtkiewicz, Station Maintenance Rule Owner

<u>NRC</u>

- D. Roth
- B. Dickson

LIST OF INSPECTION PROCEDURES USED

- IP 92902: Maintenance Follow-up
- IP 62706: Maintenance Rule
- IP 40500: Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems

LIST OF ITEMS CLOSED

VIO

50-237/97011-01(DRS); 50-249/97011-01(DRS)

t.

50-237/97011-02(DRS); 50-249/97011-02(DRS) URI

50-237/97011-03(DRS); 50-249/97011-03(DRS) IFI

Reactor Vessel Level Indication System Modification Scoping Classification of Structures,

Systems, and Components When the Only Reliability Criteria Were No Maintenance Preventable Functional Failures

Resolution of Findings from QAA 12-97-17

LIST OF ACRONYMS USED

Code of Federal Regulations Division of Reactor Safety CFR

DRS

Inspection Follow-up Item IFI

- NRC Nuclear Regulatory Commission
- SSC Structure, System, or Component
- URI Unresolved Item
- VIO Violation

E.



PARTIAL LIST OF DOCUMENTS REVIEWED

- Dresden Administrative Procedure 14-18, Revision 3, January 28, 1998, "Station Compliance with the Maintenance Rule"
- Dresden Administrative Procedure 21-03, "Processing Plant Design Changes"
- Dresden Administrative Procedure 21-06, Revision 5, July 31, 1997, "Changes and Revisions to the Updated Final Safety Analysis Report"
- Nuclear Engineering Procedure 04-01, "Plant Modifications"
- Quality Assurance audit QAA 12-97-17, February 24, 1997, "Maintenance Rule Implementation"
- Corrective Action Record 12-97-011, February 21, 1997, "Maintenance Rule Monitoring"
- Corrective Action Record 12-97-012, February 21, 1997, "Maintenance Rule Concerns"
- Nuclear Tracking System (NTS) Report 237-251-98-00300, "Maintenance Rule Self-Assessment"
- NTS Item 237-100-97-01101, "NRC violation for failure to include RVLIS Mod in maintenance rule program"
- NTS Item 237-100-01101A, "Review UFSAR, DBD, DEOP for Maintenance Rule Scoping"
- NTS Item 237-100-01101B, "Revise DAP 21-06 to add Maintenance Rule Review of UFSAR Changes"
- NTS Item 237-100-01102, "Unresolved Item Relating to the Classification of Risk Significant SSC(s) as (a)(2) when the Only Reliablity Criterion Was No MPFF"
- Plant Engineering System Performance Report January 1998
- Dresden Station Maintenance Rule Expert Panel Scoping Results (table), March 5, 1998
- Maintenance Rule Performance Criteria, March 5, 1998
- Dresden Station Maintenance Rule Category (a)(1) Systems, March 6, 1998
- Calculation DRE97-0241, Revision 1, February 16, 1998, "PSA Basis for Dresden Maintenance Rule Reliability Performance Criteria"
- Calculation DRE98-0021, Revision 1, March 6, 1998, "PSA Basis for Dresden Maintenance Rule Availability Performance Criteria"



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