U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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License No:	NPF-43
Report No:	50-341/98018(DRS)
Licensee:	Detroit Edison Company
Facility:	Enrico Fermi, Unit 2
Location:	6400 N. Dixie Hwy. Newport, MI 48166
Dates:	October 6 - 8, 1998
Inspector:	M. J. Farber, Reactor Engineer, RIII A. N. Fresco, Research Engineer, BNL
Approved by:	J. A. Gavula , Chief Engineering Specialists Branch 1

EXECUTIVE SUMMARY

Enrico Fermi, Unit 2
NRC Inspection Report 50-341/98018(DRS)

This inspection was a follow-up to the Maintenance Rule Baseline Inspection conducted January 14 through February 13, 1998, 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 and one consultant from the Brookhaven National Laboratory.

The inspectors concluded that while the maintenance rule program at Fermi 2 was adequately implemented as of February 1998, corrective actions for the findings of the baseline inspection improved the program.

Maintenance

- Aggressive corrective actions were taken to address the findings from the maintenance rule baseline inspection. The five-plant survey that reviewed the Fermi 2 program with programs from Fitzpatrick, Duane Arnold, Brunswick, River Bend, and Grand Gulf was comprehensive and resulted in extensive changes that significantly strengthened the program.

- No scoping deficiencies were identified. Scoping of systems and functions was significantly strengthened as a result of the comprehensive review project.

- The licensee's response to the two performance criteria issues was thorough and accurate. No performance criteria deficiencies were identified and proper linkage between the updated Probabilistic Safety Assessment model and the performance criteria was satisfactorily demonstrated.

- Although the specific violation example relating to the evaluation of functional failures was withdrawn, the licensee took comprehensive corrective actions which significantly strengthened the functional failure evaluation process.

Report Details

Summary of Plant Status

Fermi 2 was shut down for refueling outage RF06 during the three-day inspection.

Introduction

This inspection was a follow-up to the Maintenance Rule Baseline Inspection (report number 50-341/98002(DRS)), conducted January 14 through February 13, 1998, 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 and one consultant from Brookhaven National Laboratory.

I. Maintenance

M1 Conduct of Maintenance (62706)

M1.1 Background

a. Inspection Scope

The Maintenance Rule Baseline Inspection identified several violations and an inspection follow-up item. In addition to immediate actions to correct the specific deficiencies identified during the inspection, the licensee began a comprehensive, integrated project to examine the entire program and adjust, as necessary, all aspects. The inspector discussed the project with the Maintenance Rule Principal Engineer and examined the records of the review project.

b. Findings and Observations

The cornerstone of the licensee's project was a five-plant maintenance rule program survey. Programs at Duane Arnold, Fitzpatrick, Brunswick, Cooper, and Grand Gulf were reviewed side-by-side with the Fermi 2 program. The Fermi maintenance rule staff examined scoping, both by system and function, safety significance determinations, performance criteria, goals, and periodic assessments. Differences between the programs were carefully evaluated to determine whether changes to the Fermi 2 program were warranted. As a result of this effort, four systems and 21 functions were added to the maintenance rule scope, safety significance classifications for eight functions were changed, 25 functions were changed to clarify the function, over one hundred functions were editorially revised, and four functions were removed from the scope.

c. Conclusions

Aggressive corrective actions were taken to address the findings from the maintenance rule baseline inspection. The five-plant survey was comprehensive and resulted in extensive changes that significantly strengthened the program.

M1.2 Scoping

a. Inspection Scope

NRC Inspection Report 50-341/98002(DRS)) for the Maintenance Rule Baseline Inspection at Fermi discussed a violation involving the failure to include four systems and functions within the scope of the maintenance rule program. The inspector reviewed the licensee response to the notice of violation, corrective action documents, and revised scoping documents to determine the scope and adequacy of the response to these issues.

b. Observations and Findings on Scoping

The licensee's immediate corrective action, as stated in the response to the Notice of Violation, was to place the systems and functions in the maintenance rule scope. As discussed above, scoping of systems and functions was comprehensively evaluated and extensively revised. The inspector examined the changes, concurred with the functions deleted, and noted no deficiencies. The violation associated with scoping (VIO 50-341/98002-02(DRS)) is closed.

c. Conclusions

No scoping deficiencies were identified. Scoping of systems and functions was significantly strengthened as a result of the comprehensive review project.

M1.3 Performance Criteria

a. Inspection Scope

NRC Inspection Report 50-341/98002(DRS)) for the Maintenance Rule Baseline Inspection at Fermi discussed a reliability performance criteria violation and one Probabilistic Safety Assessment (PSA) related inspection follow-up item (IFI) concerning the performance criteria. The violation involved specifying inappropriate reliability criteria for some systems. The inspection follow-up item involved linking of performance criteria to a recently updated PSA model. To determine the scope and adequacy of the licensee's response to these issues, the inspector reviewed the following documents:

- Maintenance Rule Program Position, "Development of 'Conditional Probability' for SSCs Modeled in the Fermi 2 PSA," Log No. 96-001, Revision 1, October 2, 1998.

- Maintenance Rule Program Position, "Development of Train and Divisional Level Conditional Probability, Allowed Number of Failures and Out-of-Service Hours, and Redundancy Factor Determination," Log No. 96-002, Revision 1, October 2, 1998.

- Maintenance Rule Program Position, "Bases Summary for Maintenance Rule Performance Criteria," Revision 0, October 2, 1998.

- Maintenance Rule Program Manual, "Appendix G - Maintenance Rule SSC Specific Functions," MR APP G, Revision 5, October 5, 1998.

- Maintenance Rule Program Manual, "Appendix H - Maintenance Rule Performance Criteria," MR APP H, Revision 4, October 6, 1998.

- Maintenance Rule Program Manual, "Appendix J - Risk Significant Systems," MR APP J, Revision 0, July 1, 1998.

- Calculation File system_perf_crit_calc.xls, "Failure Probabilities for Performance Criteria Determination," March 30, 1998.

b.1 Observations and Findings on Reliability Criteria

The violation involved inappropriately applying performance criteria for the Nuclear Boiler system instrumentation to the system rather than the division level. This specific example was corrected; all systems and functions were subsequently reviewed to ensure that performance criteria were applied at the appropriate level. The review was conducted under the auspices of the five-plant survey discussed above. The inspector reviewed the performance criteria bases listed above and concluded that criteria were properly applied. The inspector considered this sufficient to resolve the issue (VIO 50-341/98002-03(DRS)) and close the violation.

b.2 Observations and Findings on Linking Performance Criteria to the PSA Model

Regarding completion of the linkage between the performance criteria and the updated PSA model, the licensee had revised Maintenance Rule Program Positions Log No. 96-001 and Log No. 96-002 and also issued a new document, Maintenance Rule Program Position Log No. 98-002. The latter document was issued to provide a greater level of detail for the bases of the performance criteria, especially the performance criteria for systems modeled in PSA97C, the version of the PSA which had been completed in August 1997 and which was in effect at the time of the Maintenance Rule Baseline Inspection. (The licensee's baseline core damage frequency for PSA97C was 7.1E-06/reactor year).

For some systems, specifically Reactor Recirculation, System Service Transformer, and Residual Heat Removal, the values which had been set for reliability performance criteria exceeded the PSA97C values and the licensee considered the PSA values too restrictive. In those cases, the methodology described in EPRI Technical Bulletins,

96-11-01, "Monitoring Reliability for the Maintenance Rule," November 1996, and 97-3-01, "Monitoring Reliability for the Maintenance Rule - Failure to Run," March 1997, was used to justify the criteria by determining the expected number of failures over the number of demands in two 18 month operating cycles at a 95% confidence level. Failures-to-run were converted to failures-to-start by assuming the maximum running time was one month. This resulted in conservative allowed failures-to-run for systems where the running time significantly exceeded one month. In all other cases, the reliability performance criteria corresponded to the mean failure rate values in PSA97C.

In view of the satisfactory demonstration of the linkage of the performance criteria with the updated PSA model PSA97C, IFI 50-341/98002-03(DRS) is considered closed.

c. Conclusions

The licensee's response to the two performance criteria issues was thorough and accurate. No performance criteria deficiencies were identified and proper linkage between the updated PSA model and the performance criteria was satisfactorily demonstrated.

M1.4 Goals and Monitoring

a. Inspection Scope

Although the violation related to evaluation of functional failures in the area of goals and monitoring was retracted, the licensee recognized that while the specific example was not a violation, it revealed vulnerabilities that needed to be addressed to avoid errors and inconsistencies. As a result comprehensive corrective actions were taken regardless of the withdrawal. The inspector discussed the program changes with the maintenance rule staff and reviewed the related documents and records.

b. Observations and Findings on Goals and Monitoring

The Maintenance Rule Program Manual, Appendix D, "Guidelines for Determining Functional Failures (FFs) and Maintenance Preventable Functional Failures (MPFFs)," and Appendix G, "Maintenance Rule SSC Specific Functions," were revised to incorporate specific guidance for evaluating functional failures. A placard, with the new guidance contained in Appendix D, was provided to the system engineers. The inspector considered the placard a program strength because it was accurate, well-designed, and user-friendly. The Desktop Reference (a complete maintenance rule handbook in daily organizer size) was also installed on the licensee's computer network, making it more accessible as an immediate reference. Both these actions made important maintenance rule information easily and immediately available to the system engineers who were charged with the responsibility of determining functional failures. This issue (VIO 50-341/98002-05(DRS)) is closed.

c. Conclusions

Although the specific violation was withdrawn, the licensee took comprehensive corrective actions which significantly strengthened the functional failure evaluation process.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) VIO 50-341/98002-02(DRS): Scoping Deficiencies

This item was discussed in section M1.2 and is closed.

M8.2 (Closed) IFI 50-341/98002-03(DRS)): Performance criteria linkage to update PSA model

This item was discussed in section M1.3 and is closed.

M8.3 (Closed)VIO 50-341/8002-04(DRS)): Inappropriate reliability performance criteria

This item was discussed in section M1.3 and is closed.

M8.4 (Closed VIO 50-341/98002-05(DRS)): Failure to properly evaluate functional failures

Although the violation was retracted, the licensee took corrective actions to address the circumstances which led to the original issuance. This was discussed in section M1.4. This item is closed.

II. Management Meetings

X1 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on October 8. The licensee acknowledged the findings presented. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

L. Bugosi, Supervisor, PSA
R. Cook, Nuclear Licensing - Compliance
R. DeLong, Superintendent, System Engineering
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B. Scheffel, Director, Performance Engineering
S. Stasek, Supervisor, Independent Safety Engineering Group
J. Tibia, Maintenance Rule Principal Engineer

NRC

G. Harris, Senior Resident Inspector

INSPECTION PROCEDURES USED

IP 62706	Maintenance Rule
IP 92902	Followup - Maintenance

ITEMS CLOSED

50-341/98002-02(DRS)	VIO	Maintenance Rule Scoping Deficiencies
50-341/98002-03(DRS)	IFI	Performance Criteria Linkage to Updated PSA Model
50-341/98002-04(DRS)	VIO	Inappropriate Reliability Performance Criteria
50-342/98002-05(DRS)	VIO	Failure to Adequately Monitor an (a)(1) Goal

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
DRS	Division of Reactor Safety
EPRI	Electric Power Research Institute
IFI	Inspection Follow-up Item
PSA	Probabilistic Safety Assessment
SSC	Structures, Systems, or Components
VIO	Violation

LIST OF DOCUMENTS REVIEWED

Procedures

- Fermi 2 Licensing/Safety Engineering Conduct Manual, MLS04, "Operating Experience Program," Revision 6, dated October 7, 1998
- Engineering Support Conduct Manual, MES40, "Maintenance Rule Program Description," Revision 4, January 7, 1998

Maintenance Rule Program Manual

- MR01, "Maintenance Rule Program Description," Revision 5, July 22, 1998
- MR02, "Expert Panel," Revision 7, July 24, 1998
- MR03, "Scoping," Revision 2, January 12, 1998
- MR04, "Determination of Risk Significance," Revision 1, January 12, 1998
- MR05, "Determination of SSC Functions," Revision 3. April 3, 1998
- MR06, "Establishing Performance Criteria," Revision 5, February 2, 1998
- MR07, "Historical Review of SSCs," Revision 0, June 24, 1996
- MR08, SSC Classification," Revision 5, July 24, 1998
- MR09, Establishment of Get Well Plans," Revision 12, September 30, 1998
- MR10, "Monitoring," Revision 6, July 30, 1998
- MR11, Periodic Assessment," Revision 1, November 14, 1997
- MR12, "Equipment Out of Service Risk Management," Revision 5, August 14, 1998

- MR13, "Critical Performance Evaluation Program (CPEP)," Revision 2, August 25, 1998
- Appendix D, "Guidelines for Determining Functional Failures (FFs) and Maintenance Preventable Functional Failures (MPFFs), Revision 7, April 15, 1998
- Appendix F, "Maintenance Rule Scoping Summary Report," Revision 2, September 25, 1998
- Appendix G, "Maintenance Rule SSC Specific Functions," Revision 3, July 13, 1998
- Appendix G, "Maintenance Rule SSC Specific Functions," Revision 4, August 21, 1998
- Appendix G, "Maintenance Rule SSC Specific Functions," Revision 5, October 5, 1998
- Appendix H, "Maintenance Rule Performance Criteria," Revision 4, October 6, 1998
- Appendix I, "On line Maintenance Risk Matrix," Revision 3, August 21, 1998
- Appendix J, "Risk Significant Systems," Revision 0, July 1, 1998
- Appendix K, "PSA Model Maintenance & Configuration Control, " Revision 0, July 1, 1998

Condition Assessment Resolution Document (CARD)

- CARD 98-11035, "Maintenance Rule Potential Scoping Violation," February 18, 1998
- CARD 98-10797, "Add Steam Tunnel Cooling to the Maintenance Rule Scope," February 4, 1998
- CARD 98-11036, "New Functions Added to Maintenance Rule Scope," February 8, 1998
- CARD 98-11040, "Maintenance Rule Potential Functional Failure Determination Violation," February 18, 1998
- CARD 98-11041, "Maintenance Rule Inspection Followup Items, February 18, 1998