ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

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Licensee:	Nebraska Public Power District
Facility:	Cooper Nuclear Station
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Team Leader:	J. E. Whittemore, Maintenance Branch Division of Reactor Safety
Inspectors:	W. M. McNeill, Reactor Inspector W. E. Scott, Senior Operations Engineer C. E. Skinner, Resident Inspector S. G. Tingen, Reactor Engineer P. R. Wilson, Senior Reactor Analyst
Approved By:	Dr. Dale A. Powers, Chief, Maintenance Branch Division of Reactor Safety

ATTACHMENTS

Attachment 1:	Partial List of Persons Contacted Inspection Procedure Used List of Items Opened List of Procedures Reviewed

EXECUTIVE SUMMARY

Cooper Nuclear Station
NRC Inspection Report 50-298/96-12

This inspection included a review of the licensee's implementation of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" [the Maintenance Rule]. This report covers a 1-week onsite period of inspection and in-office followup by inspectors from the Office of Nuclear Reactor Regulation and Region IV.

Operations

- There were licensed reactor operators with poor general knowledge of: (a) Maintenance Rule requirements and, (b) evaluation requirements for plant status to determine if configuration changes due to work authorizations or equipment failures created undue risk (Section O4.1).

Maintenance

- The failure to include the systems and components associated with Functions RMV-F01, RMP-F02, AS-F04, AS-F07, AS-F013, AS-F014, and IC-F01 within the scope of the Rule was identified as a violation (Section M1.1).

- The probabilistic risk assessment's level of detail, truncation limits, and quality appeared adequate to perform the risk ranking for the Maintenance Rule (Section M1.2).

- A violation was identified for the use of a standard performance criterion for reliability that had an adverse effect on the risk ranking used to establish structure, system, and component function safety significance (Section M1.2).

- There was inadequate performance monitoring of some functions during the times when the reactor was subcritical. The unavailability performance for the system functions of concern was not determined accurately or conservatively. The failure to determine true function performance for comparison with the performance criterion was identified as a violation (Section M1.2).

- The schedule and procedure for performing periodic evaluations appeared to meet the requirements of the Maintenance Rule (Section M1.3).

- There were significant process and performance weaknesses in the assessment of the safety impact of removing structures, systems, or components from service for monitoring and preventive maintenance. The following examples specifically indicated the inadequacy of the administrative procedure:

  - There were several instances where structures, systems, or components were removed from service without first performing a risk assessment.

  - There were process weaknesses for the assessment of risk resulting from equipment failures and the assessment of removing nonrisk-significant structures, systems, or components from service.

  - There was one instance where the licensee entered a predetermined "risk significant window" without performing the prerequisite checklist.

  The items above were examples of two violations of an inadequate procedure and a failure to follow procedure (Section M1.5).

- The licensee's program for monitoring the effectiveness of maintenance on structures was good (Section M1.6).

- Goals and performance criteria had been set commensurate with safety with some exceptions. The licensee failed to recognize an apparent failure to establish an appropriate goal when a functional performance criterion for the Residual Heat Removal System Function RHR-PF03 was not correctly determined (Section M1.6).

- Two failures due to operator error committed while supporting maintenance activities were inappropriately not considered by the licensee as maintenance preventable functional failures (Section M1.6).

- The failure to evaluate two functional failures to identify root cause in accordance with the corrective action process was identified as a violation (Section M1.6).

Engineering

- System engineering personnel knowledge was adequate to carry out assigned program responsibilities, even though poor knowledge on the part of some was identified (Section E4.1).

- Poor Maintenance Rule program training was evident in all interviewed disciplines (Section-E4.1).

Report Details

Summary of Plant Status

The single unit was at or near full power during the inspection week.

I. Operations

O4 Operator Knowledge and Performance

O4.1 Operator Knowledge of the Maintenance Rule

a. Inspection Scope (62706)

The inspectors interviewed licensed reactor operators to determine if they understood the general requirements of the Maintenance Rule and their particular duties and responsibilities for its implementation. The inspectors asked a sample of licensed reactor operators to explain the general requirements of the Maintenance Rule and to describe their responsibilities for implementing these requirements.

b. Observations and Findings

According to the licensee's program, licensed reactor operators were responsible for:

- Minimizing the impact on availability of structures, systems, and components when tagging equipment out-of-service and performing administrative requirements for tagging.
- Logging times when structures, systems, and components were removed from service. These times were subsequently used for determining structures, systems, and components unavailability.
- Evaluating plant status to determine if work authorization created undue risk.

The interviews with licensed reactor operators identified a significant number of operators that were weak in their knowledge of the general requirements of the Maintenance Rule. Some of those operators also displayed weaknesses in knowledge of their responsibilities. Some senior licensed reactor operators did not appear to understand their responsibilities for reviewing and providing final approval to commence risk-significant outage windows using Procedure 0.49, "Scheduled Risk Assessment," Revision 1. Some operators were unable to explain what should be done when more than two systems/trains on the risk evaluation matrix were taken out of service because the matrix was constructed for only two systems/trains.

Shift supervisors were supposed to evaluate plant status to determine if work authorization created undue risk. Some shift supervisors only performed this task during backshift and weekends when the work week supervisor was not available. The inspectors discussed this task with work week supervisors and found that they were not routinely evaluating risk associated with system lineup changes due to maintenance activities. This concern is further discussed in Section M1.5.

c. Conclusions

A significant number of licensed operators displayed poor general knowledge of Maintenance Rule requirements and licensed operator responsibility for evaluating plant status to determine if system lineup changes due to work authorization or failures, created undue risk. Due, in part to poor procedures, licensed operators were not always familiar with their duties associated with implementation of the Rule.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Scope of the System, Structure, and Component Functions Included Within the Maintenance Rule

a. Inspection Scope (62706)

Structure, system, and component scoping criteria are described in 10 CFR 50.65(b). The licensee had not taken the approach of including structures, systems, and components in the scope of the Maintenance Rule. Instead, the licensee's program had identified the total functions performed by each system, and placed the appropriate specific functions within the scope of the Rule. Prior to the onsite inspection, the inspectors reviewed the Cooper Nuclear Station Final Safety Analysis Report and the Emergency Operating Procedures and selected an independent sample of structure, system, and component functions that the inspectors believed to be within the scope of the Maintenance Rule. The inspectors also reviewed the structure, system, and component functions that were omitted from the scope of the Maintenance Rule as defined by the licensee's program. During the onsite review, the inspectors used their own scoping results to determine if the licensee had adequately identified the structure, system, and component functions that should have been included in the scope of the program.

b. Observations and Findings

Licensee management appointed an expert panel to perform several Maintenance Rule implementation tasks including scoping. The panel grouped structures, systems, and components into functions. Each function described what a group of

structures, systems, or components accomplished. More than one function could be assigned to a structure, system, or component. The expert panel reviewed 447 functions and determined that 302 of the functions were in the scope of the Rule.

Structures included within the scope of the Maintenance Rule were identified on the basis of the equipment located within or attached to the structure. The licensee determined all functions of any structure that contained or supported systems, components, or equipment within the scope of the Maintenance Rule, were also in the scope of the Maintenance Rule.

The inspectors reviewed the functions omitted from the scope of the Rule and identified the following discrepancies:

- The purpose of Function RMV-F01 was to monitor the radiation level of building ventilation systems, record local radiation levels, and annunciate when radiation level setpoints were exceeded. The inspectors identified that some of the radiation monitors contained in this function were utilized in the emergency operating procedure flow charts directing operators to take action based on the radiation level readings. The inspectors noted that the area radiation monitors listed below were utilized in emergency operating procedures but were not included within the scope of the Rule.

Fuel Pool Area	RMA-RA-2
New Fuel Area	RMA-RA-3
Reactor Water Cleanup Precoat Area	RMA-RA-4
Reactor Water Cleanup Sludge Decant/Pump Area	RMA-RA-5
Control Rod Drive Hydraulic Equipment Area (south)	RMA-RA-8
Control Rod Drive Hydraulic Equipment Area (north)	RMA-RA-9
High Pressure Coolant Injection Pump Room	RMA-RA-10
Residual Heat Removal Pump Room (southwest)	RMA-RA-11
Residual Heat Removal Pump Room (northwest)	RMA-RA-12
Reactor Core Isolation Cooling/Core Spray Pump Room	RMA-RA-13
Core Spray Pump Room (southeast)	RMA-RA-14

- The purpose of Function RMP-F02 was to provide continuous radiation level monitoring of the air ejector off gas system and provide alarm and isolation signals when radiation level setpoints were exceeded. The inspectors identified that failure of an off gas radiation monitor would result in loss of condenser vacuum if operators did not take any action within 30 minutes. Loss of condenser vacuum would cause a turbine trip which would cause the reactor to automatically trip.

- The purpose of Functions AS-F04, AS-F07, AS-F013, and AS-F014 were to provide auxiliary steam for heating the reactor building, control and office buildings, diesel generator rooms, and the intake structure. Updated Final Safety Analysis Report, Table X-10-1, "Station Heating System Design

Temperatures (Winter)," specified the minimum winter design temperature limits for the reactor building, control and office buildings, diesel generator rooms, and the intake structure. The inspectors determined that the loss of auxiliary steam heating system in the reactor building, control building, diesel generator rooms, or the intake structure could prevent safety-related systems and components from fulfilling their safety-related function or could cause a reactor scram.

On September 10, 1996, the licensee provided additional information stating an opinion that the loss of heating steam to any of the structures would not directly cause the failure any safety-related structure, system, or component to perform its function. The licensee had identified functions to be included in the scope of the maintenance rule program but had not identified freeze protection of safety-related equipment as a monitored function. The inspectors noted that the licensee had identified structures as being in scope if they contained or supported components and/or systems that were in scope. The additional information did not provide a basis for concluding that functions supported by all the above structures were not jeopardized by the loss of building heating steam.

- The purpose of Function IC-F01 was to provide voice communication between various areas of the plant site. The gaitronics communication system accomplished this function. The licensee performed a review of communications utilized during the performance of emergency operating procedures. This review was titled, "EOP Communications Review," and was dated May 14, 1996. The review identified the method of communication utilized for 554 emergency operating procedure actions. The gaitronics communication system was designated for use in 111 of the 554 emergency operating procedure actions. The inspectors considered that this was a significant contribution.

  The information of September 10, 1996, provided an opinion that the loss of any communication system used to execute the emergency operating procedures would provide a maximum of 25 percent of the communication capability required by the procedures. The inspectors noted that the licensee survey conducted for this purpose determined that the gaitronics system provided 20 percent of the communication required by the emergency operating procedures and judged this contribution to be significant for the successful execution of the emergency operating procedures.

The inspectors held discussions with licensee personnel regarding the justifications for not placing the functions within the scope of the Rule. On the basis of previous industry events and experience, the inspectors believed that the above systems should have been in the scope of the licensee's program. There have been numerous cases of automatic protective action or improper execution of emergency operating procedures due to: operator failure to take actions on the basis of

incorrect or failed indication or alarms; failure of equipment that required operator intervention; use of inappropriate or failed communication equipment; and cold weather degradation of systems important to safety. On August 27, 1996, a licensee representative informed the inspection team leader that Functions RMV-F01 and RMP-F02 were being placed in the scope of the licensee's Maintenance Rule Program. Failure to include appropriate, nonsafety-related structure, system, and component functions in the scope of the Maintenance Rule was a violation of 10 CFR 50.65(b) (50-298/9612-01).

c. Conclusions

All required structures, systems, and components (except the nonsafety-related systems and components previously discussed) were included within the scope of the Rule. The failure to include the systems and components associated with Functions RMV-F01, RMP-F02, AS-F04, AS-F07, AS-F013, AS-F014, and IC-F01 within the scope of the Rule was identified as a violation.

M1.2 Safety or Risk Determination

a. Inspection Scope (62706)

Paragraph (a)(1) of the Rule requires that goals be commensurate with safety. Additionally, implementation of the Rule using the guidance contained in NUMARC 93-01, "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," required that safety be taken into account when setting performance criteria and monitoring under (a)(2) of the Rule. This safety consideration would then be used to determine if the structure, system, and component functions should be monitored at the train or plant level. The inspectors reviewed the methods and calculations that the licensee had established for making these required safety determinations. The inspectors also reviewed the safety determinations that were made for the functions that were reviewed in detail during this inspection.

b. Observations and Findings

In addition to determining which structure, system, and component functions were within the scope of the Rule, the licensee's expert panel established the risk-significance ranking of the functions, performance criteria of the functions, goals for the functions, and the (a)(1), and (a)(2) lists. The expert panel was established in accordance with Section 9.3.1 of NUMARC 93-01. The expert panel membership included representatives from operations, maintenance planning, reliability engineering, plant engineering, design engineering, and quality assurance. Alternates for each permanent member and Rules for a quorum were established in the expert panel's charter. The expert panel possessed a total of 99-person years of nuclear power experience.

The final risk-significance ranking was based on a combination of results from a probabilistic risk assessment and expert panel judgement based on deterministic considerations. The licensee's program used quantitative measures of risk achievement worth, Fussel-Veseley Importance, and core damage contribution. The risk rankings were in terms of both core damage frequency (Level 1 analysis) and large early release frequency (Level 2 analysis). The expert panel did not act to remove any functions from the list of risk-significant functions that was developed from the effort described above. The expert panel had declared 57 structure, system, and component functions to be risk-significant out of the 302 functions within the scope of the Rule. Systems were classified as risk-significant if the system included a component that was necessary to support a risk-significant function. This translated into 30 risk-significant systems with a total of 15,131 risk-significant components. Within those functions that the licensee had determined to be in the scope of the Maintenance Rule, the inspectors did not identify any functions that had been misranked.

b.1 Risk Ranking Methodology

The inspectors reviewed a sample of structure, system, and component functions covered by the Rule that the expert panel had categorized as nonrisk significant to assess if the expert panel had adequately established the safety significance of those functions. All of the sampled functions were modeled in the probabilistic risk assessment. The inspectors found that the function modeling in the probabilistic risk assessment for those sampled functions was sufficiently detailed. Plant-specific data was used when statistically sufficient data was available. Otherwise, the licensee used generic data. No Bayesian updating was used. Success criteria for the selected functions were derived from engineering analysis.

The inspectors also reviewed the truncation limits used during the risk ranking process. Truncation limits were imposed on probabilistic risk assessment models in order to limit the size and complexity of the results to a manageable level. The licensee used a truncation level of 1E-10 (prior to applying recovery rules) when quantifying the probabilistic risk assessment. This was five orders of magnitude less than the overall core damage frequency estimate of 1.7E-5. The licensee's approach to truncation with respect to the risk ranking process was adequate.

Based on the review of the sampled structure, system, and component functions, it appeared that the probabilistic risk assessment's level of detail, truncation limits and quality were adequate to perform the risk ranking required for the Maintenance Rule.

b.2 Performance Criteria

The inspectors reviewed the licensee's performance criteria to determine if the licensee had adequately set performance criteria under (a)(2) of the Maintenance Rule consistent with the assumptions used to establish the safety significance. Section 9.3.2 of NUMARC 93-01 recommends that risk-significant structure, system, and component performance criteria be set to assure that the availability and reliability assumptions used in the risk determining analysis (probabilistic risk assessment) are maintained. The licensee elected to use performance criteria different than what was used in the risk determination. The probabilistic risk assessment used actual plant-specific values for unavailability and actual plant-specific or generic values for reliability. The licensee selected a performance criterion of 2.5 percent unavailability for all risk-significant functions. A performance criterion for reliability of two maintenance preventable functional failures in an operating cycle was selected for most risk-significant functions.

The licensee performed a sensitivity analysis that demonstrated that the use of 2.5 percent for unavailability preserved the assumptions used to establish safety significance. The licensee used the probabilistic risk assessment to calculate the core damage frequency increase if risk-significant functions were all assumed to be unavailable. This analysis resulted in an insignificant increase in core damage frequency. In addition, the risk ranking used to determine safety significance was not adversely affected as no additional functions were identified as risk significant.

The licensee had not performed a similar analysis that demonstrated the performance criteria used for reliability preserved the assumptions used in the probabilistic risk assessment or that the use of the criterion did not have an adverse impact on risk ranking. The inspectors noted that there was no relationship established between the criterion and the failure probability assumptions in the probabilistic risk assessment since the number of function demands were not tracked. Thus, widely different actual function reliability estimates (probability of failure upon demand) could result from the same number of maintenance preventable functional failures in a given time period if the number of demands were different.

This method of measuring and tracking functional reliability was inadequate and represented a failure to set performance criteria that were commensurate with safety. This was identified as a violation of 10 CFR 50.65 (50-298/9612-02).

The inspectors inquired how unavailability was determined for the times when certain systems were not required to respond. A demonstration of the data base system indicated that availability was determined by comparing the time a function was available to the time it was required to be available, and unavailability was calculated as the complement of availability.

The inspectors asked a licensee representative how the time required to be available for functions of four specific systems was determined. The representative responded that for the purpose of calculating availability, these systems were not required to be available when the reactor was subcritical. The systems were automatic depressurization, emergency diesel generators, high pressure coolant injection, and residual heat removal. The inspectors pointed out to various licensee personnel that the facility license required some of the above system functions to be operable when the reactor was shutdown at normal operating temperature and pressure and, therefore, the function should be available.

The inspectors reasoned that since availability was represented by the fraction described above, if the denominator of the fraction depicting availability (time required to be available) was smaller than actually required by the license, availability would appear to be larger, hence the complement of availability, or unavailability would appear to be smaller.

The licensee had established a performance criterion of 2.5 percent unavailability for the system functions of concern. Failure to meet this criterion would require that the functions be placed in (a)(1) and goals to be set. Therefore, using the licensee's current process, it was not possible to arrive at a realistic and conservative value for function unavailability performance. The inspectors identified this as a potential violation of the Maintenance Rule.

The licensee submitted additional information on September 10, 1996, in response to the potential violation. The response contained new data and calculations which indicated how functional unavailability would change as a result of using the time of depressurization to determine when the function could be demanded. The response implied that the change in unavailability due to the different method of calculation was not significant. However, the inspectors noted percentage unavailability of some functions related to the referenced systems had increased as much as 0.5 percent (1.37-1.90 percent), within the allowed 2.5 percent unavailability. The inspectors considered this change, 20 percent of the limit, to be significant.

This failure to monitor and determine actual function unavailability for comparison with the performance criterion, was a violation of 10 CFR 50.65 (50-298/9612-03).

c. Conclusions

It appeared that the probabilistic risk assessment's level of detail, truncation limits and quality were adequate to perform the risk categorization for the Maintenance Rule. The licensee's use of a standard performance criterion for unavailability, although different from what was assumed in the probabilistic risk assessment, did not adversely affect the risk ranking used to establish structure, system, and component function safety significance. However, the licensee was not able to demonstrate that their use of a standard performance criteria for reliability did not have an adverse affect on the risk ranking used to establish structure, system, and component function safety significance, and this was identified as a violation. Additionally, the licensee's procedures did not provide for adequate monitoring of performance of some system functions during the times when the reactor was subcritical, and this was a violation.

M1.3 Periodic Evaluation

a. Inspection Scope (62706)

Paragraph (a)(3) of the Rule requires that performance and condition monitoring activities and associated goals and preventive maintenance activities be evaluated taking into account, where practical, industry-wide operating experience. This inspection is required to be performed at least one time during each refueling cycle, not to exceed 24 months between evaluations. The inspectors reviewed the plans and procedures the licensee had established to ensure this evaluation would be completed as required. The inspectors also discussed these plans with the licensee's Maintenance Rule coordinator who was responsible for performing this evaluation.

b. Observations and Findings

At the time of the inspection, the licensee was not required to have performed the first periodic evaluation. A licensee representative stated that the current intention was to perform the first evaluation following the next refueling outage (RF17). The inspectors reviewed Administrative Procedure 0.27.3, "Maintenance Rule Program Periodic Assessment," Revision 0, to determine if the procedure contained sufficient guidance to meet the requirements of the Rule. All of the NUMARC 93-01 recommendations for periodic evaluations were incorporated into the procedure.

c. Conclusions for Periodic Evaluation

The licensee's schedule and procedure for performing periodic evaluations appeared to meet the requirements of the Rule.

M1.4 Balancing Reliability and Unavailability

a. Inspection Scope (62706)

Paragraph (a)(3) of the Rule requires that adjustments be made, where necessary, to assure that the objective of preventing failures through the performance of preventive maintenance is appropriately balanced against the objective of minimizing unavailability due to monitoring or preventive maintenance. The inspectors reviewed the plans and procedures the licensee had established to ensure this evaluation was completed as required by the Rule. The inspectors also discussed these plans with the licensee's reliability engineering supervisor, who was responsible for performing this evaluation.

b. Observations and Findings

The inspectors reviewed the licensee's process for balancing function reliability and unavailability. The requirements for balancing were contained in Administrative Procedure 0.27.3. The licensee's approach consisted of monitoring function performance against the established function performance criteria. The process considered a function balanced if the performance criteria were met. As stated above, the established performance criteria was 2.5 percent unavailability and reliability of two maintenance preventable functional failures per fuel cycle.

The inspectors determined that use of maintenance preventable functional failures did not give sufficient information about function reliability. Meaningful estimates of reliability would necessitate information that incorporated function demands and time in service.

c. Conclusions for Balancing Reliability and Unavailability

The inspectors concluded that the licensee's proposed method of balancing reliability and unavailability using maintenance preventable functional failures alone as the measure of reliability would not meet the intent of the Maintenance Rule. However, the performance of balancing was not required until the first periodic evaluation. The NRC will address this issue when assessing the licensee's corrective action in response to Violation 50-298/9612-02in Section M1.2.b.2.

M1.5 Plant Safety Assessments Before Taking Equipment Out of Service

a. Inspection Scope (62706)

Paragraph (a)(3) of the Maintenance Rule states that the total impact of maintenance activities on plant safety should be taken into account before taking

equipment out of service for monitoring or preventive maintenance. The inspectors reviewed the licensee's procedures and discussed the process with the Maintenance Rule coordinator, the expert panel members, the plant operators, system schedulers, and work week supervisors.

b. Observations and Findings

The inspectors reviewed the licensee's process and performance regarding their risk assessment of removing equipment from service. The inspectors identified several weaknesses.

The licensee incorporated the requirements to assess the impact on plant safety when removing equipment from service into Administrative Procedure 0.49, "Schedule Risk Assessment," Revision 1, which was dated August 9, 1996. The original procedure contained a matrix that identified either prohibitions (due to Technical Specifications) or "risks windows" (none or risk significant) associated with combinations of risk-significant equipment that were proposed to be removed from service. The revised procedure contained an upgraded matrix that identified the windows by level of risk (high, medium, or none). The risk matrix in the original procedure was inadequate because it did not include all risk-significant systems identified in the Level 1 probabilistic risk assessment. The new matrix was an improvement in that all Level 1 risk-significant systems were included. The inspectors noted that both procedure revisions required reliability engineering to determine the risk associated with any combination of risk-significant equipment not covered by the matrix prior to removing those components from service. As noted in Section O4.1.b, some operations personnel were not familiar with this requirement.

Neither the original nor the revised Administrative Procedure 0.49 contained guidance on what actions were to be taken when plant configuration changed due to equipment failures while in a "risk significant window." The procedure was silent regarding the necessity of performing a risk assessment following the discovery of a failed structure, system, or component, and there was no guidance regarding what actions needed to be taken if the plant was in a high-risk configuration as a result of the structure, system, or component failure.

In addition, Administrative Procedure 0.49 did not contain guidance for assessing risk when removing low-risk structures, systems, or components from service. Combinations of low-risk structures, systems, or components removed from service could potentially place the plant in a higher than acceptable risk-significant configuration.

According to Administrative Procedure 0.49, system schedulers were responsible for performing the risk assessment associated with a proposed work week window. However, the procedure was unclear regarding responsibility for performing the risk assessment after the work week schedule was frozen or when emergent work was

identified. System schedulers stated their responsibility for performing risk assessments ended once the work week schedule was frozen. They further stated that risk assessments for any schedule changes after the freeze date were the responsibility of the scheduling supervisor for the period before the work week, and the work week supervisor during the work week. When interviewed, a work week supervisor stated he was unaware that he was responsible for assessing the risk impact of schedule changes during the work week. A shift supervisor stated that he relied on the work week supervisor to perform any required risk assessments for changes to the work week schedule if the work week supervisor was onsite. The inspectors found that between July 10 and August 9, 1996, the work week supervisor had approved over 20 additional maintenance activities (including the removal of safety-related equipment from service) to the work week schedules. No risk assessments were documented for those activities as required by Administrative Procedure 0.49.

The inspectors identified the following sample of schedule impact forms depicting maintenance activity additions to the schedule for the period specified that were not assessed for any change in risk.

DATE APPROVED	ACTIVITY ID	AFFECTED EQUIPMENT
July 11, 1996	96-1121	Fire Protection System Flow indicator
July 12, 1996	96-0035	Turbine High Pressure Steam Leak
July 15, 1996	96-0764	Circulating Water System Strainer
July 23, 1996	96-1179	Reactor Water Cleanup Pump B Motor
July 26, 1996	96-1179	Reactor Water Cleanup Pump B Coupling
July 26, 1996	96-1224	Average Power Range Monitor

On the basis of the known plant conditions at the times in question, it did not appear that the changes to the work week schedule resulted in the plant being placed in a risk-significant configuration. However, 10 CFR 50.65 (a)(3) required that an assessment of the total plant equipment that was out of service be taken into account to determine the overall effect on performance of safety functions during the performance of monitoring and preventive maintenance activities. In addition, 10 CFR 50 Appendix B, Criterion V required that activities affecting quality be prescribed by documented procedures. Therefore, the failure to provide adequate instructions regarding the responsibility for ensuring that risk assessments were performed when removing safety-related structures, systems, or components from service was a violation (50-298/9612-04).

On September 10, 1996, the licensee submitted additional information disputing that a violation existed. The licensee stated that there was no incidence of undue risk due to changed configuration and failure to assess risk. The NRC agreed with the licensee regarding undue risk during the exit meeting on August 16, 1996. The licensee also referenced NRC Inspection Procedure 62706, "Maintenance Rule, page A-2, paragraph 4, which stated in part that failure to perform risk assessment would not be a violation. The inspectors agreed that a violation of 10 CFR 50.65 did not occur. However, a violation of 10 CFR 50 Appendix B, Criterion V did occur.

As noted previously, 10 CFR 50.65 (a)(3) instructed that an assessment of the total plant equipment that was out of service be taken into account to determine the overall effect on performance of safety functions during the performance of monitoring and preventive maintenance activities. Administrative Procedure 0.49, Step 8.1.7 required system schedulers to initiate a "risk significant window" checklist if a proposed planned maintenance activity would place the plant in a "risk significant window." The checklists contained guidance needed prior to entering a "risk significant window." This included prestaging equipment, contingency planning, performance of dry runs, prejob briefings and approval signatures for entry into the window.

Based on a sample of plant configurations since July 10, 1996, the inspectors identified one instance where a "risk significant window" was entered, but a risk-significant window checklist was not performed. On July 17, 1996, the No. 2 emergency diesel generator was removed from service to inspect its muffler bypass valve (Maintenance Work Request 96-1125). This placed the plant in an Administrative Procedure 0.49 "risk significant window"; however, the system scheduler did not initiate a risk-significant window checklist as required. In response to the inspectors' concern, the licensee documented this issue in Problem Identification Report 2-04383. 10 CFR 50, Appendix B, Criterion V requires, in part, that activities affecting quality shall be prescribed by documented procedures and shall be accomplished according to those procedures. Therefore, the above failure to follow Administrative Procedure 0.49 was identified as a violation (50-298/9612-05).

The licensee submitted additional information on September 10, 1996, but did not disagree with the potential violation. The inspectors reviewed the additional information and determined that it did not negate the potential violation.

The inspectors identified that since April 1996, the licensee's reliability engineering group was trending plant instantaneous and cumulative risk due to work activities. This was being performed to provide feedback on the risk assessment process and to improve risk management. The licensee updated the trends usually the week after the scheduled work week. The inspectors reviewed the trends and did not identify periods where the plant was operating in a high-risk configuration.

c. Conclusions for Safety Assessments

The inspectors identified significant procedural and performance weaknesses regarding the licensee's assessment of the safety impact of removing structures, systems, or components from service for monitoring and preventive maintenance.

The inspectors concluded that Administrative Procedure 0.49 was inadequate. There were several instances where structures, systems, or components were removed from service without first performing a risk assessment. There was one instance where the plant entered a predetermined "risk significant window" without the prerequisite checklist performed. This was a violation. Administrative Procedure 0.49 also contained other process weaknesses on the assessment of risk resulting from equipment failures and the assessment of removing nonrisk-significant structure, system, or components from service.

M1.6 Goal Setting and Monitoring and Preventive Maintenance

a. Inspection Scope (62706)

The inspectors reviewed program documents and records in order to evaluate the process that had been established to set goals and monitor under paragraph (a)(1) and to verify that preventive maintenance was effective under paragraph (a)(2) of the Rule. The inspectors also discussed the program with the Maintenance Rule coordinator, expert panel members, system engineers, plant operators, schedulers, and corrective action program personnel.

The inspectors reviewed the systems described below to verify: that goals or performance criteria were established with safety taken into consideration; that industry-wide operating experience was considered, where practical; that appropriate monitoring and trending were being performed; and that corrective action was taken when a structure, system, or component function failed to meet its goal or performance criterion, or when a structure, system, or component function experienced a maintenance preventible functional failure.

b. Observations and Findings

b.1 Safety Consideration in Setting Goals and Performance Criteria

The Maintenance Rule as implemented using the guidance in NUMARC 93-01 requires that safety (risk) be taken into consideration when establishing goals under (a)(1) or performance criteria under (a)(2).

The licensee had four functions related to three systems in the (a)(1) category. These were risk-significant functions and the licensee had appropriately established goals for the functions. The licensee did not use the run-to-failure or inherently-reliable classifications for any functions. Therefore, plant-level performance criteria or goals were established for all other nonrisk-significant functions.

The licensee's expert panel used the risk determination process described in Section M1.2 above to assess the relative risk of all structure, system, and component functions within the scope of the Rule. The results of this process were used to categorize structure, system, and component functions as either risk significant or nonrisk significant. System or train-level performance criteria were established for all high-risk functions, even though an entire function may not be lost due to the existence of redundant trains or equipment. In other words, a maintenance preventable functional failure could still be identified and counted, even if the function was not lost because a redundant train or component was available.

Plant-level performance criteria were established for all other in-scope structure, system, and component functions, i.e., nonrisk significant, normally operating systems.

(1) Structures

The licensee's Administrative Procedure 0.27.1, "Periodic Structural Inspections of Structures," Revision 1, was used to perform an initial baseline inspection of all in-scope structures. Future inspections were to be performed at least every 5 years. The procedure also established four specific functions that were evaluated for each structure. Detailed guidance was provided for evaluating and reporting the condition or performance of each structure's function.

The inspectors initially questioned the acceptability of performance for the functions of structures and how a structure status could be moved between (a)(1) and (a)(2). Discussion with site structural engineering personnel clarified these issues when it was explained that the unacceptable performance of any function would place a structural function in (a)(1). The licensee also made a simple revision to the procedure that further clarified any confusion and indicated how the structures were treated by the Maintenance Rule. The licensee's program for evaluating and monitoring structures within the scope Maintenance Rule met the intent of the Rule.

The licensee had developed and implemented a strong program for monitoring the effectiveness of maintenance on structures within the scope of the Maintenance Rule.

(2) Reactor Equipment Cooling

The licensee had identified six functions within the reactor equipment cooling system. All six functions were monitored under Category (a)(2). One function, PF01, was risk significant and monitored using unavailability and maintenance preventable functional failures at the train level. The licensee monitored the other five functions using maintenance preventable functional failures only.

There were no maintenance preventable functional failures identified by the licensee for the current fuel cycle. The inspectors found that performance criteria were reasonable and commensurate with safety.

(3) Digital Electro-Hydraulic Control

The licensee had identified one function within the digital electro-hydraulic control or turbine control system. The licensee monitored the function under Category (a)(2) at the plant level using scram frequency.

There were no maintenance preventable functional failures identified by the licensee for the current fuel cycle. The inspectors found that performance criteria was reasonable and commensurate with safety.

(4) High Pressure Coolant Injection

The licensee had identified three functions within high pressure coolant injection system. Function PF01 was risk significant and was being monitored under Category (a)(1). Function SD1 was being monitored under Category (a)(2) using only maintenance preventable functional failure for a performance criterion.

In the current fuel cycle, no maintenance preventable functional failures were identified by the licensee. A sample of maintenance work requests was reviewed by the inspectors to establish if any conditions existed that should have been identified as maintenance preventable functional failures. No potential failures were identified.

The inspectors found that performance criteria and goals were reasonable and commensurate with safety.

(5) Main Steam

The licensee had determined that there were 16 functions associated with the main steam system that were monitored under (a)(2). Function ADS PF01 was designated as risk significant and monitored using unavailability and maintenance preventable function failures. There were 9 functions that the licensee monitored using only maintenance preventable function failures, and 6 functions were monitored at the plant level.

Concerning the functions monitored at the plant level, two were monitored using scram frequency and the remaining four were monitored using emergency operating procedure maintenance preventable functional failures. According to licensee representatives an emergency operating procedure maintenance preventable functional failure was the failure of a function that resulted from the performance of a step in the emergency operating procedures.

The inspectors requested the licensee's staff to demonstrate how emergency operating procedure maintenance preventable functional failures would be identified by system engineers. During the demonstration, the inspectors and licensee personnel identified that the procedures for implementing the Rule did not define emergency operating procedure maintenance preventable functional failures. Also, procedures did not address this term in the context of failures per unit time, e.g., one emergency operating procedure maintenance preventable functional failure per year. This was another example of weakness in the licensee's procedures.

A Maintenance Rule data base used by Maintenance Rule program personnel was not available to system engineers. This data base related components to specific emergency operating procedure functions. The licensee planned to revise the applicable procedure and also make the data base available to the system engineers. These steps were appropriate and should clarify any future questions in regard to determining emergency operating procedure maintenance preventable functional failures.

The inspectors determined that there had been one maintenance preventable functional failure in the main system for the current fuel cycle. A review of this failure found the determination to be conservative. The performance criteria were reasonable and commensurate with safety.

(6) Core Spray System

The functions associated with the core spray system were monitored under Category (a)(2) using train-level performance criteria based on unavailability and reliability. There had not been a maintenance preventable functional failure of the spray system since 1994. The inspectors reviewed licensee event reports, NRC inspection reports, and the core spray system performance evaluation performed by the licensee and verified this information to be correct.

The inspectors found that performance criteria were reasonable and set commensurate with safety.

(7) Turbine Generator

The functions associated with the turbine generator were monitored under Category (a)(2) using a plant-level performance criterion based on reliability. The inspectors reviewed industry operating events associated with turbine generators and verified that the licensee identified the appropriated events in their industry operating event review.

The inspectors found that the performance criterion was reasonable and set commensurate with safety.

(8) Instrument Air System

The licensee had designated Functions IA-PF02, "Compressed air for the instrument air system," and IA-PF03, "Dry compressed air used for the instrument air system," to Category (a)(1) for exceeding the unavailability performance criteria. The remaining instrument air system functions scoped in the Rule were monitored under Category (a)(2).

The inspectors found that performance criteria were reasonable and set commensurate with safety, corrective action for exceeding a performance criterion was adequate, and that preventive maintenance items were performed as scheduled.

(9) Heating and Ventilation System

The licensee monitored functions associated with the heating and ventilation system under Category (a)(2) using train or plant-level performance criteria. A performance criterion for Function HV-F03 was no more than two maintenance preventable functional failures during an operating cycle. The expert panel had determined that

Function HV-F03 was not a risk-significant system function. The inspectors noted that one potential maintenance preventable functional failure was assessed against Function HV-F03.

The inspectors reviewed Licensee Event Reports 50-298/95-016, "Control Room Emergency Filter System Inoperable During Refueling Operation Due to Personnel Error," and 50-298/95-019, "Control Room Emergency Filter System Inoperability Due to Unavailability of Emergency Diesel Generator." In both instances, a train of the control room emergency filter system was rendered inoperable because operators failed to properly align the system to support planned maintenance activities.

The licensee evaluated these events as operator errors and did not consider evaluating them as potential maintenance preventable functional failures. The inspectors noted that the definition of maintenance provided in NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," included all functions that support maintenance. The inspectors determined that a failure such as this, due to operator error in support of a maintenance activity, was a maintenance preventable functional failure.

The inspectors found that performance criteria were reasonable and set commensurate with safety and that preventive maintenance items were performed as scheduled. However, the lack of a requirement to evaluate operator errors for potential maintenance preventable functional failures represented a weakness in the licensee's program.

(10) Emergency Diesel Generators

The inspectors reviewed the 25 functions associated with the emergency diesel generators. All but one function were designated to be risk significant and were being monitored under (a)(2) using train level performance criteria based on reliability and unavailability. The remaining function was designated to be nonrisk significant and was being monitored under (a)(2) using a system-level performance criterion based on reliability. At the time of the inspection, 3 functions associated with the emergency diesel generators were approaching their performance criteria: DG-PF01b and DG-PF02b each had experienced 2 maintenance preventable functional failures, and one more would cause the affected function to be monitored under (a)(1); and DGDO-PF01a had unavailability approaching its 2.5 percent performance criterion.

The inspectors found that the performance criteria were reasonable and were commensurate with safety.

(11) Reactor Feedwater System

The inspectors reviewed eight functions associated with the reactor feedwater system. Two of the functions were assessed as risk-significant and were being monitored under (a)(2) using train-level performance criteria based on reliability and unavailability. The licensee had designated the other six functions as nonrisk significant, and they were being monitored under (a)(2), with four using system-level performance criteria based on reliability, and two using plant-level criteria.

The inspectors found that the performance criteria were reasonable and were commensurate with safety.

(12) Service Water System

The inspectors reviewed 23 functions associated with the service water system. The licensee had designated 10 of the functions as risk significant and they were being monitored under category (a)(2) using train-level performance criteria based on reliability and unavailability. The other 13 functions were being monitored at the system level using performance criteria based on reliability.

The performance of the service water pumps was adversely affected by silt in the river water. However, the pump performance trending program was adequate to indicate degrading pump performance, and schedule corrective maintenance.

The inspectors found that the performance criteria and monitoring were reasonable and were commensurate with safety.

(13) Turbine Equipment Cooling System

The inspectors reviewed the single function associated with the turbine equipment cooling system. The function was assessed as risk significant. It was being monitored under Category (a)(1) using a system-level goal based on the normal reliability and unavailability performance criteria to be accomplished within a specific-time period, namely prior to July 1998. The requirement to monitor under Category (a)(1) resulted from high unavailability, caused, in part, by

system maintenance outages to correct various component leakage, and in part by the apparent low priority for completion of maintenance after tags were placed, a practice which apparently ended when the system was recognized as being risk significant under the licensee's Maintenance Rule program.

The inspectors found that the goal was reasonable and commensurate with safety.

(14) Hydrogen/Oxygen Monitoring System

The licensee monitored the hydrogen/oxygen monitoring system under Category (a)(2) using system performance criteria, which were based on maintenance preventive functional failures.

The inspectors found that performance criteria were reasonable and were set commensurate with safety.

(15) Condensate System

The condensate system was being monitored under Category (a)(2) using plant-level performance criteria, which were based on maintenance preventive function failures and reactor scram.

The inspectors found that performance criteria were reasonable and were set commensurate with safety.

(16) Radiation Monitors

The licensee monitored radiation monitors under Category (a)(2) using plant-level performance criteria, which were based on emergency operating procedure maintenance preventive function failures.

The inspectors found that performance criteria were reasonable and were set commensurate with safety.

(17) Residual Heat Removal System

The licensee monitored the residual heat removal system functions under Category (a)(2) using train-level performance criteria and plant-level performance criteria, which were based on maintenance preventive function failures and unavailability.

The inspectors identified an error made in an evaluation that placed the performance criteria over the acceptance limit. As a result, this finding was initially identified as a violation of 10 CFR 50.65(a)(1).

The licensee supplied additional information, re-evaluated the components listed under the function, and demonstrated that there were numerous components listed under the function that did not support or contribute to the function. Therefore, the licensee was able to demonstrate that the performance criteria met the acceptance limit.

The inspectors reviewed the history of this issue by reviewing Problem Identification Reports 2-03307 and 2-03388 which documented that Function RHR-PF03 for Train A and B had not met the train-level performance criteria based on unavailability. The description of Function RHR-PF03 was to support plant hot standby and shutdown cooling operations by removing decay heat via the residual heat removal heat exchangers. The licensee reviewed the unavailability information and concluded that four valves, RHR-MOV-MO17, RHR-MOV-MO27A, RHR-MOV-MO66B, and RHR-V-368B, were added to the function's unavailability time conservatively and recalculated the unavailability without the times associated with the four valves. The new unavailability times were within the train-level performance criteria; therefore, the licensee downgraded the significance of the two problem identification reports. This downgrade eliminated the possibility of requiring a root-cause determination.

The inspectors requested that the licensee provide information used to downgrade the problem identification reports at which time the licensee re-evaluated the information. The licensee identified that three out of the four valves, RHR-MOV-MO17, RHR-MOV-MO27A, and RHR-MOV-MO66B, did effect the function. The licensee recalculated the unavailability times and determined that Train A unavailability time was greater then the train-level performance criteria; therefore, the problem identification report should not have been downgraded.

Train B unavailability time was less then the train-level performance criteria and was downgraded properly.

The licensee upgraded the problem identification report on Train A and performed an in-depth evaluation and determined that there were still numerous components listed under this function that had no contribution to the function. Removal of the components decreased the unavailability times to a current valve of 1.27 percent for Train A and 1.83 percent for Train B.

Apparently, if licensee personnel had not been questioned about the original assessment, the mistake would not have been identified. There were no procedural requirements that would have assured expert panel review and approval of changes made when the function started in (a)(2) and remained in (a)(2). Licensee representatives indicated that they planned to evaluate applicable procedures and make changes to preclude recurrence of this oversight.

b.2 Use of Industry-Wide Operating Experience

The Maintenance Rule, as implemented using the guidance in NUMARC 93-01, requires that industry-wide operating experience be taken into consideration, where practical, when establishing goals under Category (a)(1) or performance criteria under (a)(2).

The inspectors' review found that within the licensee's organization, an existing group was assigned responsibility to review and distribute information identified as operational experience. The group was further responsible for identifying where the information was specifically needed. Administrative procedures required the Maintenance Rule coordinator responsible for incorporating industry-wide operating experience into all elements of the licensee's Maintenance Rule program.

b.3 Monitoring and Trending

The statements of consideration for the Maintenance Rule indicate that where failures are likely to cause loss of an intended function, monitoring should be predictive in nature providing early warning of degradation. The licensee had assigned the responsibility for trending and evaluating the performance of system-related functions to the Maintenance Rule Group.

The inspectors reviewed monitoring and trending activities for various systems. The inspectors reviewed the documentation for the selected systems and noted that some predictive monitoring and trending was being performed. Many of the system and train-level performance criteria were based on unavailability and maintenance preventive functional failures. When a performance criteria for systems or trains were exceeded, or where a repetitive maintenance preventive functional failure occurred, the licensee established goals as required by Section (a)(1) of the Maintenance Rule.

The inspectors also noted that the system engineers had typical trending data from established programs, such as inservice testing, inservice inspection, motor-operated valve testing, Appendix J testing, and pump vibration. In addition, the system engineers reviewed nonconformance reports, problem identification and resolution reports, and selected maintenance work requests for identification of maintenance preventable

functional failures. Generally, system engineers were found to be familiar with the capabilities of databases to acquire and display data and information in tabular and graphic forms. Although the system engineers did not have input to the selection of monitored parameters, those parameters that were monitored provided a reasonable understanding of a system's health.

b.4 Corrective Actions

The inspectors reviewed the licensee's process and procedures for establishing corrective actions. The inspectors reviewed the corrective actions that were taken for the sample of systems that are addressed under Section M1.6.b.1 of this report and interviewed each of the maintenance or system engineers who had primary responsibility for performing root-cause determinations and establishing corrective actions. The results of this review for some of those systems are described below.

(1) High Pressure Coolant Injection

The licensee had placed the high pressure coolant injection function, PF01, in Category (a)(1) because the system performance had exceeded the standard unavailability performance criteria of 2.5 percent. Goals were established within the licensee's corrective action program. The goals were to continue monitoring against the same performance criteria and avoid an increase in average out of service time for two consecutive months, decrease the unavailability to less than 2.5 percent by March 1997, and maintain the unavailability below 2.5 percent until January 1998.

The inspectors determined that the unavailability increase was the result of problems with vacuum breakers that had since been replaced. Similar vacuum breaker failures were identified in the main steam system. A review of the maintenance history of vacuum breakers in five different applications (high pressure coolant injection, reactor core coolant isolation, main steam, and two containment isolation applications) found no significant pattern to necessitate placement of vacuum breakers in Category (a)(1).

(2) Instrument Air System

The inspectors reviewed Condition Report 96-0465, dated June 14, 1996. The purpose of this report was to determine why Functions IA-PF02 and IA-PF03 exceeded their performance criteria

for unavailability, develop corrective action, and propose goals. The inspectors noted that the report addressed the apparent root-cause, corrective action, and goals for monitoring under Category (a)(1) of the Rule.

The licensee classified Function IA-PF01 as risk significant and the performance criterion was no more than two maintenance preventable functional failures during the fuel cycle. The inspectors noted that two potential maintenance preventable function failures were assessed against Function IA-PF01.

The first failure was documented in Problem Identification Report 2-00256 on May 19, 1996. This report was initiated because of restricted air flow, possibly due to loose corrosion particles through the B instrument air dryer prefilter. The report was properly dispositioned to determine the apparent root cause of the failure in accordance with Administrative Procedure 0.5, "Problem Identification and Resolution," Revision 8.

A second failure was identified and documented in Problem Identification Report 2-04779 on July 23, 1996, of an instrument air dryer excessive moisture alarm.

The inspectors noted that Problem Identification Report 2-04779 was not dispositioned in accordance with the licensee's corrective action program in that an apparent root-cause evaluation of the failure was not required to be performed. Section 6.3 of Administrative Procedure 0.5 required that the corrective action program staff assign a condition report number to a problem identification report that described a condition adverse to quality. Section 9.2.2 of Administrative Procedure 0.5 specified that if the condition affected Maintenance Rule equipment, the condition report must address the root cause or apparent cause of the failure. Section 8.5.2.6 of Administrative Procedure, 0.27, "Maintenance Rule Program," Revision 1, required that the Maintenance Rule coordinator review the apparent root-cause evaluation and make the final determination if a maintenance preventable functional failure had occurred.

Although system engineering was aware that an apparent root cause was required for Problem Identification Report 2-04779, the inspectors could not determine if a root-cause evaluation would be performed because the problem identification report was not dispositioned in accordance with the licensee's corrective action program.

Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 1, January 1995, endorses NUMARC 93-01, "Industry Guidelines for Monitoring Effectiveness of Maintenance at Nuclear Power Plants," as an acceptable method for implementing the requirements of 10 CFR 50.65. Regulatory Guide 1.160 states that the methods described in the regulatory guide will be used in the evaluation of the effectiveness of maintenance activities of licensees who are required to comply with 10 CFR 50.65 unless a licensee has proposed an acceptable alternative method for compliance. The licensee subscribed to the NUMARC 93-01 methodology in Administrative Procedure 0.27, "Maintenance Rule Program," Revision 1, Section 2.2. NUMARC 93-01, Section 9.4.4, states in part, that a cause determination is required for a failure of a risk-significant structure, system, or component and for repetitive maintenance functional failures for any system, structure, or component within the scope of the Maintenance Rule, and that the cause determination identify the cause of the failure and any corrective action to preclude recurrence. Section 9.2.2 of Administrative Procedure 0.5, Problem Identification and Resolution, Revision 8, implements this NUMARC 93-01 requirement and specifies that if the condition affects Maintenance Rule equipment, the condition report must address the root cause or apparent cause of the failure and corrective action.

The failure to follow the requirements of Sections 6.3 and 9.2.2 of Administrative Procedure 0.5 when dispositioning Problem Identification Report 2-04779 was identified as a violation (50-298/9612-06).

(3) Heating and Ventilation System

Problem Identification Report 2-04776, dated July 22, 1996, was written to report excessive stroke time for Air-Operated Valve HV-AO-261. The licensee attributed the problem to a sticking solenoid valve. The report was not dispositioned in accordance with Sections 6.3 and 9.2.2 of Administrative Procedure 0.5 in that the need to evaluate for apparent root cause of the failure was not determined. The corrective action program staff did not identify that a condition adverse to quality had occurred that effected Maintenance Rule equipment and did not assign the problem identification report a condition report number. Although system engineering was aware that an apparent root cause analysis was required, the inspectors could not determine if an apparent root cause analysis should have been performed since the problem identification report was not dispositioned in accordance with the licensee's corrective action

program. The failure to follow the requirements of Sections 6.3 and 9.2.2 of Administrative Procedure 0.5 when dispositioning Problem Identification Report 2-04776 was identified as a second example of a violation (50-298/9612-06).

On September 10, 1996, the licensee submitted additional information for consideration. The inspectors' original characterization of this issue indicated that the licensee had failed to perform an evaluation to determine if maintenance preventable functional failures had occurred. The correct characterization was that the licensee failed to follow a procedural requirement to evaluate Maintenance Rule equipment failures for the root or apparent cause of the failures.

The inspectors noted that the four functions being monitored under Category (a)(1) were classified as (a)(1) because of unavailability exceeding the plant-wide performance criterion of 2.5 percent. Discussions with involved personnel revealed that, in general, the corrective action was focused on reducing the time a system was out of service for preventive maintenance. Licensee personnel suggested combining preventive maintenance activities, lengthening the interval between preventive maintenance activities, or eliminating some preventive maintenance as possible methods for improving availability.

c. Conclusions

c.1 Safety Consideration in Setting Goals and Performance Criteria

The licensee's program for monitoring the effectiveness of maintenance on structures was good.

The inspectors concluded that setting a goal under Category (a)(1) of attaining a performance level for unavailability identical to the established performance criteria under (a)(2) by a specified date is acceptable as long as preventive maintenance does not become inappropriately reduced to meet that time constraint. The risk determination process was appropriately taken into account when establishing the goals and performance criteria. Goals and performance criteria had been set commensurate with safety.

A weakness was identified in the area of evaluating maintenance preventable functional failures in that a failure due to operator error committed while supporting a maintenance activity was not considered a maintenance preventable functional failure.

c.2 Industry-Wide Operating Experience

The inspectors concluded that industry-wide operating experience was received by a responsible licensee program, which distributed the appropriate information to organizations responsible for implementing the Maintenance Rule. The licensee used industry-wide operating experience as the Rule intended.

c.3 Monitoring and Trending

The information available to the systems engineers for monitoring and trending activities was acceptable. The licensee's trending of function performance was satisfactory.

c.4 Corrective Actions

The licensee had in place a process for the root-cause evaluation. Corrective actions were usually appropriate. System engineers were knowledgeable of their assigned systems and were involved in the development and implementation of corrective actions. However the inspectors identified occurrences where corrective action program procedural requirements for addressing Maintenance Rule equipment were not followed. The licensee's failures to properly disposition issues in accordance with the corrective action process was identified as a violation.

M2 **Maintenance and Material Condition of Facilities and Equipment**

a. Inspection Scope (62706)

In the course of verifying the implementation of the Maintenance Rule, the inspectors performed partial walkdowns to examine the material condition of the systems listed below.

- Condensate
- Emergency Diesel Generators
- Feedwater
- H_2/O_2 Monitor
- High Pressure Coolant Injection
- Main Steam
- Reactor Equipment Cooling
- Residual Heat Removal
- Service Water
- Turbine Equipment Cooling

b. Observations and Findings

The inspectors found that the systems inspected appeared to be free of corrosion; oil leaks; water leaks; trash; and based on their external condition, well maintained, with the following exceptions:

- Welding cable was stored on the floor of the high pressure coolant injection room;
- Significant external corrosion existed on B service water pump;
- External exhaust piping for both emergency diesel generators was rusty; and
- Condensate pumps had a large number of small oil leaks.

c. Conclusions

Based on their external condition, most of the systems walked down appeared to be adequately maintained.

M7 Quality Assurance in Maintenance Activities

M7.1 Licensee Self-Assessment

a. Inspection Scope (62706)

The inspectors reviewed a quality assurance evaluation completed in March 1996 and a third party evaluation of the licensee's program performed by a consulting firm in July 1996. A report of an assist visit by an industry group team in May 1996 was also reviewed.

b. Observations and Findings

A thorough program audit had not been performed at the time of the inspection. The Quality Assurance Evaluation Report, dated March 12, 1996, identified issues with the timeliness of preparation for program implementation, a large dependence on contractor personnel, and a lack of knowledge about the Maintenance Rule by Cooper Nuclear Station personnel. The assist visit report, dated May 24, 1996, assessed the status of all required program elements and identified those elements requiring change or improvement prior to July 10, 1996. The third party evaluation, dated July 9, 1996, identified several changes that were needed in the licensee's process procedures to implement the Maintenance Rule as required.

c. Conclusions

A significant amount of program assessment had been done as indicated in the three reports above. The inspectors concluded that the two evaluations and the site visit had benefitted the licensee and contributed to the implementation of the Maintenance Rule Program. However, the inspectors could not reach a conclusion on the effectiveness of the licensee's self-assessment effort on the basis of one quality assurance evaluation.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.3 Review of Updated Final Safety Analysis Report (UFSAR) Commitments

A recent discovery of a licensee operating their facility in a manner contrary to the UFSAR description highlighted the need for a special focussed review that compares plant practices, procedures and/or parameters to the UFSAR descriptions. While performing the inspections discussed in this report, the inspectors reviewed the applicable portions of the UFSAR that related to the areas inspected. The inspectors verified that the UFSAR wording was consistent with the observed plant practices, procedures and/or parameters.

E4 Engineering Staff Knowledge and Performance

E4.1 Engineers Knowledge of Maintenance Rule

a. Inspection Scope (62706)

The inspectors interviewed the licensee's engineers within the system engineering organization to assess their understanding of the Maintenance Rule and associated responsibilities. The inspectors also reviewed the training that had been administered to system engineering personnel.

b. Observations and Findings

System engineers were knowledgeable of their assigned systems and had knowledge that was adequate to implement their program responsibilities. However, examples of a lack of knowledge about the Maintenance Rule by system engineers were identified during interviews.

- Some were not familiar with their system functions plant-level performance criteria.
- Some did not know how function performance criteria were developed.

- Some were not aware that their systems' performance criteria could be changed with the expert panels' agreement.

- Some did not know how a system could be removed from Category (a)(1).

- Some struggled with the database but were able to find information either by asking someone or by trial and error.

Interviews also revealed that there was a lack of site experience within the system engineering group. One inspector found there was only 2 years of Cooper-site experience spread among four system engineers that were interviewed.

The inspectors reviewed the training that had been administered to familiarize various site personnel groups with their responsibilities under the Maintenance Rule program. Two 4-hour training sessions had been developed and administered by the site training organization. These sessions on the Maintenance Rule and the licensee's program were administered to operations, maintenance, scheduling, planning, and engineering personnel. In addition, licensee representatives indicated special training sessions had been administered to system engineering and expert panel personnel to provide guidance in the performance of their Maintenance Rule program responsibilities. Some of this training was performed at expert panel or engineering staff meetings in the form of seminars or tailboard sessions.

A records review indicated that 4 of the 17 current system engineering incumbents did not receive the initial training that was intended for all system engineers. The inspectors noted that a majority of the tailboard session records were accompanied by sign in sheets. However, attendance at the additional formal sessions specifically for system engineering could not be verified.

c. Conclusions

The inspectors concluded that system engineering personnel knowledge was adequate to carry out assigned program responsibilities, even though poor knowledge on the part of some was identified.

The attendance at training administered to system engineering and expert panel personnel was not adequately documented, and poor attendance at training sessions may have contributed to the pockets of poor knowledge identified by the inspectors. The inspectors considered the licensee's training related to the Maintenance Rule program to have been poor.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors discussed the progress of the inspection on a daily basis and presented the inspection results to members of licensee management at the conclusion of the onsite inspection on August 16, 1996. In addition, a supplemental telephonic exit was held on September 6, 1996, to discuss the enforcement findings from the inspection. During this exit, the licensee presented new information on the potential violations. A second telephonic exit was held on October 3, 1996, to discuss the results of additional inspection in response to the additional information provided to the inspectors. Licensee management acknowledged the findings presented.

The inspectors asked the licensee staff and management whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Billesbach, Supervisor, Scheduling
M. Boyce, Senior Manager, Engineering
T. Carson, Supervisor, Maintenance
L. Christiansen, Maintenance Rule Coordinator
F. Diya, Manager, Engineering Support
J. Flaherty, Supervisor, Mechanical Design Engineering
C. Gaines, Manager, Events Analysis
M. Gillan, Supervisor, Corrective Action Program
R. Godley, Manager, Station Licensing
P. Grahm, Site Manager
J. Herron, Plant Manager
B. Houston, Manager, Licensing
S. Jobe, Superintendent, Operations Training
C. Moeller, Licensing Engineer
B. Newell, Supervisor, Instrument and Control Maintenance
D. Olson, Supervisor, System Engineering
D. Pandya, Supervisor, Design Engineering
J. Salisbury, Supervisor, System Engineering
G. Smith, Manager, Quality Assurance Operations
M. Unruh, Supervisor, Maintenance
D. Van Der Kamp, Supervisor, Operations
R. Wachowiak, Supervisor, Reliability Engineering

OTHERS

K. Dowdy, Maintenance Rule Engineer, Omaha Public Power District
S. Floyd, Nuclear Energy Institute
J. Johnson, Maintenance Rule Engineer, Omaha Public Power District
J. Loynes, Maintenance Rule Staff Contractor
D. Potter, Maintenance Rule Staff Contractor
D. Rains, Nuclear Energy Institute
E. Wasil, Reliability Engineering Contractor

NRC

S. Black, Chief, Quality Assurance and Maintenance Branch, NRR
R. Correia, Chief Maintenance and Reliability Section, NRR
M. Miller, Senior Resident Inspector
D. Powers, Chief, Maintenance Branch, Region IV

INSPECTION PROCEDURE USED

IP 62706 Maintenance Rule

LIST OF ITEMS OPENED

Opened

50-298/96012-01	VIO	Failure to include four nonsafety-related systems functions within the scope of the Maintenance Rule program.
50-298/96012-02	VIO	Failure to demonstrate that performance criterion for reliability preserved the assumptions used in the PRA.
50-298/96012-03	VIO	Failure to adequately monitor and track unavailability performance criteria for some systems during periods of time when the reactor was subcritical.
50-298/96012-04	VIO	Inadequate procedure to require the performance of risk assessment due to equipment failure or configuration change.
50-298/96012-05	VIO	Failure to initiate a risk-significant window checklist when required by procedure.
50-298/96012-06	VIO	Failure to perform root cause assessment of failures of Maintenance Rule equipment as required by procedure.

LIST OF PROCEDURES REVIEWED

AP 0.19	"Equipment Data File Program," Revision 5
AP 0.27	"Maintenance Rule Program," Revision 1
AP 0.27.1	"Periodic Structural Inspections of Structures," Revision 0
AP 0.27.2	"Maintenance Rule Program Goal Setting," Revision 0
AP 0.27.3	"Maintenance Rule Program Periodic Assessment," Revision 0
AP 0.49	"Schedule Risk Assessment," Revision 1
AP 0.5	"Problem Identification and Resolution," Revision 8
EP 3.4.3	"Modification Package," Revision 11
MRI 001	"Scoping Guidelines," Revision 0
MRI 002	"Risk Significance Determination," Revision 0

MRI 003 "Performance Criteria Development and Performance Evaluation," Revision 0

ENCLOSURE 3

Facsimile from Chris Moeller (NPPD) to Dale Powers (NRC) dated September 10, 1996

Nebraska Public Power District
Cooper Nuclear Station

FACSIMILE INFORMATION TICKET

TRANSMIT TO:

Recipient Name DALE POWERS

Company NRC - REGION IV

City, State

Facsimile Number 817 860 8212

Confirmation Number X

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TRANSMITTED FROM:

NEBRASKA PUBLIC POWER DISTRICT
P.O. Box 98
Brownville, NE 68321

Name CHRIS MADSEN

Department CNS - LICENSING

Facsimile Number: (402) 825-5211
Facsimile Confirmation: (402) 825-3811

REPLY TO SEPTEMBER 6, 1996, MAINTENANCE RULE INSPECTION EXIT
COOPER NUCLEAR STATION

The District appreciates the opportunity to provide additional information regarding the findings of the NRC's recent Maintenance Rule Baseline Inspection.

The District has made a concerted and diligent effortto comply with the letter and intent of the Maintenance rule. The District supports and participates in several industry groups active in pooling knowledge and experience in implementing the Maintenance Rule, and maintains contact with many individuals who have experience and expertise in this area. The District is committed to these activities to ensure that the latest information and industry positions are reflected in the Maintenance Rule program at CNS.

In view of this effort and the results of the inspection, we would like to come to the most complete understanding of how so many potential violations persisted through the inspection, both for the sake of the District as well as for the purpose of sharing this information with our associated industry groups.

The potential violations and the District's position are set forth in items A through F below:

A. 10 CFR Part 50.65, paragraphs (b)(1) and (b)(2) require that structures, systems, and components that meet any of the following criteria are included in the scope of the Maintenance Rule:

1) Safety related structures, systems, or components
2) Nonsafety related structures, systems, or components:
   a) that are relied upon to mitigate accidents or transients or are used in plant emergency operating procedures; or
   b) whose failure could prevent safety related structures, systems, and components from fulfilling their safety related function; or
   c) whose failure could cause a reactor scram or actuation of a safety related system.

The inspection team noted that the district failed to include the following systems or components in the scope of the Maintenance Rule:

[1] Area radiation monitors that are listed in Table 10 of EOP 5A as components that are used in plant emergency operating procedures
[2] Process radiation monitors in function RMP-F02 ascomponents whose failure could cause a reactor scram

[3] Communications system (Gai-Tronics) in function IC-F01 as components that are used in plant emergency operating procedures

[4] Auxiliary Steam system in functions AS-F01, AS-F04, AS-F07, AS-F10, AS-F13, and AS-F14 as a system whose failure could prevent safety related structures, systems, and components from fulfilling their safety related function

The District agrees that items [1] and [2] should be in scope. For items [3] and [4], the District believes a reasonable and diligent effort was made to determine whether these items should be included within the scope. The process used to reach the CNS determinations followed the guidance of NUMARC 93-01, Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants. The NRC reached different conclusions, perhaps by a different process. The District would appreciate an opportunity to gain an understanding of the NRC's reasoning in these two instances. We are interested in how the use of the NUMARC guidance led to a different outcome.

Discussion of Case [1]

During the review of EOP flowcharts, Table 10, "Secondary Containment Radiation Levels" was inadvertently overlooked.

The District agrees that these components should be in scope of the maintenance rule, and the components were added. A review of CNS work history was performed, and it was determined that none of these components experienced failures during the historical review period.

CR 96-0702 was initiated to determine if there were any other EOP components missing from scope. This effort is in progress.

Discussion of Case [2]

During the initial scoping, it was assumed that adequate time existed for Operations to respond to a failure of the process radiation monitors in RMP-F02 to avoid a plant shutdown. Based on further discussions with Operations personnel, this position has been re-evaluated.

The function was placed into scope and a history of failures was performed. There were no failures found during the historical review period.

CR 96-0718 was initiated to resolve this problem. Since RMP-F02 has already been placed into scope, it is not likely that any other actions will be necessary.

Discussion of Case [3]

NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, provides the following guidance on EOP equipment that should be included in scope:

> *8.2.1.3 Nonsafety-Related SSCs that are used in Emergency Operating Procedures*
>
> *Are the nonsafety-related SSCs used in plant Emergency Operating Procedures (EOPs)?*
>
> *This step requires an evaluation be performed to identify important nonsafety-related SSCs under utility control that are used in EOPs. For a nonsafety-related SSC to be considered important, it must add significant value to the mitigation function of an EOP by providing the total or a significant fraction of the total functional ability required to mitigate core damage or radioactive release (e.g., required quantity of water per minute to fulfill the safety function). Nonsafety-related SSCs used in EOPs that are under the control of a utility and are important as established above are within the scope of the Maintenance Rule. Utilities should establish maintenance practices for important nonsafety-related SSCs used in EOPs consistent with their importance.*

In the Questions and Answers from NUMARC Industry Workshops on Implementation of the Maintenance Rule 10CFR50.65 held on August 4-6, 1993 in Atlanta, Georgia and on August 23-25, 1993 in St. Louis, Missouri, the following is found in question number 30 under Scoping:

> *Scope* ***30. How is significant contribution in the EOP determined?***
>
> *No specific value has been established. PRA data and expert panel reviews could be considered in the determination of significant contribution. See Section 8.2.1.3 of NUMARC 93-01 for an example.*

During the scoping review, the Expert Panel questioned the use of communication equipment during the performance of Emergency Operating Procedures. The Expert Panel established a Sub-Committee to perform a communications usage review.

The Sub-Committee consisted of one licensed Senior Reactor Operator and one member of the Maintenance Rule Program staff. The Sub-Committee was tasked with two activities:

1) determine if any communication equipment was specified for use by any Emergency Operating Procedure, and

2) identify the communication equipment utilized during performance of Emergency Operating Procedure steps requiring information exchange.

The Sub-Committee initially reviewed the EOPs to identify those procedure steps requiring information exchange. Documentation provided to the Maintenance Rule Baseline Inspection team identifies those procedure steps requiring communication. The Sub-Committee determined that use of any specific communication system was not mandated by the EOPs.

Each EOP procedure step requiring information exchange is identified in documentation provided to the Maintenance Rule Baseline Inspection team. For each of these steps, the Senior Reactor Operator identified the method of information exchange. The methods of information exchange include face-to-face, Gai-Tronics system, radio, TSC Bone Phone, and sound powered phone. When identifying the methods of information exchange, the Senior Reactor Operator utilized his knowledge of the plant in identifying the communication method he would utilize. If, in review of the EOP, the SRO recognized that a Gai-Tronics system phone was adjacent to the area of procedure activity, the Gai-Tronics system was identified as being used during performance of the step. The selection of a type of communication system was based on convenience. Any step identified as using the Gai-Tronics system could be performed utilizing the radio or face-to-face communication methods.

The Sub-Committee presented the results of the communications evaluation to the Expert Panel. The Expert Panel reviewed the study and determined the following:

1) CNS is provided with multiple systems to facilitate communication. At worst, any given communication system provides a maximum of 25% of the communication capability required by the EOPs. It was recognized that, should all installed communications hardware fail, sufficient manpower is available to provide effective communications during accident response when the Emergency Plan response personnel are in place.

2) Each communication system was determined to not provide a significant fraction of the total functional ability to mitigate core damage or radioactive release.

3) The failure modes of the communications systems are apparent, i.e. they are not subject to hidden failures.

The conclusion of the CNS Expert Panel was that the Gai-Tronics communication system did not provide "*the total or a significant fraction of the total functional ability required to mitigate core damage or radioactive release*", as previously referenced in NUMARC 93-01, and was not in scope.

Discussion of Case [4]

NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, states:

> *8.2.1.4 Nonsafety-Related SSCs Whose Failure Prevents Safety-Related SSCs from Fulfilling their Safety-Related Function*
>
> *Will the failure of nonsafety-related SSCs prevent safety-related SSCs from fulfilling their safety-related function?*
>
> *This step requires that each utility investigate the systems and system interdependencies to determine failure modes of nonsafety-related SSCs that will directly affect safety-related functions.*
>
> *As used in this section of the guideline, the term "directly" applies to nonsafety-related SSCs:*
>
> *1. Whose failure prevents a safety function from being fulfilled; or*
>
> *2. Whose failure as a support SSC prevents a safety function from being fulfilled.*
>
> *A yes answer identifies that the nonsafety-related SSCs are within the scope of the Maintenance Rule.*
>
> *A utility should rely on actual plant-specific and industry wide operating experience, prior engineering evaluations such as PRA,*

IPE, IPEEE, environmental qualification (EQ), and 10 CFR 50 Appendix R analyses.

Industry wide operating experience is reviewed for plant-specific applicability and, where appropriate, is included in utility specific programs and procedures. It is appropriate to use this information to the extent practical to preclude unacceptable performance experienced in the industry from being repeated. An event that has occurred at a similarly configured plant should be considered for applicability to the reviewing utility.

The determination of hypothetical failures that could result from system interdependencies but have not previously been experienced is not required. Failures subsequent to implementation of this guideline shall be addressed in the determination of cause, corrective action, and performance monitoring as described in Sections 8.0, 9.0 and 10.0.

The Expert Panel's initial review of the auxiliary steam functions concluded that a failure of the auxiliary steam functions would not directly cause any safety related SSC to fail its function. The Expert panel reviewed the CNS essential classification evaluation which required that a component be classified as essential if its failure would cause a safety related component to fail its function. No auxiliary steam component is classified as essential or EQ. Neither the PRA nor the IPE considered auxiliary steam important enough to model.

In addition, the Maintenance Rule review of Cooper Nuclear Station plant specific operating experience and industry operating experience did not identify any failure of a safety related system caused by a loss of auxiliary steam.

NUMARC 93-01 paragraph 8.2.1.4 states, "*The determination of hypothetical failures that could result from system interdependencies but have not previously been experienced is not required.*" The Expert Panel believes that failure of safety systems as a result of auxiliary steam failures is such a hypothetical case for Cooper Nuclear Station. Any subsequent failures of safety related systems caused by failures of auxiliary steam shall be addressed in the determination of cause, corrective action, and performance monitoring as described in Sections 8.0, 9.0 and 10.0 of NUMARC 93-01.

B. 10 CFR Part 50.65, paragraph (a)(2) allows structures, systems, and components to be excluded from monitoring under paragraph (a)(1) where it has been demonstrated that the performance or condition of a structure, system, or

component is being effectively controlled through the performance of appropriate preventive maintenance, such that the structure, system, or component remains capable of performing its intended function.

Furthermore, IP 62706 03.02.a.1 indicates that the use of performance criteria is a method of demonstrating satisfactory performance under paragraph (a)(2) of the rule; and it would be necessary for safety significant SSCs to establish both reliability and availability performance criteria.

The inspection team noted that unavailability for certain risk significant systems (HPCI, ADS, Diesel Generators, and RHR) was only monitored during power operations and not during shutdown conditions.

The District believes the means developed to monitor unavailability of the listed systems provides equivalent results, but are both simpler to implement as well as less ambiguous in interpretation than a more complex monitoring method that would include periods of cold shutdown.

Discussion

The Maintenance Rule program at CNS monitors risk significant functions for unavailability during periods of demand. The CNS PSA assumption of power operations was used as a basis for this demand (i.e. the time that the reactor is critical). CNS Technical Specifications can also be used to define the period of demand.

Technical Specifications require that certain configurations of equipment be operable at different times. HPCI is required when the PCS pressure is greater than 150 psig and prior to startup. SRVs are required when the PCS is greater than 0 psig and prior to startup. ADS logic is required when the PCS is greater than 113 psig and prior to startup. Two diesel generators are required when the reactor is critical and one is required during cold shutdown when fuel is being moved. Two subsystems of RHR are required when the PCS is greater than 0 psig and prior to startup. During cold shutdown, one subsystem of RHR is required if one subsystem of Core Spray is available, otherwise, two RHR subsystems are required.

One common demand period that can be defined is the period when the plant is in cold shutdown versus when it is not. An entry in the Shift Supervisor Log, status of the reactor head vent (open/closed), can be used to make this determination. Counting the period when the reactor is not in cold shutdown as the period of demand for risk significant functions would be an acceptable method of monitoring performance.

In response to this issue, a sensitivity analysis was performed by the District to change the formulas used to determine outage duration. The demand periods were modified to include the period following the reactor going sub-critical and the head vents open. This increased demand time a total of approximately 166 hours form January 1992 through December 1995. The effect of adding the demand and out of service time for the affected functions did not change the (a)(1) or (a)(2) status of any of these functions. (See Attachment 1 for a description of the sensitivity calculation.) It is therefore concluded that although using the head vent status as an indicator of the period of demand for risk significant functions may be more precise than the time the reactor is critical, hours critical are an adequate measure of demand.

The period during cold shutdown must be considered separately. While the Expert Panel recognizes five key outage safety functions as risk significant, the systems that provide those functions can vary greatly during the course of the outage. It therefore did not conclude that any of the individual system functions were risk significant during cold shutdown. In addition, the meaning of the quantified unavailability is substantially different during shutdown than power operation because the demand on the equipment is substantially different. For example, when a diesel generator is taken out of service during power operations, its loads are all typically available; however when it is out of service during the outage, many of the loads are also out of service. The same unavailability from these situations do not equate to equivalent increase in risk. The same type of argument should be considered for the required response and mission times of equipment in the various modes. It is therefore appropriate that shutdown functions are monitored only for failures and not for unavailability.

Actions to Enhance the Program

Since the data used to monitor unavailability when the reactor is not in cold shutdown is already available, it will be recommended to the Expert Panel that the period of demand for risk significant functions be marked by the status of the reactor head vent in the Shift Supervisor Logs. If approved, the current unavailabilities will be adjusted to reflect the change. As stated above, there will be no change in (a)(1)/(a)(2) status from this action.

We would appreciate an opportunity to discuss with the Staff the specific means favored for determining unavailability under shutdown conditions.

C. 10 CFR Part 50.65, paragraph (a)(3) requires that in performing monitoring and preventive maintenance activities, an assessment of the total plant equipment that

is out of service should be taken into account to determine the overall effect on performance of safety functions.

The inspection team concluded that procedure 0.49, Schedule Risk Assessment is inadequate to satisfy this requirement because it does not clearly state the responsibilities for station personnel to conduct risk evaluations for changes of plant configurations due to emergent work. Several examples of situations where work was performed without risk evaluation were found during the inspection, although not specifically identified in the exit. The District does not believe that any incidence existed in which the station configuration presented undue risk.

The District recognizes that improvements in the on-line risk assessment process are desirable. However, the District does not agree that procedure 0.49 is inadequate to satisfy paragraph (a)(3) of the Maintenance Rule. The District does agree, however, that the entire on-line maintenance process can be greatly improved to facilitate efficient work, cost savings, and more effective risk management.

We would appreciate an opportunity to discuss the applicability to this situation of the portion of the inspection manual discussed below. This information was factored into the District's conclusion that a violation may not be warranted in this case.

Discussion

Administrative Procedure 0.31, Equipment Status Control, states that the Operations department has overall ownership of the Equipment Status Control program and will control all deviations from normal configuration. As such, it is Operations that primarily maintains the safe configuration control of the plant. In April 1996, Administrative Procedure 0.49, Schedule Risk Assessment, was approved to provide a tool in evaluating the risk of on-line maintenance using PSA insights. This procedure provides guidance in evaluating the risk of planned maintenance for systems considered important in the PSA; as such, it was not intended for emergent work, which is primarily corrective in nature.

Procedure 0.49 currently cover the impact of emergent work on planned maintenance activities in the following steps:

4.2 System Schedulers are responsible for:

4.2.1 Scheduling of planned or emergent work activities into the appropriate work week.

4.2.2 Controlling the scope of work activities during schedule development and developing contingency schedules as required.

4.2.3 Performance of the Risk Significant Window Checklist.

8.5 IDENTIFICATION AND CONTROL OF EMERGENT WORK

8.5.1 Emergent work is identified and prioritized each morning at the PIR screening meeting. These jobs will be coded into the appropriate work week by the System Scheduler...

Procedure 0.49 erroneously stated that it was the System Scheduler that incorporated emergent work into a frozen schedule, when in fact, the Work Week Supervisor typically performs this function. Because of this, planned work schedules were not always re-evaluated when emergent work was added prior to the work being performed. A back end review of this work, however, indicated that no unacceptable safety function performance has resulted from the removal of plant equipment from service.

The NRC Inspection Manual, Inspection Procedure 62706, Maintenance Rule, Appendix A, Enforcement Guidance, page A-2, paragraph 4 states:

> *Since the rule states that, in performing monitoring and preventive maintenance activities, an assessment of the total plant equipment that is out of service should be taken into account to determine the overall effect on performance of safety functions, the failure to perform this assessment would not be a violation.*

Detailed cumulative schedule risk assessments had been performed by the station during the early part of 1996, during the development phase of Administrative Procedure 0.49. This assessment went line by line through the schedule and documented whether each activity was risk significant or had the potential to trip the plant. Each activity then had a cumulative risk determination as well as provided any comments or clarification for the activity risk rating. A summary of risk insights for the week and systems to remain in service was also performed. These weekly assessments were found to be very manpower intensive (3 to 4 man days to perform per schedule) and produced very insignificant risk insights. To provide risk assessment trending, Reliability Engineering started monitoring the instantaneous and cumulative risk impact with the inception of and in accordance with Administrative Procedure 0.49 to perform a back end review of maintenance

activities. The trending from these reviews indicated that there was no significant increase in risk as a result of maintenance activities, indicating detailed up-front manual evaluations were not warranted for current maintenance practices.

A number of inquiries were made by the NRC's Mr. Wilson about various maintenance activities that occurred during the time period from July 10, 1996, to the time of the inspection. These inquiries, as recorded in the Cooper Maintenance Rule audit data base and Cooper NRC response team notes, are presented below. An analysis by the station of the maintenance activity risk significance is also provided. While it is acknowledged that this is not a complete list of all the information that was looked at by the inspectors, it is felt to be representative of the types of information reviewed.

Maintenance Work Request Number	Maintenance Activity and Risk Assessment
95-4350	Replace LIS-101B High Side Vent Valve. This level indicating switch provides 1 input in a one out of two twice logic for reactor scram and PCIS Group 2,3 and 6 isolation. Maintenance was performed during surveillance testing for this logic when a half scram/isolation was in place. While LIS-101B affects the NBI function, only having one of the four out of service is not risk significant per the procedure 0.49 Risk Significant Window matrix.
96-1125	Perform an internal inspection of DG2 muffler bypass valve. The DG was disabled for the duration of this job, making it a risk significant evolution per procedure 0.49. A Problem Identification Report (PIR) was initially generated because no Risk Significant Window checklist was generated for this activity. Further evaluation found that risk had been adequately assessed, though not documented. See potential violation D (below) writeup for further details.
96-0146	Replace FT-97B High Side Drain Valve. This Service Water Flow transmitter for B RHR heat exchanger was valved out of service and blocked to replace this valve. Both RHR and SW functions and operation were unaffected by this maintenance. The

	procedure 0.49 Risk Significant Window matrix considers this non risk significant.
96-0162	Install new RCIC-PI-66 indicator. This pressure indicator provides indication of RCIC suction pressure and is used for indication only. This maintenance isolated the pressure indicator from the system and did not affect RCIC operation or function. The procedure 0.49 Risk Significant Window matrix considers this non risk significant.
96-1287	Drain oil and inspect slinger ring for B CRD pump inboard bearing. This maintenance required removing the B CRD pump from service to perform this maintenance. Procedure 0.49 Risk Significant Window matrix considers this non risk significant.
96-0097	Replace DGLO-PI-3144 pressure gage. This maintenance isolates and replaces the DG1 lube oil filter outlet pressure indicator. The DG operation and function is not affected by this maintenance. The procedure 0.49 Risk Significant Window matrix considers this non risk significant.

A request was made as to the type of maintenance that was performed on 7-26-96 at 9:40 pm on SW Loop A based on an entry in the Shift Supervisors log. The log revealed that a problem existed with the A SWBP vibration instrument that was used during surveillance testing. A different probe was used and vibration was determined to be acceptable. No maintenance was performed, the SWBP was not blocked out of service during the questionable vibration indication and SW system operation and function were not affected. Procedure 0.49 Risk Significant Window matrix considers this non risk significant.

A request was made to determine the effect of performing surveillances 6.SW.401 and 6.SW.402. Reviewing these surveillances found that they test the service water check valves to the Diesel Generators. Each of the two Diesel Generators on site has two service water cooling supplies, one from each of the two Service Water headers. These surveillances test one of four check valves in the Service Water supply lines to the Diesel Generators at a time. Therefore, during the surveillance, neither the Diesel Generators nor the Service Water headers is made inoperable

nor unavailable. Procedure 0.49 Risk Significant Window matrix considers this non risk significant.

None of the above examples indicated that inadequate management of risk had been demonstrated by the station. It should be noted that most of the inquiries made by the inspector concerned the performance of corrective maintenance rather than the performance of monitoring or preventive maintenance as required by both the Maintenance Rule and NRC Inspection Manual for the Maintenance Rule.

In the case of the Diesel Generator muffler bypass valve inspection, while a documentation of a risk assessment should have been performed, an after the fact review of the Risk Significant Window checklist did not reveal any risk management measures that were not performed.

The impact of these activities with other testing or maintenance activities that were occurring simultaneously were discussed with the inspector, but there were no instances where any risk significant combination was identified. This was validated by re-reviewing all maintenance activities that were included in the Maintenance Rule database and were provided to the inspector.

Actions to Enhance the Program

A revision to procedure 0.49 is in the review process that incorporates the correct responsibility for the risk assessment of emergent work. Upon approval, it will clearly identify the Work Week Supervisor as the individual responsible for this assessment, and will provide direction for performing that activity. During the interim, the Schedule Impact Form (the vehicle used to add emergent work to a frozen schedule) has been revised to include a signature by the Scheduling Supervisor indicating that the Schedule Risk Assessment has been performed per 0.49 prior to performing emergent work.

Measures are being taken to enhance the risk assessment process at Cooper Nuclear Station. At the time of the audit, the station realized that the assessment of emergent and cumulative schedule risk was a potential future vulnerability. In the future, more on-line maintenance is anticipated, which must be bounded by a more comprehensive risk assessment than is currently required. A more stream-lined and integrated risk assessment is planned to be implemented by the end of 1996 through the site's Life Cycle Maintenance Cost Management program. This program determines what routine maintenance to perform, and when and how to efficiently group maintenance activities. The program then lays out the equipment groups over a cycle schedule to manage the manpower loading and risk of planned

maintenance over this period. The program performs an integrated risk assessment both when the schedule is frozen and when emergent activities occur. It is anticipated that this program will enable the station to perform more on-line maintenance in a controlled and methodical manner.

D. Cooper Nuclear Station Administrative Procedure 0.49, Schedule Risk Assessment step 8.1.7 requires:

> *8.1.7 The System Scheduler shall use Attachment 2, Risk Significant Window Checklist, to prepare a Risk Significant Window for each window in Attachment 1, Risk Significant Windows.*

The inspection team found that for the internal inspection of Diesel Generator #2 muffler bypass valve on July 17, 1996, the Risk Significant Window Checklist was not completed by the System Scheduler. This would be a violation of Administrative Procedure 0.49.

The District does not disagree with the potential procedural violation. However, the station did not enter a configuration that constituted undue risk, and all of the compensatory actions that would have been required by Risk Significant Window Checklist were performed.

Discussion

As stated in section C (above) procedure 0.49 covers emergent work in the following steps:

> *4.2 System Schedulers are responsible for:*
>
> *4.2.1 Scheduling of planned or emergent work activities into the appropriate work week.*
>
> *4.2.2 Controlling the scope of work activities during schedule development and developing contingency schedules as required.*
>
> *4.2.3 Performance of the Risk Significant Window Checklist.*
>
> *8.5 IDENTIFICATION AND CONTROL OF EMERGENT WORK*
>
> *8.5.1 Emergent work is identified and prioritized each morning at the PIR screening meeting. These jobs will*

be coded into the appropriate work week by the System Scheduler...

In practice, the System Scheduler is not normally involved in schedule changes after the schedule is frozen. Schedule changes after the freeze date are requested by the Maintenance shops or the Work Week Supervisor and approved by the Scheduling Supervisor. The changes are administratively controlled by an internal routing sheet, called the Schedule Impact Form. In the case of the muffler bypass valve, the schedule was frozen on July 3, 1996 for work that was scheduled to start the week of July 15, 1996. The work on the DG was identified on July 11, 1996 and performed on July 17, 1996 A Schedule Impact Form was filled out for the DG and approved by the Scheduling Supervisor.

Corrective Steps Taken

When this problem emerged during the NRC Maintenance Rule Audit, a Problem Identification Report (PIR) was generated, because this maintenance activity would have been considered risk significant by procedure 0.49, and yet a Risk Significant Window Checklist was not filled out. During the investigation of this incident, the discrepancies in procedure 0.49 concerning responsibilities for evaluating emergent work were identified. As an interim corrective action, the Schedule Impact Form was revised to require the Scheduling Supervisor to assess the schedule change impact on risk as described in Procedure 0.49. An after the fact procedure 0.49 Risk Significant Window Checklist was also performed for this maintenance activity. It was found that all the compensatory actions and risk considerations that should have been performed, such as having an activity coordinator, generating a schedule "fragnet" for the evolution, conducting a prejob brief, and conducting a post job critique, were performed for this evolution.

A procedure change request for procedure 0.49 is in routing which incorporates this requirement. The procedure change request also requires Reliability Engineering to perform an overall assessment of the schedule when the schedule is frozen, and also provides clarification for some of the items in procedure 0.49 that the Scheduling Department found confusing. Consideration is also being given to determine how to assess the overall risk of minor maintenance, troubleshooting, and other typically low risk activities that could potentially change plant configuration.

In the long term, a more stream-lined and integrated risk assessment is planned to be implemented by the end of the year through the site's Life Cycle Maintenance Cost Management program. This program determines what routine maintenance to perform, and when and how to efficiently group maintenance activities. The

program then lays out the equipment groups over a cycle schedule to manage the manpower loading and risk of planned maintenance over this period. The program performs an integrated risk assessment both when the schedule is frozen and when emergent activities occur. It is anticipated that this program will enable the station to perform more on-line maintenance in a controlled and methodical manner.

E. 10 CFR Part 50.65, paragraph (a)(2) allows structures, systems, and components can be excluded from monitoring under paragraph (a)(1) where it has been demonstrated that the performance or condition of a structure, system, or component is being effectively controlled through the performance of appropriate preventive maintenance, such that the structure, system, or component remains capable of performing its intended function.

The inspector indicated that the Residual Heat Removal function RHR-PF03 to support hot standby and shutdown cooling operations was not dispositioned under paragraph (a)(1) when its performance criterion for unavailability was not met.

The District respectfully submits additional information, detailed below, which indicates that, in accordance with Administrative Procedure 0.27, a disposition was performed to address the systems failure to meet its performance criterion for unavailability. We believe this additional information might lead to a reconsideration of this matter as a potential violation.

Discussion

On July 9, 1996 two PIRs were written to address RHR-PF03 Out Of Service (OOS) time exceeding the 2.5% OOS performance criteria established for each train of that function. PIR 2-03308 was written against RHR-PF03 train B (RHR-PF03b) being 4.07% at the beginning of 1996 and PIR 2-03307 was written against train A (RHR-PF03a) OOS being 2.69% at the beginning of 1996.

The OOS values for the beginning of 1996 are derived from OOS data from the beginning of 1992 through the end of 1995. The 1992 through 1995 OOS data produces extremely conservative OOS values because all of the CICs in a given function are included in the analysis without regard for whether or not they cause unavailability of the function. (For instance, consider a small steam trap drain isolation valve included in a function. Assume that even if the valve fell out of the system, the function would not be affected. If this valve was tagged out for a packing leak during the 1992 to 1995 time frame, the OOS time associated with the necessary repair was accrued to the function OOS time.)

Because of this conservatism, when the OOS value from the 1992 to 1995 data (the baseline OOS time) is greater than the 2.5% OOS performance criteria, one of the first evaluations performed in response to the attendant PIR is an examination of what CICs contributed to the OOS time. A determination is then made of whether the CICs can cause the associated function to be rendered unavailable. OOS time for CICs that do not affect function availability is removed from the OOS database and the OOS time for the function is recalculated.

In response to the PIRs against RHR-PF03a and RHR-PF03b, the System Engineer examined the contributing components and recommended the removal of OOS time associated with the following CICs:

RHR-MOV-MO66B	RHR HX B BYPASS THROTTLE
RHR-MOV-MO27A	RHR LOOP A INJECTION OUTBOARD THROTTLE
RHR-MOV-MO17	RHR SHUTDOWN COOLING SUPPLY OUTBOARD ISOLATION
RHR-V-368B	B RHR HX STEAM SUPPLY SHUTOFF

After removal of these CICs, the OOS time for RHR-PF03a and RHR-PF03b was recalculated. The new baseline OOS values indicated that RHR-PF03a and RHR-PF03b should be dispositioned by the Expert Panel as (a)(2). The PIRs associated with RHR-PF03 were downgraded to Departmental Disposition Items but were not closed out, pending final disposition of the RHR-PF03 (a)(1)/(a)(2) status by the Expert Panel.

During the final assessment process prior to the Expert Panel meeting to disposition RHR-PF03, the System Engineer reevaluated the decision to remove all of the CICs listed above from OOS consideration. This reevaluation was based on the system engineer's review of the function description of RHR-PF03 and his subsequent realization that some of the CICs removed from OOS consideration could affect the shutdown cooling portion of the function.

The decision to reintroduce the OOS time associated with RHR-MOV-MO66B, RHR-MOV-MO27A, and RHR-MOV-MO17 resulted in the following OOS values:

RHR-PF03a baseline of 3.02%
RHR-PF03b baseline of 2.24%

Current (8/96) OOS value for RHR-PF03a of 2.4%
Current (8/96) OOS value for RHR-PF03b of 1.98%

The OOS time associated with RHR-V-368B was not re-introduced into the calculation because the time frame associated with the OOS of this CIC was when the plant was at full power and there was therefore no demand for the steam condensing mode of RHR.

Regardless of the CICs that were removed from the RHR-PF03a OOS database, the OOS time associated with RHR-PF03a exceeded 2.5% at the beginning of 1996 and at the time the PIR was written. The corrective action taken by the System Engineer of removing OOS time associated with RHR-V-368B is appropriate. RHR-PF03b is correctly identified as a candidate for continued monitoring in accordance with part (a)(2) of the Maintenance Rule. Both of these functions were pending (a)(1) evaluation by the Expert Panel, as directed by procedure 0.27, at the time of the baseline inspection. RHR-PF03a was never improperly dispositioned into (a)(2).

Actions to Enhance the Program

The District is considering a change to procedure 0.27 that would require Expert Panel approval prior to removing any OOS from the unavailability calculations. Until that evaluation is completed, the Expert Panel will review and approve evaluations that remove OOS from the unavailability calculations.

Activities Subsequent to the Inspection Concerning RHR-PF03

Further examination by the system engineer of the CICs populating RHR-PF03a and RHR-PF03b indicated that there were several CICs that make no contribution to the function of RHR-PF03. Removal of OOS for these CICs decreases the baseline RHR-PF03a OOS to 1.63% and RHR-PF03b baseline OOS to 2.13%. This baseline adjustment results in current OOS values of 1.27% for train A and 1.83% for train B. It was therefore recommended to the Expert Panel on September 4, 1996 that the OOS associated with those CICs be excluded from the unavailability calculation and that function RHR-PF03 be dispositioned as (a)(2) for continued monitoring under the Maintenance Rule. It was recommended that the PIRs associated with the excessive OOS time be closed out. The Expert Panel approved the recommendations.

It was also determined that the CICs in question are more appropriately monitored in function AOG-F01, since the purpose of these valves is to supply steam to the third stage air ejector in the AOG system. The function of AOG-F01 is to reduce activity of vent gases prior to the release to atmosphere and provide an alternate means of pressure control in accordance with EOPs. This function is not considered risk significant.

The following CICs were approved by the Expert Panel on September 4, 1996, for transfer to AOG-F01:

EE-STR-921MV	STARTER FOR RHR-921MV
RHR-MO-1485MV	RHR 921MV BYPASS
RHR-MO-920MV	STEAM SUPPLY TO AOG UPSTREAM SHUTOFF
RHR-MO-921MV	STEAM SUPPLY TO AOG DOWNSTREAM SHUTOFF
RHR-MOT-920MV	STEAM SUPPLY VALVE TO AOG EJECTORS
RHR-MOT-921MV	STEAM SUPPLY TO AOG DOWNSTREAM SHUTOFF
RHR-MOV-1485MV	RHR921MV BYPASS
RHR-MOV-920MV	STEAM SUPPLY TO AOG UPSTREAM SHUTOFF
RHR-MOV-921MV	STEAM SUPPLY TO AOG DOWNSTREAM SHUTOFF
RHR-V-1385	AOG STEAM SUPPLY MANUAL SHUTOFF
RHR-SW-1485MV	CONTROL SWITCH FOR RHR-1485MV
RHR-SW-920MV	CONTROL SWITCH FOR RHR-920MV
RHR-SW-921MV	CONTROL SWITCH FOR RHR-921MV
RHR-MOT-1485MV	RHR-921MV BYPASS VALVE
EE-MCC-Q(4A)	STARTER FOR RHR-1485MV(MO-1485)
EE-MCC-Q(10C)	STARTER FOR RHR-920MV(MO-920)

There is no effect on AOG-F01 by addition of these CICs, since AOG-F01 is appropriately monitored for MPFFs only, and none of the OOS time associated with the added CICs is MPFF related.

F. Cooper Nuclear Station Administrative Procedure 0.27, Maintenance Rule Program requires that a MPFF determination be performed for component failures. The applicable sections are:

> *8.5.2.2 System Engineers shall determine whether planned maintenance activities and component failures cause functions to be unavailable and provide determinations to the Maintenance Rule Coordinator via the Maintenance Rule Information Database. System Engineers shall:*
>
> *a. Identify function unavailability as a result of PM performance.*
>
> *b. Identify whether SSC failure results in functional failure.*
>
> *c. Identify whether the performance of a corrective maintenance activity will result in function unavailability.*

8.5.2.6 Following review of completed controlling documents, the Maintenance Rule Coordinator performs as follows:

a. Accrue unavailability time for functions based on PMID and STETS Input, including Shift Supervisor's Logs for equipment unavailability associated with conditions other than equipment failure.

b. Perform MPFF analysis based on PIR and MWR review per Attachment 1, Maintenance Preventable Functional Failure Overview, Attachment 2, MPFF Determination, and Attachment 3, Repeat MPFF Determination.

c. Revise current performance tracking databases to reflect accrual of MPFFs and unavailability.

The inspectors found two PIRs related to equipment failure that did not receive a MPFF determination. These PIRs were 2-04776 and 2-04779.

The District believes that the proper evaluations were completed prior to the inspection, and that no potential violation has occurred.

Discussion

A review of the Maintenance Rule Information Database indicates that both of these PIRs were evaluated by the appropriate System Engineers prior to the baseline inspection. Both PIRs contained CIC failures that were considered by the System Engineers to be FFs. These functional failures are being counted as MPFFs until the Maintenance Work Request (MWR) is closed and the cause of the failures can be determined. If the cause indicates that the failure was not maintenance preventable, the failure will no longer be counted against the performance criteria for the function(s).

PIR 2-04776 involved failure of a valve stroke time during performance of surveillance procedure 6.SC.201 on HV-AO-261AV. This component is a reactor building ventilation exhaust inboard isolation valve operator. While performing the test, the valve closing time was 16.09 seconds, which is greater than its operability limit of 12 seconds.

This component affects the following functions:

HV-SD1	Maintain Secondary Containment
SGT-SD1	Maintain Secondary Containment
HV-F03	Provide Reactor Building temperature, humidity control and air movement for personnel comfort and equipment performance.

The valve failure was evaluated by both the Heating & Ventilation and the Standby Gas Treatment Engineers. On July 24, 1996, it was determined by both the HV and SGT System Engineers that the functions to maintain secondary containment were not impacted because the failure of a stroke time test in which the valve will actually close is not a functional failure. Also on July 24, 1996, the test failure was identified by the HV engineer as a functional failure of HV-F03. It was recorded as a MPFF by the Maintenance Rule Coordinator in the maintenance rule database pending closure of the Maintenance Work Request. This is standard practice in the CNS Maintenance Rule Program.

PIR 2-40779 documented that Instrument Air Dryer A failed on July 22, 1996. This component affects function IA-PF03. The System Engineer performed an evaluation of this PIR on July 30, 1996, and entered it as a functional failure in the Maintenance Rule database. This is being counted as a MPFF pending the closure of the Maintenance Work Request.

Actions to Enhance the Program

No further actions are required since all functional failures are conservatively treated as maintenance preventable function failures until it can be proven otherwise.

Attachment 1

The NRC noted that the method used to calculate out of service (OOS) values for some functions may be non conservative. This concern is based on the fact that demand time is calculated from the time the reactor is taken critical to the time the reactor is scrammed or the mode switch is taken to shutdown. The NRC feels that this method does not take into consideration the period of time between reactor shutdown and reactor depressurization (cold shutdown) when certain functions may be required. The functions of concern are as follows:

ADS-PF01 Prevent over pressurization of the Nuclear System

DG-PF01 Provide Emergency Diesel power to plant equipment required for safe shutdown of the plant in emergencies

DG-PF02 Monitor and control system operation

HPCI-PF01 Provide high pressure emergency core cooling

RHR-PF01 Provide drywell and suppression pool spray to remove containment heat following a LOCA.

RHR-PF02 Restore and maintain reactor vessel coolant inventory after a LOCA and during shutdown conditions.

In response to this concern, the formulas used to determine outage duration were modified for the subject functions to include the period of time between shutdown and depressurization. This change increased demand time a total of approximately 166 hours from 1/92 through 12/95, as shown in the following table.

ORIGINAL OUTAGE START (SCRAM OR MODE SWITCH TO SD)	NEW OUTAGE START (RX HEAD VENTED)	ELAPSED HRS	AFFECTED MONTH	OLD DEMAND	NEW DEMAND
2/10/1992 7:30:00 PM	2/11/1992 7:12:00 AM	11.7	2/92	542	554
4/19/1992 7:00:00 PM	4/20/1992 12:58:00 PM	17.97	4/92	600	618
9/11/1992 7:04:00 PM	9/12/1992 4:00:00 PM	20.93	9/92	624	645
3/5/1993 2:00:00 PM	3/6/1993 2:40:00 AM	12.67	3/93	120	133
12/14/1993 1:34:00 AM	12/15/1993 6:10:00 AM	28.6	12/93	604	632
3/2/1994 5:47:00 PM	3/3/1994 10:41:00 AM	16.9	3/94	SEE BELOW	SEE BELOW
3/16/1994 7:45:00 PM	3/17/1994 8:42:00 AM	12.95	3/94	312	342
5/25/1994 10:00:00 PM	5/26/1994 11:57:00 PM	25.95	5/94	624	650
10/14/1995 1:24:00 AM	10/14/1995 7:27:00 PM	18.05	10/95	312	330
	TOTAL DEMAND CHANGE:	165.72			

Attachment 1 (Continued)

The effect of adding the demand and out of service time for the affected functions during depressurization and cooldown is illustrated on the attached spreadsheet. No function's OOS time was affected sufficiently to change the (a)(1) or (a)(2) status of the function.

The baseline OOS values for the beginning of 1996 are derived from OOS data from the beginning of 1992 through the end of 1995. The 1992 through 1995 OOS data produces extremely conservative OOS values because all of the CICs in a given function are included in the analysis without regard to their contribution to causing unavailability of the function.

This conservative approach is the primary contributor to the marked increase in RHR OOS time using the revised outage start times. Specifically, OOS time is accrued when RHR-MO-MO16A and RHR-MO-MO16B are tagged shut to allow placing RHR in shutdown cooling mode. These valves are the RHR pump minimum flow valves and must be closed during RHR shutdown cooling mode to prevent pumping reactor water inventory to the Torus. Tagging the valves shut does not render the function unavailable. In fact, the valves must be closed to enable the function. The OOS time associated with these valves during shutdown cooling operations could be removed on the basis of not causing a loss of function, and the associated OOS time for the RHR functions would be lower than currently documented.

CONCLUSIONS

Recalculation of OOS time had no impact on monitoring status of affected functions.

Increases in OOS values resulting from recalculation were primarily the result of the conservative method used to identify original baseline OOS time for functions.

In the future, demand time for the listed functions will be calculated to accrue up to the time the reactor is vented.

EFFECT ON FUNCTION OOS WHEN CALCULATING DEMAND UP TO TIME REACTOR IS VENTED									
FUNCTION	ORIGINAL BASELINE OOS VALUE	NEW BASELINE USING TIME TO VENT	DIFFERENCE IN OOS BASELINE VALUE	ORIGINAL CURRENT OOS VALUE	NEW CURRENT VALUE USING TIME TO VENT	DIFFERENCE IN OOS CURRENT VALUE	ORIGINAL MONITORING STATUS	CURRENT MONITORING STATUS	DIFFERENCE IN MONITORING STATUS
ADS-PF01a	0.03%	0.04%	0.01%	0.04%	0.05%	0.01%	(a)(2)	(a)(2)	NO CHANGE
ADS-PF01b	0.03%	0.04%	0.01%	0.09%	0.10%	0.01%	(a)(2)	(a)(2)	NO CHANGE
DG-PF01a	1.95%	2.21%	0.26%	1.69%	1.89%	0.20%	(a)(2)	(a)(2)	NO CHANGE
DG-PF01b	1.95%	2.21%	0.26%	1.78%	1.97%	0.19%	(a)(2)	(a)(2)	NO CHANGE
DG-PF02a	0.04%	0.04%	0.00%	0.33%	0.33%	0.00%	(a)(2)	(a)(2)	NO CHANGE
DG-PF02b	0.04%	0.04%	0.00%	0.56%	0.56%	0.00%	(a)(2)	(a)(2)	NO CHANGE
HPCI-PF01	3.84%	3.78%	-0.06%	3.04%	3.00%	-0.04%	(a)(1)	(a)(1)	NO CHANGE
RHR-PF01a	1.79%	2.38%	0.59%	1.36%	1.80%	0.44%	(a)(2)	(a)(2)	NO CHANGE
RHR-PF01b	1.79%	2.38%	0.59%	1.38%	1.82%	0.44%	(a)(2)	(a)(2)	NO CHANGE
RHR-PF02a	1.76%	2.47%	0.71%	1.33%	1.86%	0.53%	(a)(2)	(a)(2)	NO CHANGE
RHR-PF02b	1.76%	2.47%	0.71%	1.37%	1.90%	0.53%	(a)(2)	(a)(2)	NO CHANGE