

August 1, 1997

FOR: The Commissioners

FROM: L. Joseph Callan /s/
Executive Director for Operations

SUBJECT: THE MAINTENANCE RULE: MONITORING THE QUALITY OF 10 CFR 50.65(a)(3) AND METHODS FOR MONITORING ITS EFFICACY

PURPOSE:

To respond, in part, to the staff requirements memorandum (SRM) of April 11, 1997, regarding the maintenance rule and to inform the Commission about:

1. the staff's plans to monitor the quality of licensee safety assessments once the maintenance rule baseline inspections are complete and to ensure that inspection guidance is consistent with the requirements of 10 CFR 50.65(a)(3);
2. how the staff will assess the effect of the rule on the overall quality of maintenance, and ultimately on equipment performance, in order to determine the efficacy of the rule.

BACKGROUND:

The maintenance rule, 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," was issued on July 10, 1991, and became effective on July 10, 1996. The staff has periodically sent the Commission papers and provided briefings on the status of the maintenance rule, the last Commission paper being SECY 97-055, "Maintenance Rule Status, Results, and Lessons Learned," dated March 4, 1997. The staff briefed the Commission on the same subject on March 10, 1997. In response to the briefing, the Commission issued a staff requirements memorandum (SRM) on April 11, 1997, asking the staff to: (1) consider clarifying paragraph (a)(3) of the maintenance rule; (2) provide specific examples of weak programs or safety assessments found during baseline inspections and the staff's bases for its findings; (3) address how the staff would monitor the quality of the (a)(3) safety assessments and; (4) determine the efficacy of the rule in general. This Commission paper responds to the last two issues in that SRM, the other two issues are addressed in a separate Commission paper that will be before the Commission in the near future.

DISCUSSION:**Staff Plans for Monitoring the Quality of Safety Assessments**

During the baseline inspections, the staff evaluates each licensee's program for performing the (a)(3) safety assessments. This provides a measure of confidence that licensees have a program in place for performing adequate safety assessments. As noted in SECY 97-055, the staff has found weaknesses in licensee (a)(3) safety assessment methods and procedures; however, none was found unacceptable.

Once the baseline inspections are complete, implementation of the maintenance rule inspection program shifts to the resident inspectors who will use guidance provided in inspection procedure (IP) 62707 , "Maintenance Observation." One part of IP 62707 describes how to conduct the (a)(3) safety assessment inspections. The guidance states that licensees are expected (but not required) to assess the impact on safety prior to removing equipment from service for preventive maintenance. Resident inspectors (on a sampling basis) verify that safety assessments were performed before equipment was removed from service for preventive maintenance. However, the inspection procedure does not contain specific guidance regarding assessment quality. Current guidance is that, if the results of the licensee's (a)(3) safety assessment seem suspect on the basis of the resident inspectors' general knowledge, then the resident inspectors would review the issue with their management and with either the regional senior reactor analysts (SRAs) or the Probabilistic Safety Assessment Branch (SPSB) in the Office of Nuclear Reactor Regulation. If warranted, a special inspection using the baseline inspection procedure, IP 62706 , "Maintenance Rule," would be performed to assess the quality of the licensee's approach to the (a)(3) safety assessments.

The Commission, in its April 11, 1997, SRM, asked the staff to assess the wording of paragraph (a)(3) of the maintenance rule. In the other maintenance rule-related Commission paper noted above, the staff is recommending proposed rulemaking to require safety assessments should the associated regulatory analysis support such action.

Assessing the Efficacy of the Maintenance Rule

The maintenance rule was issued, in part, in response to the number of plant transients and trips caused by equipment performance problems. Therefore, the number of trips and transients due to ineffective maintenance serves as a measure of the efficacy of the maintenance rule. In addition, equipment performance parameters provide an indication of maintenance effectiveness. However, the extent to which the maintenance rule contributes to any trends in these areas cannot be definitively separated from other factors that influence licensee performance.

Implementation of the maintenance rule should have a more significant impact on those licensees with weak maintenance programs since many of the activities required by the maintenance rule were already being performed by those licensees that had effective maintenance programs. The maintenance rule should increase maintenance effectiveness because it requires licensees to establish goals and monitor performance, take corrective actions, periodically evaluate maintenance effectiveness, and adjust their maintenance programs accordingly. It also encourages the assessment of the impact of preventive maintenance on safety. Establishing goals and monitoring against those goals helps licensees determine whether plant equipment is

performing in accordance with expectations. This helps licensees identify problem equipment and thus gives them an opportunity to avoid or reduce failures. When goals are not met or failures occur, licensees take corrective actions to prevent recurrence of the failure; this should reduce the number of equipment failures with time. By periodically assessing maintenance effectiveness, licensees should develop a documented record of equipment performance and trends, and should be able to determine if the balance between equipment reliability and equipment availability is appropriate. Licensees will adjust their programs on the basis of what they learn from these periodic evaluations. Further, assessing the impact on safety of removing equipment from service for preventive maintenance should lead to better management of online maintenance and a better understanding of the risk associated with maintenance.

The staff from the Office of Nuclear Reactor Regulation (NRR) and from the Office for Analysis and Evaluation of Operational Data (AEOD) have discussed several means of obtaining information that would be useful in evaluating the efficacy of the maintenance rule. The staff will continue to pursue potentially useful techniques to be applied to the existing NRC performance indicators to focus on events more directly related to equipment problems. This might include identifying subsets of such indicators as scrams, safety system actuations, safety-system failures, and maintenance cause codes, that are the result of equipment problems. It might also include trending systems and components responsible for plant transients and licensee event reports (LERs). In addition, the staff expects to use the equipment performance data that will become available from the INPO's Equipment Performance and Information Exchange (EPIX) and Safety System Performance Indicator

(SSPI) systems to identify equipment performance trends.⁽¹⁾ The scope of equipment in EPIX includes all equipment within the scope of the maintenance rule. Useful data from this system includes unplanned equipment unavailability, failure rates, and numbers of repetitive maintenance-preventable functional failures. These quantitative measures can indicate overall trends in equipment performance. However, these quantitative measures cannot separate out the contribution attributable solely to the implementation of the maintenance rule.

In addition to assessing equipment and plant performance data, the staff will rely on qualitative assessments of licensee performance obtained from inspection reports, and the integrated assessments of licensee performance developed through the SALP process. The baseline inspection program demonstrated that some licensees have implemented monitoring and corrective action programs that are more robust than licensee programs that existed before the rule. As licensees complete the periodic evaluations required by the rule, the staff will obtain additional information about the effect the maintenance rule may have had on equipment and plant performance. However, since the periodic evaluations are only conducted once per fuel cycle and because of the lag time between changes in maintenance practices and equipment performance, the staff believes it will be unable to discern any overall trends for several cycles (at least five years).

In conclusion, the staff intends to assess the efficacy of the maintenance rule. Existing plant and equipment performance indicators will be used along with the inspection program and the SALP process and other techniques that would have to be developed. Although the staff should be able to draw conclusions related to trends in maintenance and equipment performance, the specific contribution of the maintenance rule will be a subjective assessment rather than a quantitative measure. The staff will inform the Commission of the results of its efforts.

COORDINATION:

The Office of the General Counsel has no legal objection to this paper. The Chief Financial Officer has reviewed this paper for resource implications and has no objections. The Office of the Chief Information Officer has reviewed this paper for information technology and information management implications and concurs.

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1. The staff's use of data from EPIX and SSPI was described in [SECY-97-101](#) , "Proposed Rule, 10 CFR 50.76, 'Reporting Reliability and Availability Information for Risk-Significant Systems and Equipment'," dated May 7, 1997.