

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, D.C. 20555-0001

April 14, 1997

**NRC INFORMATION NOTICE 97-18: PROBLEMS IDENTIFIED DURING MAINTENANCE  
RULE BASELINE INSPECTIONS**

Addressees

All holders of operating licenses, construction permits, and decommissioning-stage licenses for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to the problems identified during the 10 CFR 50.65 (maintenance rule) baseline inspections performed from July 1996 through February 1997. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. In addition, recipients are reminded that they are required to take industry-wide operating experience (including NRC Information Notices) into consideration, where practical, when setting goals and performing periodic evaluations under the maintenance rule. Since suggestions contained in this information notice are not NRC requirements, no specific action (other than those required by the maintenance rule) or written response is required.

Background

The NRC published the maintenance rule on July 10, 1991, as Section 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," of 10 CFR Part 50. The rule became effective, after a five year implementation period, on July 10, 1996. The rule requires licensees to monitor the effectiveness of maintenance activities for safety-significant plant equipment in order to minimize the likelihood of failures and other events caused by lack of effective maintenance.

The nuclear industry developed a guideline for implementing the maintenance rule, formerly Nuclear Management and Resources Council now known as Nuclear Energy Institute (NUMARC) 93-01, "Industry Guidance for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants (May 1993)." Revision 2 to NUMARC 93-01 was issued in April 1996 to address lessons learned from pilot inspections performed at nine nuclear power plants. In March 1997, the NRC issued Revision 2 to Regulatory Guide (RG) 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," which endorsed, with clarifications, NUMARC 93-01, Revision 2, as providing methods acceptable for complying with the provisions of the rule.

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4/23/97

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### Description of Circumstances

To ensure the effective implementation of the maintenance rule, the NRC staff is in the process of performing a baseline inspection at each licensed facility. These inspections began in July 1996 and are expected to be completed in July 1998. Inspection findings from the first 20 baseline inspections are discussed below; a list of the inspection reports that have been issued to date is provided in Attachment 1.

#### **1. Failure To Include Emergency Lighting and Communications Systems In the Scope of Rule**

In 10 CFR 50.65(b) the regulations require that the scope of the maintenance rule include nonsafety-related structures, systems, and components (SSCs) that are relied upon to mitigate accidents or transients or that are used in plant emergency operating procedures. On the basis of interviews of licensed plant operators at many sites, the NRC staff determined that operators typically rely on various types of communications systems (e.g., radios, telephones, public announcement equipment) when performing their duties during an accident or transient. In addition, operators rely on the emergency lighting system(s) to provide lighting to perform their accident or transient mitigation duties on a loss of normal plant lighting. Despite this reliance, a number of licensees had excluded emergency lighting and communications systems from the scope of the rule. The NRC staff has issued notices of violation to licensees for failing to include communications system(s) equipment and emergency lighting system(s) within the scope of the maintenance rule without adequate justification to show why the system(s) are not relied upon during accident or transient conditions.

#### **2. Failure To Establish Appropriate Reliability and Availability Goals and Performance Criteria**

Section 50.65(a)(1) requires that goals be established commensurate with safety. NUMARC 93-01 provides methods acceptable to the NRC for meeting 10 CFR 50.65 (a)(1) and (a)(2) requirements. Using the NUMARC 93-01 guidance, performance criteria that are used to demonstrate effective preventive maintenance for high safety significant SSCs should be established to ensure that reliability and availability assumptions used in plant-specific safety analyses are maintained or adjusted. Several licensees failed to demonstrate that goals and performance criteria requirements were established commensurate with safety. For example, several licensees established a single performance criterion for reliability (e.g., number of maintenance preventable functional failures [#MPFFs]/2 years) without an adequate technical basis. In some cases, when compared to the number of demands, the number of MPFFs allowed would be indicative of much lower reliability than the licensee assumed in its risk analysis. More specifically, licensees failed to demonstrate that the criterion preserved the assumptions defined by plant-specific probabilistic risk assessments, individual plant examinations, or other risk determining analyses. Also, several licensees failed to establish an availability performance criterion for certain high safety significant SSCs.

Section 50.65(a)(3) requires balancing the reliability achieved through preventative maintenance against the objective of minimizing unavailability. When establishing goals and performance criteria under 10 CFR 50.65 (a)(1) and (a)(2) of the rule, some licensees could not adequately perform that balancing because the reliability performance criteria for some SSCs were inadequate or SSC availability performance criteria were not established.

**3. Failure To Adequately Assess Risk Prior to Taking SSCs Out of Service for Monitoring or Preventive Maintenance**

Section 50.65(a)(3) states, in part, 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. Several licensees' processes and programs were found to be weak in assessing the safety impact of removing equipment from service for maintenance or monitoring.

- a. At one facility several examples were identified where the licensee underestimated the risk associated with plant configurations established for performing on-line preventive maintenance. For this facility, one unit was operating for extended periods with a power operated relief valve block valve shut and a pressurizer spray valve out of service. The licensee did not recognize that this configuration contributed to plant risk. As a result, on several occasions, the increase in core damage frequency associated with taking additional plant equipment out of service for maintenance was significantly underestimated.
- b. At other facilities, the licensees' processes for assessing safety impact were weak. Risk matrices and other risk assessment tools used by some licensee's for assessing the acceptability of taking combinations of equipment out of service were too limited in scope and in some instances, failed to include risk significant systems. Procedures for using these risk assessment tools did not always provide sufficient guidance on their limitations. In addition, personnel responsible for making these assessments were not always knowledgeable of the limitations of these tools.

**4. Failure to Include Decommissioning Stage Reactor SSCs Within the Scope of the Maintenance Rule**

As stated in Section 50.65(a)(1), the maintenance rule applies to "Each holder of a license to operate a nuclear power plant under Sections 50.21(b) or 50.22." During the Dresden Independent Safety Inspection 50-237/96-201; 50-249/96-201 (Accession Number 9612270052) the NRC inspectors identified that the licensee had incorrectly excluded from the scope of the rule certain Unit 1 SSCs that are required to ensure the spent fuel is maintained in a safe condition. Although the licensee had established appropriate surveillance activities for these SSCs, they had not established goals or performance criteria as required by the rule. They believed that Unit 1 was no longer considered an operating plant because it had been defueled and therefore did not come under the scope of the rule. However, the NRC inspectors confirmed that even though

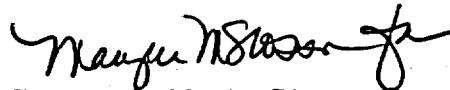
the Unit 1 license had been amended for possession only, it remained an operating license under Section 104 of the Atomic Energy Act, as described in 10 CFR 50.21(b) and, therefore, should have been included within the scope of the maintenance rule. The failure to include certain Unit 1 SSCs within the scope of the rule was identified as a deficiency.

The maintenance rule was amended effective on August 28, 1996 to clarify the requirements for nuclear power plants that had decided to terminate their license. Section 50.65(a)(1) now states that for a nuclear power plant for which the licensee has submitted the certifications specified in Section 50.82(a)(1), this section shall apply only to the extent that the licensee shall monitor the performance or condition of all SSCs associated with the storage, control, and maintenance of spent fuel in a safe condition, in a manner sufficient to provide reasonable assurance that such SSCs are capable of performing their intended functions. These requirements include setting goals or performance criteria for any SSCs required to maintain the spent fuel in a safe condition; monitoring against those goals or performance criteria, and taking appropriate corrective action when those goals are not met.

#### Discussion

In order to ensure industry-wide understanding, the staff has clarified these issues and others in Revision 2 to RG 1.160. In addition, as part of its efforts to maintain effective communication with the industry and the public regarding the maintenance rule, the NRC staff has developed a "Home Page" for the World Wide Web. The intent of the home page is to provide a comprehensive, up to date, resource of maintenance rule-related regulatory documents, guidance documents, inspection procedures, and inspection reports in a searchable format. The NRC staff will make the Home Page publicly accessible after prototype testing is complete.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.



Thomas T. Martin, Director  
Division of Reactor Program Management  
Office of Nuclear Reactor Regulation

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#### Attachments:

1. List of Maintenance Baseline Inspection Reports
2. List of Recently Issued NRC Information Notices

*Attachments Filed in Jacket*

## LIST OF MAINTENANCE BASELINE INSPECTION REPORTS

<u>PLANT</u>	<u>REPORT NO.</u>	<u>DATE ISSUED</u>	<u>ACCESSION NO.</u>
Palo Verde Units 1, 2 & 3	50-528/96-09 50-529/96-09 50-330/96-09	08/21/96	9608260100
Cooper Station	50-298/96-12	10/07/96	9610150125
Peach Bottom Units 2 & 3	50-277/96-07 50-278/96-07	10/09/96	9610210114
St. Lucie Units 1 & 2	50-335/96-13 50-389/96-13	10/16/96	9610310141
D.C. Cook Units 1 & 2	50-315/96-09 50-316/96-09	11/14/96	9611220150
Hatch Units 1 & 2	50-321/96-12 50-366/96-12	11/22/96	9612020162
Sequoyah 1 & 2	50-327/96-12 50-328/96-12	01/02/97	9701170016
Prairie Island Units 1 & 2	50-282/96-12 50-306/96-12	01/10/97	9701140119
Nine Mile Point Unit 1	50-220/96-12	01/15/97	9701240126
Perry Unit 1	50-440/96-14	01/29/97	9702050111
Washington Nuclear Project 2	50-397/96-18	01/29/97	9702030185
Indian Point 3	50-286/96-80	02/14/97	9702210210
Surry Units 1 & 2	50-280/97-01 50-281/97-01	02/20/97	9702250357(ltr) 9702250362(rpt)

**LIST OF MAINTENANCE BASELINE INSPECTION REPORTS (CONT.)**

<b><u>PLANT</u></b>	<b><u>REPORT NO.</u></b>	<b><u>DATE ISSUED</u></b>	<b><u>ACCESSION NO.</u></b>
Davis-Besse Unit 1	50-346/97-02	03/06/97	9703110189
Catawba Units 1 & 2			
	50-413/97-01	03/20/97	* not available
Waterford Unit 3	50-414/97-01		
	50-382/97-01	03/21/97	* not available

\* As of the date of this information notice, the inspection report had not been entered into the NRC NUDOCS system.

**LIST OF RECENTLY ISSUED  
NRC INFORMATION NOTICES**

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<b>Information Notice No.</b>	<b>Subject</b>	<b>Date of Issuance</b>	<b>Issued to</b>
97-17	Cracking of Vertical Welds in the Core Shroud and Degraded Repair	04/04/97	All holders of OLs or CPs for boiling- water reactors
97-16	Preconditioning of Plant Structures, Systems, and Components Before ASME Code Inservice Testing or Technical Specification Surveillance Testing	04/04/97	All holders of OLs or CPs for nuclear power reactors
97-15	Reporting of Errors and Changes in Large- Break Loss-of-Coolant Accident Evaluation Models of Fuel Vendors and Compliance with 10 CFR 50.46(a)(3)	04/04/97	All holders of OLs or CPs for nuclear power reactors and all reactor fuel vendors
97-14	Assessment of Spent Fuel Pool Cooling	03/28/97	All holders of OLs or CPs for nuclear power reactors
97-13	Deficient Conditions Associated with Pro- tective Coatings at Nuclear Power Plants	03/24/97	All holders of OLs or CPs for nuclear power reactors
97-12	Potential Armature Binding in General Electric Type HGA Relays	03/24/97	All holders of OLs or CPs for nuclear power reactors

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OL = Operating License  
CP = Construction Permit

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 original signed by M.M. Slosson

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Attachments:

1. List of Maintenance Baseline Inspection Reports
2. List of Recently Issued NRC Information Notices

DOCUMENT NAME: MR-IN.003 Tech Editor has reviewed & concurred on 03/18/97

\*See previous concurrence OFFICIAL RECORD COPY

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DOCUMENT NAME: MR-IN.0073

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DOCUMENT NAME: MR-IN.002

\*See previous concurrence

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