



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

February 4, 1997

MEMORANDUM TO: David B. Matthews, Chief  
Generic Issues and Environmental  
Projects Branch  
Division of Reactor Program Management  
Office of Nuclear Reactor Regulation

FROM: Stewart L. Magruder, Project Manager  
Generic Issues and Environmental  
Projects Branch  
Division of Reactor Program Management  
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF JANUARY 9, 1997, MEETING WITH THE NUCLEAR ENERGY  
INSTITUTE (NEI) ON MAINTENANCE RULE ISSUES

On January 9, 1997, representatives of NEI and several licensees met with representatives of the Nuclear Regulatory Commission (NRC) at the NRC's offices in Rockville, Maryland. Attachment 1 provides a list of meeting attendees.

The purpose of the meeting was to attempt to reach a common understanding on the staff's position regarding the following maintenance rule (MR) inspection issues:

- Technical Basis for Using Maintenance Preventable Functional Failures (MPFFs) as a Reliability Performance Criterion
- Use of Questions and Answers (Q&As) from the 1993 MR Workshops
- Scoping
- Timeliness of Dispositioning Structures, Systems, and Components (SSCs) from (a)(2) to (a)(1)
- Technical Guidance for Monitoring Structures
- Perceived Prescriptiveness in MR Inspections

Technical Basis for Using MPFFs as a Reliability Performance Criterion

The NEI and licensee representatives were concerned that the NRC staff had established a new interpretation of reliability performance criteria for safety (risk) significant SSCs that had not been previously identified as a generic safety issue during the pilot visits. The NEI and licensee representatives proposed to establish a common understanding which defines NRC staff expectations for establishing reliability performance criteria that

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could be linked to reliability assumptions used in the Probabilistic Risk Assessment (PRA)/Individual Plant Examinations (IPEs).

The NRC staff restated its concerns regarding the adequacy of reliability performance criteria established by some licensees and its proper link to the reliability assumptions used in PRA/IPEs as provided in a letter from Frank Miraglia, NRC, to Ralph Beedle of NEI, dated October 22, 1996 (Attachment 2). The staff noted that individual licensees should provide a technical justification that statistically links reliability performance criteria to assumptions used in the PRA or provide appropriate justification for any significant deviations from assumptions used in the PRA. The staff stated that using generic reliability performance criteria of two MPFFs per fuel cycle on safety (risk) significant SSCs without an adequate technical basis was not acceptable.

The staff reiterated that licensees do not have to count the number of actual demands for SSCs, but licensees could estimate the number of expected demands for most SSCs given the Technical Specification surveillance test and post maintenance test frequency for safety (risk) significant systems. Also, where risk-significant SSCs are not modeled in PRAs, an adequate technical basis would have to be provided.

The NEI and licensee representatives stated that they understood NRC's position on reliability performance criteria and that the industry would establish more appropriate reliability performance criteria for safety (risk) significant systems. NEI also stated that the industry would follow the guidance for establishing reliability performance criteria contained in Electric Power Research Institute (EPRI) Technical Bulletin 96-11-01, Monitoring Reliability for the Maintenance Rule, dated November, 1996, (Attachment 3) or other appropriate methods. Additionally, the industry stated that some form of condition monitoring (e.g., channel functional failure rates) would most likely be appropriate for some safety significant SSCs (i.e., Reactor Protection System).

The NRC staff stated that the approach to establishing and monitoring reliability performance criteria documented in the EPRI bulletin appeared reasonable; however, the NRC staff could not endorse this document. The NRC staff stated that other approaches to establishing and monitoring reliability performance criteria may also be considered acceptable.

#### Use of Q&As from the 1993 MR Workshops

NEI stated that the Q&As from the 1993 MR workshops were used to determine NRC's position regarding activities that can cause MPFFs. The NEI and licensee representatives determined from these Q&As that the NRC staff did not consider operator errors to be MPFFs. NEI did not understand the NRC staff's current position on operator errors which cause functional failures that could be considered MPFFs.

The NRC staff provided the NEI and licensee representatives with a letter from Suzanne Black, NRC, to Mr. Ray Ng of NEI, dated June 29, 1994, regarding industry's use of the Q&As from the 1993 MR workshops (Attachment 4). The letter states, in part, that "the staff's responses could change as more experience is gained during the implementation of the rule. Therefore, licensees should understand that these answers represent the staff's current thinking and that information gathered during future site visits, future workshops, or other activities prior to the implementation date of the rule, July 10, 1996, may affect these answers." Based on a discussion of the information provided in this letter, the NEI and licensee representatives stated that they now understand the staff's position on Q&As from the 1993 MR workshops.

The NRC staff also provided the NEI and licensee representatives with the NRC's policy statement on maintenance of nuclear power plants which was published in the Federal Register on March 23, 1988 (Attachment 5). This policy statement is referenced in NUMARC 93-01, Rev 0, in the definition of maintenance. This document defines the activities that form the basis of a maintenance program.

The policy statement states that activities that form the basis of a maintenance program include the following activities: surveillance, post maintenance testing, and return to service. Based on this, the staff determined that operator errors that cause equipment failures should be considered MPFFs if the operators are participating in surveillance, post maintenance testing or return to service activities following maintenance. This includes operator errors which occur during the removal of a system from service prior to surveillance testing or maintenance.

The NEI and licensee representatives stated that they need to explore this area further with regard to MR implementing procedures before taking these factors into account when determining MPFFs.

### Scoping

The NEI and licensee representatives were concerned that NRC inspectors were expanding the scope of the MR to include non-safety related SSCs, such as emergency lighting and communications systems, utilized to mitigate accidents and transients or used in emergency operating procedures (EOPs).

The NRC staff considers the scoping criterion of paragraph (b)(2)(i) of the MR to include all SSCs that are used to mitigate an accident or transient, or are used in the EOPs, that provide significant contribution to the mitigation function. Examples of SSCs that the staff believes should be considered include those communications and emergency lighting systems which are necessary for operators to successfully mitigate accidents, transients, and use the EOPs.

NEI stated that they believe that licensees and their MR expert panels should be given more flexibility in determining which SSCs add significant value to the mitigation functions of SSCs. They also stated, however, that they understood the staff's position on the matter and would inform all NEI members of the NRC staff's position on these SSCs.

#### **Timeliness of Dispositioning SSCs from (a)(2) to (a)(1)**

NEI stated that the complexity of the cause determination and corrective action process have led to a timeliness issue with regard to dispositioning SSCs from (a)(2) to (a)(1).

The NRC staff's position is that based on a review of NUMARC 93-01, Rev 0, the timeliness of dispositioning SSCs from (a)(2) to (a)(1) can be interpreted in a very broad manner. In NUMARC 93-01, Rev 0, Section 9.4, states that "the results of monitoring (including (a)(1) and (a)(2) activities) should be analyzed in a timely manner to assure that appropriate action is taken."

The timeliness of cause determinations and corrective actions in most licensee's programs should be linked to the safety (risk) significance of the SSC. The NRC staff believes that licensees' MR processes and procedures for cause analysis, cause determination, and corrective action should include MR dispositioning activities to complete the proper link of these activities to maintenance rule required activities.

The NRC staff recognizes that some cause analyses and cause determinations may involve difficult tasks to identify the exact cause for functional failures or MPFFs and under these situations licensees should be given flexibility to determine whether SSCs should be dispositioned from (a)(2) to (a)(1) with goals established. However, in cases where cause analyses and cause determinations are clear and straight forward, and the performance criteria has been exceeded, then timely corrective actions, dispositioning SSCs from (a)(2) to (a)(1), and establishment of goals should be completed during the same time period. In all cases, licensees should establish a reasonable schedule to accomplish all these activities.

#### **Technical Guidance for Monitoring Structures**

NEI also asked whether the NRC staff is planning to add additional guidance in regulatory guide (RG) 1.160, Rev 2, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," on methods licensees should use to disposition structures from (a)(2) to (a)(1).

The NRC staff stated that it plans to finalize RG 1.160, Rev 2, and issue it by the end of February, 1997. The staff stated that RG 1.160, Rev 2, will include guidance which generally states that a structure should be placed in the (a)(1) category if (1) degradation is to the extent that the structure may not meet its design basis, or (2) the structure is degrading such that if the degradation were allowed to continue uncorrected until the next normally

scheduled surveillance, the structure may not meet its design basis. The structure should remain in the (a)(1) category until the degradation and its cause have been corrected.

NEI stated that they plan on revising their own industry guidance document, NEI 96-03, "Industry Guidance Document for Monitoring Structures," in the near future.

#### **Perceived Prescriptiveness in MR Inspections**

Some licensee representatives initially thought that MR baseline inspections would only look at performance issues. After several NRC MR baseline inspections, they understood that the NRC staff's MR baseline inspection efforts were focused on program and performance issues. NEI has the perception that MR implementation was not going as smoothly as anticipated. NEI stated their desire to make MR implementation an excellent example of a successfully implemented risk-informed, performance based rule which other rules in the future could follow. They expressed concern that NRC inspectors are questioning expert panel decisions.

The NRC staff stated that the MR has both performance based and compliance based aspects. The staff agreed that MR baseline inspections have focused on MR program issues as was always intended and necessary. Licensees were using the guidance contained in NUMARC 93-01, Rev 0; however, some licensees took certain exceptions to NUMARC 93-01 to implement their program and each of these MR program exceptions had to be reviewed based on its own merits. The inspectors are appropriately questioning the bases for expert panel decisions and other MR related decisions. The headquarters oversight of MR baseline inspections is meant to ensure inspectors permit licensees maximum flexibility in implementing the MR.

The NRC staff stated that the MR is one of the first performance based regulations. Industry and the NRC have very little experience with these type of regulations. The MR baseline inspections have been somewhat focused on program issues because the staff believes that it needs to assess whether licensees have established adequate programs to consistently implement MR requirements. The staff expects that once a licensee has demonstrated that their MR program implementation is adequate, then NRC inspections would focus on performance issues. This is also the current inspection method employed by NRC site resident inspectors to verify compliance to the MR.

Project No. 689

Attachments: As stated

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NRC/NEI MEETING ON MAINTENANCE RULE ISSUES  
LIST OF ATTENDEES  
January 9, 1997

<u>NAME</u>	<u>ORGANIZATION</u>
Tony Pietrangelo	NEI
Doug Walters	NEI
Richard Favreau	TVA
Sharon Boardman	APS
Steve Ryan	APS
Marci Cooper	TVA
Wallace Colvin	Centerior Energy
Bruce Sheffel	Detroit Edison
Keith Fry	Southern Nuclear
Richard Wachowiak	NPPD
R. Levline	WPPSS
Zach Taylor	Duke Power
Thomas Turek	PECO Nuclear
Jim Lynde	Westinghouse
Gary Van Bladeren	AEP
Glenroy Smith	NYP&A
David Worledge	ARM-EPRI
Brian Felker	Duke Power
David Baker	Niagra Mohawk
George Wierzbowski	Niagra Mohawk
Dana Kelly	INEL
Lynn Connor	STS
Barry Sullivan	NUS
Altheia Wyche	SERCH-Bechtel
Bruce Boger	NRC/NRR
Lee Spessard	NRC/NRR
Suzanne Black	NRC/NRR
Jeff Shackelford	NRC/NRR
Rich Correia	NRC/NRR
Donald Taylor	NRC/NRR
JD Wilcox	NRC/NRR
Mark Rubin	NRC/NRR
Tom Bergman	NRC/NRR
Dan Lurie	NRC/OC
Frank Talbot	NRC/NRR
Stu Magruder	NRC/NRR





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

October 22, 1996

Mr. Ralph E. Beedle  
Senior Vice President  
and Chief Nuclear Officer  
Nuclear Generation  
Nuclear Energy Institute (NEI)  
1776 Eye Street, N.W., Suite 300  
Washington, D.C. 20006-3706

Dear Mr. Beedle:

I am responding to your letter of September 30, 1996, regarding your concern that the maintenance rule baseline inspections have identified a generic industry issue. Your letter described the NRC's position on the use of reliability as a performance "indicator," discussed the industry's choice of reliability performance indicators, and implied the NRC has established "new interpretations of compliance expectations through inspection and enforcement."

I, too, am concerned that the industry and regulatory guidance developed over the last several years may not be completely understood by the licensees, even though the nine site pilot visits did not reveal such a problem. My concern is based on the fact that, in four out of the five maintenance rule baseline inspections (MRBIs) completed by the NRC through October 4, 1996, potential violations of 10 CFR 50.65 (the Maintenance Rule) have been found in the area of goals and performance criteria that the licensees have established for reliability of systems, structures, trains, and components (SSCs). (A more detailed explanation of my concern is contained in the enclosure.)

Paragraph (a)(1) of the maintenance rule requires that "goals shall be established commensurate with safety ...." Although not a requirement, quantitative methods — with individual plant examinations (IPEs) or plant-specific probabilistic risk assessments (PRAs), for example, as the basis — have been used to establish this required link with safety. Your guidance document, NUMARC 93-01, ties the requirements for goals (10 CFR 50.65 (a)(1)) to similar requirements for performance criteria (10 CFR 50.65 (a)(2)). NUMARC 93-01, Paragraph 9.3.2, "Performance Criteria for Evaluating SSCs," states, "Performance criteria for risk significant SSCs should be established to assure that reliability and availability assumptions used in the plant-specific PRA, IPE, IPEEE, or other risk determining analysis are maintained or adjusted when determined necessary by the utility." It is the lack of a clear link to PRA/IPE/IPEEE or other reliability assumptions that is at the root of the NRC's concerns.

Maintaining the link between reliability assumptions in the plant-specific risk-determining analysis and the performance standards under the maintenance rule has been a longstanding position of the agency. For example, the meeting summary regarding the April 22, 1992, NRC/NUMARC public meeting for developing maintenance rule implementation guidance noted:

"The Industry Guideline allows but does not recommend or require the use of IPE/PRA results for performance criteria or goal setting. The NRC believes the maintenance (monitoring) results should be used to confirm performance and conditions (including component and train availability and reliability) in available IPE/PRA and other safety analysis results."

As indicated above, this concern was resolved prior to the NRC's endorsement of NUMARC 93-01.

The maintenance rule is a risk-informed, performance based regulation that requires licensees to provide reasonable assurance that SSCs remain capable of performing their intended functions. The NRC does not expect licensees to perform highly sophisticated, rigorous analyses to demonstrate that reliability performance criteria are mathematically equivalent to the values used in PRAs. Rather, our expectation is that licensees provide a reasonable and appropriate technical basis for selecting performance criteria to meet the regulation. However, it is expected that such approaches would incorporate some consideration of demands for standby systems and service time for normally operating systems.

Acceptable approaches exist for linking performance levels to safety (risk). During the nine pilot site visits performed to review early implementation of the maintenance rule, reviews of the licensees' goal- and performance criteria-setting processes were performed. As stated above, the inspectors found that licensees did understand the issues related to developing performance standards for reliability that were linked to safety. Several of those licensee programs described in significant detail the link to safety (risk) and justified the use of functional failures in the measure of SSC reliability. Therefore, the issue was not raised in the trip reports or meetings with NEI, since none existed.

In short, the NRC's position has been, and is, that performance standards -- goals and performance criteria -- must be demonstrably linked to safety, and our enforcement decisions will continue to be made based on licensee compliance with 10 C.F.R. 50.65.

October 22, 1996

As requested by your letter, a public meeting between the industry and the NRC was arranged and held on Tuesday, October 15, 1996, to discuss this issue. During that meeting, the staff and NEI agreed that additional guidance to the industry is warranted. On October 16, 1996, at an NEI workshop, discussions took place among industry participants to propose approaches to solution of the issue for further consideration. I anticipate that guidance on this issue will be promulgated by NEI at the earliest possible time so as to give those licensees that may not currently have acceptable reliability performance criteria the basis for making the necessary adjustments in their programs.

Sincerely,  
Original signed by  
Frank J. Miraglia

Frank J. Miraglia  
Acting Director  
Office of Nuclear Reactor Regulation

Enclosure: As stated

cc: Thomas E. Tipton  
Vice President, O&E Dept.  
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## THE RELIABILITY PERFORMANCE STANDARD

NUMARC 93-01 defines reliability as "(a) measure of the expectation (assuming that the SSC is available) that the SSC will perform its function upon demand at any future instant in time." Numerically, for normally operating SSCs, reliability is the complement of the ratio of the expected number of failures to a given time of required performance. The ratio of functional failures to a specified number of operating hours could be shown to describe a reliability level that could be related to the plant-specific PRA/IPE/IPEEE or other risk-determining analysis.

Likewise, for standby SSCs, reliability is the complement of the ratio of the expected number of failures to a given number of start demands and, once started, run demands. The ratio of functional failures to a specified number of attempted starts and attempted runs could be shown to describe a reliability level that could be related to the plant-specific PRA/IPE/IPEEE or other risk-determining analysis.

In four of the five maintenance rule baseline inspections conducted thus far, the licensees used maintenance preventable functional failures (MPFFs) over time as their reliability performance standard. For normally operating SSCs, that performance standard could be acceptable if it described a satisfactory relationship to plant-specific PRA/IPE/IPEEE or other risk-determining analysis. The onus is upon the licensee to demonstrate the satisfactory nature of that relationship, and those four licensees had not done so.

More of a problem, however, was their use of MPFFs over time as a performance standard for standby SSCs. As described above, the reliability calculation for a standby SSC must incorporate both failures and demands. All four licensees failed to incorporate demands in their calculations and, therefore, used unacceptable performance standards, clearly not demonstrating a relationship to plant-specific PRA/IPE/IPEEE or other risk-determining analysis.

Enclosure