



STATE OF ILLINOIS
DEPARTMENT OF NUCLEAR SAFETY
1035 OUTER PARK DRIVE
SPRINGFIELD, IL 62704
(217) 785-9900

THOMAS W. ORTCIGER
DIRECTOR

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JIM EDGAR
GOVERNOR

Regulatory Publications Branch
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and Publication Services
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Subject: NRC Draft Regulatory Guide DG-1020, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"

The Illinois Department of Nuclear Safety (IDNS) appreciates the opportunity to submit comments on NRC Draft Regulatory Guide DG-1020, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." IDNS believes that quality maintenance of systems, structures and components is a prime contributor to reactor safety at a nuclear power plant, and agrees with any effort that maintains or increases the margins of safety designed into plants.

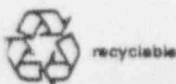
IDNS staff reviewed the 10 CFR 50.65 rule, the Draft Regulatory Guide DG-1020, and the NUMARC 93-01, Revision 2A, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." Before we comment on the four specific questions related to NRC endorsement of the draft guidance contained in NUMARC 93-01, we wish to comment on the 10 CFR 50.65 rule. It is our belief that the rule is not detailed enough to ensure consistent performance by all nuclear power plant owners. Historically, there have been widespread levels of performance in the nuclear industry, including several plants that were shut down because of poor performance. We do not believe a generic maintenance rule, with little detail on monitoring, preventive maintenance, performance or acceptance criteria, will ensure optimum maintenance practices nationwide, or provide the NRC with a clear technical basis to regulate maintenance in the nuclear power plants.

It appears to IDNS that either the rule or regulations associated with the rule need to be thorough and descriptive so that licensees know what is expected of them and the rule can be readily enforced. Otherwise, maintenance performance will continue to vary widely throughout the industry. We believe the NRC maintenance rule or a similar NRC regulatory document should address such factors as:

- performance measures and their bases
- performance trends and corrective action programs

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- failure histories
- root cause failure analysis
- risk significance analysis
- in-service inspection and test results
- vendor requirements and recommendations
- environmental effects (temperature, humidity, radiation)
- corrosion mechanisms
- structural degradation
- shelf life and items subject to degradation, such as elastomers
- continuity, voltage or current measurements
- vibration analysis (equipment)
- instrument precision, accuracy (calibration), and response time
- wall thickness measurements (piping components)
- valve stroke time
- bearing temperature monitoring
- infrared surveys (motors, circuit breakers)
- oil analysis (rotating equipment)

We think that the maintenance rule and the proposed NUMARC 93-01 Guideline will fail to provide the consistent implementation needed throughout the nuclear industry because they are far too general and lack specific criteria. We believe that the missing factors can be described in sufficient detail in NUMARC 93-01 to specify expectations for maintenance processes without being overly-prescriptive and without penalizing the majority of plants who perform well. Without this level of detail, however, those nuclear power plants that have exhibited maintenance weaknesses in the past may continue to be underachievers, due to the lack of specific direction on what constitutes acceptable processes for preventive maintenance, monitoring activities, and establishing performance criteria. This lack of direction is of special concern since the NRC does not plan to scrutinize in detail the maintenance programs of the licensees, and adherence to the NUMARC 93-01 Guidelines is not required of the licensees.

Detailed below are IDNS comments on the four specific questions for which the NRC is soliciting responses:

1. The license renewal rule, 10 CFR 54, contains requirements that are related to the maintenance rule. Is it possible to apply NUMARC 93-01 as written, or to modify the guidance, in order to not only satisfy the maintenance rule but also to address the requirements of the license renewal rule?

The answer to the first question is best discussed in relation to the NRC's own comments on the effects of aging as stated in the 10 CFR Part 54 Statement of Consideration sections IV.e.(ii)(1), (2), and (3). In consideration of these comments, an applicant for a license renewal may be able to use the structures, systems, and components (SSCs) as determined via the maintenance rule as a starting point for determining the SSCs that are important to

license renewal. But such a determination alone should not be used to define the scope of SSCs for license renewal. The pitfall of relying solely on the NUMARC document as the determinant of SSCs important to license renewal is that the analysis under the NUMARC document may not account for failure mechanisms that only reveal themselves subsequent to the current 40-year license. As an example of this potential conflict with the license renewal rule, see section 8.2.1.5 in NUMARC 93-01 that states, in part: "As indicated in the above paragraph (8.2.1.4), the determination of potential failures that could hypothetically occur but *have not been previously experienced* is not required."

2. In 10 CFR 50.65(a)(1), the maintenance rule calls for monitoring the performance or condition of structures, systems and components against licensee-established goals, and 10 CFR 50.65(a)(2) states that such monitoring is not required if the performance or condition of structures, systems, and components is effectively controlled through the performance of appropriate preventive maintenance such that the structure, system, or component remains capable of performing its intended function. The guidance being provided emphasizes the establishment of performance criteria to demonstrate that structures, systems, and components are effectively controlled through preventive maintenance. Is the guidance sufficiently clear that an affirmative demonstration is necessary that the established performance criteria have been met if a structure, system, or component is to be considered to be controlled under 10 CFR 50.65(A)(2)? If not, how could the clarity and consistency of the guidance be improved?

The guidance provided in section 9.0 sufficiently outlines the process of determining how and when paragraph 50.65(a)(2) applies. The NUMARC document adequately stresses the difference between monitoring an SSC under paragraph 50.65(a)(1) when the SSC does not meet the established performance criteria, and maintaining the equipment at the established performance criteria level in accordance with paragraph 50.65 (a)(2). Section 9.2 specifically states: "All SSCs determined to be within the scope of the Maintenance Rule are subject to an effective PM program as indicated by (a)(2) When SSCs in (a)(2) do not perform acceptably, they are evaluated to determine the need for goal setting and monitoring under the requirements of (a)(1)." Section 9.3.3 adequately addresses the method of evaluating the SSCs against the performance criteria and section 9.4.3 provides clear guidance for dispositioning SSCs from (a)(1) to (a)(2).

3. Both the statement of considerations for the maintenance rule (56 FR 31308, July 10, 1991) and NUMARC 93-01 refer to the concept of inherent reliability. Is this concept sufficiently clear, given the examples and discussion to describe the concept in NUMARC 93-01, or are there improvements that would help to better define this concept?

Further clarification of this concept appears to be warranted. The problem is the subjective nature of the term "high reliability." Perhaps a better definition would be to say that an SSC is of high reliability if it meets the licensee-established performance criteria with no preventive maintenance. Otherwise high reliability is too subjective; eg., is it 80%, 90%, 99%?

4. NUMARC 93-01 outlines methods based on probabilistic risk assessment (PRA) to determine risk significance of structures, systems, and components. Is this guidance clear and does it satisfactorily address low-frequency, high-consequence contributors (e.g., inter-system loss-of-coolant accidents and boiling water reactor anticipated transients without scram events), or are there improvements that would add to the clarity and completeness of this guidance?

It would appear that Sections 9.3.1.1 and 9.3.1.2 of NUMARC 93-01, entitled, Criteria Determination Method 1, and Criteria Determination Method 2, respectively, adequately encompass the questioned events.

General Comment

The process for selecting SSCs important to the maintenance rule as outlined in the NUMARC document includes the option of choosing SSCs based on their risk significance. The criteria for selecting SSCs important to license renewal in the license renewal rule allow a similar approach. Both allow for determining this risk significance through the use of a plant specific IPE/PRA. Since all licensees must submit an IPE that must be approved by the NRC, it would seem logical to use the IPE assumptions and data in both the selection of the risk significant SSCs and the performance criteria that the SSCs must satisfy. Moreover, from a safety perspective, it would appear prudent that all licensees be required to use the IPE/PRA methodology. Such a requirement would not pose any additional burden on the licensee other than to perform the IPE in the first place. The benefit gained by implementing such a requirement would be that it would tie together different regulatory requirements, the common denominator being the identified risk contributors in the IPE. While IDNS does not discount or discourage the use of deterministic methods in selecting SSCs important to the maintenance rule or plant life extension, we think they should be used in combination with probabilistic methodologies.

The maintenance rule can be thought of as ensuring that the failure rate used in the PRA/IPE does not increase, and thereby change the results of the IPE. Therefore, if the NRC approves a licensee's IPE as showing an acceptable amount of risk, i.e., below a certain core damage frequency, then as long as the failure rates used in the IPE submittal do not degrade the level of risk, as defined by the IPE core damage frequency number, this is acceptable and so is the level of maintenance.

Thus, the level of reliability assumed in the approved IPE could then become an important standard against which the maintenance program could be measured. As NUMARC 93-01 is currently written, the licensees can implement any standard they feel is appropriate. By using the IPE insights, the NRC would be able to more efficiently use their resources because they would not have to scrutinize several different methods of determining risk significance in order to be sure the right SSCs are being monitored to the proper level.

IDNS recognizes that SSC reliability data is the backbone of any method of attempting to accurately determine risk. We also recognize that it is the most difficult to obtain accurately. Consistency of assumptions between licensees on how this performance data is determined is critical to the validity and reliability of risk assessment results. IDNS also believes that the NRC should scrutinize each licensee's maintenance plan and the validity of the assumptions that went into it as part of the maintenance rulemaking.

The methodology in NUMARC 93-01 lists six specific ways of determining SSC reliability criteria, plus a seventh non-specific one that alludes to the acceptance of the use of "expert opinion." Use of expert opinion was a topic of much debate during the license renewal rulemaking, as it is recognized as a mechanism leading to inconsistent assumptions between submittals, hence, inconsistent risk conclusions between licensees.

IDNS, in previous comments submitted on the license renewal rulemaking, urged the NRC to apply insights from the IPE as an important element in the selection of the SSCs appropriate for license renewal. As pointed out in the discussion above, a similar situation exists for selecting the SSCs for applicability of the maintenance rule. IDNS believes the IFEs have many valuable safety applications and urges the NRC to: (1) establish firm criteria for determining SSC reliability in IPE submittals, so that consistency of assumptions across submittals is achieved, (2) review IPE submittals with the rigor assigned to new plant design approvals, and (3) require the licensees to maintain their IPEs up-to-date in a timely manner. In so doing, the NRC will also, in our opinion, increase the value of IPEs in other important safety areas, such as providing the basis for addressing remaining unresolved safety issues, determining what regulations are marginal to safety and are candidates for elimination, and focusing inspection activities.

Lastly, IDNS questions the statement on page 35 of the NUMARC 93-01 Guideline that "Documentation developed for implementation of this guideline is not subject to the utility quality assurance program unless the documentation used has been previously defined as within the scope of the quality assurance program." Will the NRC endorse NUMARC 93-01 but not audit the documentation resulting from the implementation of NUMARC 93-01, in accordance with 10 CFR 50, Appendix B? To do so seems inconsistent with current practice and intent of the regulation.

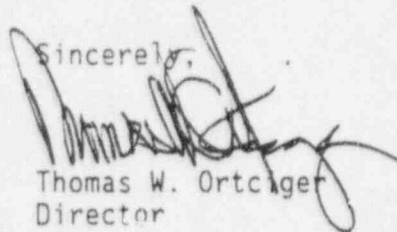
In summary, although we have addressed the four specified questions, we believe resolving these questions is not enough to improve overall maintenance

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at United States nuclear power plants. Only when specific criteria are mandated in a maintenance regulatory document with regard to goals, monitoring techniques, preventive maintenance, and performance standards will the NRC have the regulatory basis to enforce optimum maintenance practices in the United States.

IDNS believes that a performance-based maintenance rule is appropriate for the next generation of nuclear power plants if tied to the PRA for that design. However, a performance-based rule cannot be back-fitted to the existing generation of plants and enforced unless it contains adequate standards and requirements and is tied to a common methodology that ensures consistency across licensees. IDNS believes that common methodology should be established through the IPEs.

Sincerely,



Thomas W. Ortenger
Director

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