



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

OCT 27 1989

Mr. Zack T. Pate, President  
Institute of Nuclear Power Operations  
Suite 1500  
1100 Circle 75 Parkway  
Atlanta, GA 30339-3064

Dear Mr. Pate:

This letter responds to your letter of September 8, 1989, regarding nuclear plant performance indicators. I would like to take this opportunity to commend INPO for helping to achieve a consensus on a set of international overall performance indicators and to assure you that the NRC recognizes this important step forward for industry.

We noted two principal issues in your letter. First, you were concerned that emphasis by NRC, state regulatory agencies, and the public on specific indicators of licensee performance, such as unplanned scrams and forced outages, could cause unsafe practices or attitudes to develop among the operations personnel at commercial power reactor facilities. Secondly, you urged the NRC to adopt the recently agreed upon set of international performance indicators. Your letter also proposed the reshaping of NRC's Performance Indicator Program to accommodate your views on these issues and to abandon further development of indicators for the area of nuclear plant maintenance. This letter responds to these key issues raised by you and the enclosure responds to each of your six reshaping proposals.

INPO'S views, representing the organization created by the nuclear industry to carry out industry self-assessment activities, are valuable to the NRC. It is, however, NRC's responsibility, mandated by Federal law, to ensure that the public health and safety are protected with respect to activities licensed by NRC. In this connection, it is our policy not to overemphasize performance indicators versus other measures of safety performance, and we have cautioned others in this area. For example, our policy dictates that the Performance Indicator Program not be specifically referenced in SALP reports. Thus, we are deeply concerned by your perception that the NRC uses performance indicators in a manner that drives nuclear utilities to manage the indicators and thus take actions that can be

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adverse to safety and reliability. We are aware of no instance in which licensees have taken unsafe action or violated regulations based on NRC use of performance indicator information.

We firmly believe that our use of the performance indicators in identifying causative and emerging safety problems continues to be appropriate. Our decision-making process regarding plant performance relies on an understanding of the underlying causes for poor performance and not on the numerical values of the indicators either separately or as a set. As you know, the indicators, such as failures of a plant's safety systems or frequent forced outages due to equipment failures, may be symptomatic of safety problems. In that context, the staff does recognize the events captured by certain indicators in SALP performance discussions or reports. However, to reaffirm our policy, we intend to issue revised and clarified guidance to the NRC staff on the use of performance indicators.

NRC recognizes that the use of performance monitoring and incentive programs has become widespread in recent years and we have expressed some generic concern for the potential adverse safety impact of some of these uses. In this regard, we continue to emphasize, to all parties, the potential pitfalls in the misuse of performance indicators in such incentive programs.

It is the responsibility of utility management to recognize and properly manage the economic demands of utility operation without compromising safety or conservative safety attitudes among their staff. It is also their responsibility not to place undue pressures on the plant staff, whether based on INPO indicators, NRC indicators, or others. If INPO is aware of instances where, to avoid adverse performance indicator trends, utility personnel are manipulating plant operations, procedures, design, or other activities in a manner that could degrade safety, the situation should be immediately referred to senior licensee management and to the NRC. Furthermore, INPO should also strongly discourage utilities and economic regulators from using performance indicators in a manner that can be adverse to plant safety and reliability.

The staff reviewed your proposal regarding our adoption of the set of ten international performance indicators. At the outset, we note that the goals of the NRC Performance Indicator Program and the goals of an international program are not identical. The goal of the international performance indicator program appears to focus on safety and economic considerations that characterize overall plant performance in order to provide peer pressure for improved performance. Our program goal, indeed our fundamental responsibility, is to ensure safe facility operation, and we use a number of activities including plant-specific analysis of

operational data to support that goal. Our indicators were designed in accordance with this use, and are one of several tools used by NRC senior management to help us more promptly recognize declining safety performance. In this regard, NRC indicators now include indicators that are of diagnostic value in understanding the safety of plant operations (i.e., cause codes with the potential to add corrective actions, and maintenance effectiveness) which are not in the international set, and it should not be expected that our performance indicators would be consistent with the international program. Thus, we plan to continue to use selected indicators unique to our safety needs. However, we recognize that four of the NRC and INPO indicators have essentially the same definitions. The slight differences in numerical values for the four common indicators appear to be due to differences in groupings of plants, and our staffs should continue to refine and reduce these differences. We also plan to continue our research activities to develop meaningful programmatic indicators, and would be pleased to have continued coordination with INPO in the area of performance indicator development.

As you know, in the area of nuclear plant maintenance indicators, the staff is currently engaged in a demonstration project with NUMARC, INPO, and six utilities. We view this initiative as important to the Commission's efforts to assess industry maintenance trends. It is also important to the industry's initiatives to improve the monitoring of maintenance effectiveness, a weakness noted by our inspections. Since the source of the maintenance effectiveness indicator data is the Nuclear Plant Reliability Data System (NPRDS), a voluntary reporting system, we plan to proceed cautiously and in a manner that we hope will enhance industry participation. The NRC has always viewed the NPRDS as an important element of a full reporting system as discussed in the rulemaking for 10 CFR 50.73. The staff has given licensees credit for their participation in the NPRDS on issues arising from Generic Letter 83-28 and other matters. Therefore, although the system is voluntary and is managed by INPO, we have stressed the need for full and complete reporting to that system to obtain component failure information for utility use and for NRC programs. I would like to assure you that our usage of the system will continue to be prudent.

Mr. Zack T. Pate

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Your proposals are further addressed in the enclosure. In summary, although we view the NRC performance indicator program as distinct from yours, with different goals and applications, we will continue to coordinate our activities with you and resolve differences where practical.

Sincerely,

Original Signed By:  
James M. Taylor

James M. Taylor  
Acting Executive Director  
for Operations

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As stated

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Commissioner Roberts  
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*[Handwritten signature]*  
10/27/89

## ENCLOSURE

This enclosure discusses each of the specific proposals and associated issues contained in the September 8, 1989, letter.

1. Recognize and encourage the use of the industry's internationally agreed upon set of overall performance indicators. Adopt this set of performance indicators for appropriate monitoring of industry and utility progress by NRC senior management. Discontinue using performance indicator definitions that are similar to (but not identical to) the industry performance indicators.

### Response:

The NRC staff encourages the use of a set of international performance indicators by the commercial power reactor industry. In addition, the NRC will consider the adoption of specific indicators from that set which can contribute to the NRC program. However, it must be recognized that the NRC, where necessary, will maintain an independent performance indicator program to meet its goals and objectives.

NRC activities directed at the development of methods to assess licensee performance started in the mid-1970's. The current Performance Indicator Program is an outgrowth of this effort, and has been developed in response to NRC needs. Thus, the NRC indicators are focussed on identifying safety concerns while the international set of indicators seems to focus on overall facility performance which includes safety and economic considerations.

The current set of NRC indicators and the INPO indicators are not identical although four of the eight NRC indicators have essentially the same definitions. The slight differences in numerical values for the four common indicators appear to be due to differences in groupings of plants, and our staffs should continue to refine and reduce these differences. While it is worthwhile to work on reaching a common definition for similar performance indicators, different indicators are appropriate because of the different goals. For example, the NRC staff successfully completed the development of two new indicators that are not in current industry programs - specifically, the indicators of cause codes, recently approved by the Commission for implementation, and maintenance effectiveness, currently in a demonstration status.

2. Refrain from emphasizing the number of reactor scrams. Discontinue tracking and publishing the number of manual scrams.

### Response:

The NRC staff does not have the view that the number of scrams, on its face value, is highly safety significant and our staff guidance is consistent with this philosophy. The NRC staff's objective in monitoring unplanned reactor scrams, automatic and manual, is to understand root causes of transients and assess the performance of the requisite equipment and plant personnel during the transient. This is an essential component of our program, and this activity flows directly from our regulatory responsibilities.

Unplanned manual scrams are a result of the licensed operator's decision to shut down the reactor in response to changing plant conditions. An assessment of such transients affords us the ability to detect the results of utility initiated changes that impact plant systems, for example, the effectiveness of measures taken by licensees participating in the owners groups programs to improve feedwater systems. Further, such assessments look for situations where the licensed operators may fail to promptly insert a manual trip when conditions dictate that such action is appropriate.

Transients involving manual scrams can have actual or potential safety significance and, thus, are reportable events pursuant to 10 CFR 50.72 and 50.73. However, they are not included in the NRC Performance Indicator Program in order not to create a hesitancy to scram on the part of operators. Yet, transients requiring manual scram are an important part of operational experience from a safety perspective. For example, on February 25, 1983, operators at Salem Unit 1 manually scrambled the reactor in response to low steam generator water level during startup. The investigation of that manual scram led to the discovery of a failure to automatically scram and to the discovery that insufficient review of the circumstances of an earlier manual scram at the unit on February 22, 1983, had obscured the first anticipated transient without scram (ATWS) event at a commercial pressurized water reactor in the U.S.

The NRC staff has not singled out or placed undue emphasis on manual scrams in its published analyses, for example in NUREG-1275, Volume 5. Manual scrams are briefly mentioned in Section 3 of the report to place them in perspective, and are not broken out separately anywhere else. The study also focuses on industry and NSSS trends and patterns, and does not highlight individual plant experience. Lastly, consonant with INPO peer review comments, Section 1 of the NUREG contains the clear admonition that while manual scrams are included in order to provide a complete perspective on scram reduction, this should not be viewed as infringing on the operator's responsibility to place safety of the plant first.

Even spurious scrams resulting from an RPS fail-safe malfunction or testing error are potentially safety significant events. The Executive Summary of INPO 87-022, a report examining RPS performance, notes:

Reactor scrams originating from within the RPS accounted for 22 percent of the 4.4 unplanned automatic scrams per reactor year during 1984 and 1985. These scrams caused unplanned reactor transients, any of which can lead to a serious event.  
[Emphasis added]

In this regard, since January 1984, the NRC has identified a total of 43 transients with complications (personnel errors or equipment failures that complicate the plant recovery) that were initiated by a spurious RPS actuation.

The overall significance of reactor scrams in the industry's own view is underscored by the cover article entitled "Stopping Scrams" in Volume 4, Number 3 of the publicly available journal, The Nuclear Professional, published by the The National Academy of Nuclear Training. The editor's note at the end of this article states that the American Nuclear Society recognized the scram reduction program at the featured plant through a Meritorious Performance in Reactor Operations award presented in 1989.

Finally, an automatic scram - based performance indicator can be manipulated by substituting manual scrams for automatic scrams. If this were to occur, the number of potentially safety significant transients could remain constant or actually increase while appearing to decrease. While we have seen only one possible instance of this, the possibility constitutes another reason for monitoring the full picture on scram experience.

3. Discontinue using PIs in a manner that drives nuclear utilities to manage the indicators and thus take actions that can be adverse to safety and reliability.

Response:

It is our view that the NRC does not use quantitative indicators in a manner that drives the management of licensees to take unsafe actions. Further, we know of no situation or incidents where this has occurred. If situations are known to INPO where utilities are managing the indicators with an attendant negative safety impact, these situations should be brought to the attention of senior licensee management and the NRC. Utilities must train and direct their personnel not to manage indicators. INPO should play a leadership role in this activity.

The guidance provided in Agency Announcement No. 30 cautions the staff on the potential inappropriate uses of performance indicators. We intend to reemphasize that guidance. There have been isolated cases where comments by NRC staff members, when not taken in proper context, were perceived by others to imply that the NRC was using raw indicator counts, as opposed to analysis of the underlying causes, as determining factors in its performance evaluations. However, we note that each issue of the NRC performance indicator report contains a discussion of the NRC policy on the use of performance indicators to address this concern. We discourage the use of the report for performance measurement in conjunction with incentive programs.

The corrective maintenance backlog, cited in your letter as having a potential adverse impact on safety, was considered as a candidate indicator by the staff for use in the NRC Performance Indicator Program. AEOD/S804B, January 1989<sup>1/</sup> noted the use of such "process indicators" may be appropriate for management control of maintenance, but were not appropriate for industry-wide NRC maintenance performance monitoring. In fact, one of the considerations noted during the maintenance indicator development work was that the use of such process indicators had the potential alluded to in your letter.

From time to time NRC inspectors may consider plant-specific trends of data including maintenance backlog in their reviews. Where such reviews indicate a potential problem, it should be brought to the licensee's attention. It appears that the licensee's reaction was inappropriate in the case noted in your letter.

The NRC staff's indicator development activities have always considered the potential manipulation of a candidate indicator as an element that must be carefully considered prior to adoption. Accordingly, the most recent indicator

<sup>1/</sup> Application of the NPRDS for Maintenance Effectiveness Monitoring, AEOD/S804B, January 1989.

implemented by the NRC was formally reviewed for its potential for manipulation by licensees. The staff found that adequate safeguards existed to support the implementation of this indicator. <sup>2/</sup> The current NRC indicators are viewed as having minimum potential for manipulation.

4. Discontinue attempts to define other maintenance indicators. Avoid use of a "maintenance effectiveness indicator" based on NPRDS data for regulatory action.

Response:

The Commission and the staff place a high priority on the need for maintenance indicators. The Commission again recently directed the staff to expedite development and validation of its maintenance indicator, which is based on NPRDS data. This is being accomplished in part through an industry demonstration project (in accordance with specific Commission direction) in which INPO and NUMARC are participating. In this context, the possible impacts of using NPRDS data for an indicator will be explored. We note that the Commission has no alternative source of consistent component failure data as the result of providing credit for the existence of a viable NPRDS in the event reporting rulemaking for 10 CFR 50.73. If the viability of NPRDS or the NRC's access to NPRDS were to come into question, the bases for postponing rulemaking on component failure reporting would have to be re-examined. Although staff efforts to define other maintenance indicators are continuing with Commission direction, regulatory actions are not being taken or are planned based on performance indicators alone.

The Commission's position on the need for and the history of maintenance indicator development has been well established. In late 1986, the Commission directed that the staff continue to explore the development of performance indicators beyond those then included in the program. The Commission was particularly interested in such factors as maintenance and training. Further, in mid-1988, the Commission again directed that the staff should develop indicators on maintenance performance.

In the ensuing work the staff examined a wide range of potential indicators for maintenance, including those process indicators, such as maintenance backlog, under trial development by the industry under INPO coordination. The staff independently determined that such process indicators were indeed being manipulated, especially where goals had been formulated and plant-to-plant comparisons were being made via industry-wide distributions of values for various indicators. Our analysis, documented in AEOD/S804A, supported the conclusion

<sup>2/</sup> SECY 89-046, Performance Indicator Development - Cause Codes, February 7, 1989.



that measures based on objective component failure data showed the most promise for giving a reliable indication of the effectiveness of maintenance.

INPO has not pursued the development of a trending tool or indicator based on component failures, although it manages the NPRDS system. INPO has developed the CFAR approach for determining plant-specific outlier failure rates, using industry averages as a standard for comparing plants. However, this tool does not provide an indication of improving or declining effectiveness in maintenance. At the same time, the NRC Maintenance Team Inspections have consistently identified deficiencies in licensee programs for trending component failure data, which the NRC staff considers to be an important part of an effective maintenance program.

5. Review and strengthen the guidance in NRC Announcement No. 30 and hold the staff accountable for adhering to its guidance. Specifically, eliminate all reference to performance indicators in SALP reports.

Response:

We intend to revise and reissue the guidance in Announcement 30 to clarify our policy on the use of performance indicators. In addition, we are considering revising our procedures for SALP evaluations. We consider it inappropriate to allow the erroneous perception to exist that our Performance Indicator Program is the sole determining factor in the evaluation of licensee performance. The NRC staff has always utilized the statistics of the program as a screening tool to facilitate identifying areas for further staff evaluation. As you know, the real value of the indicators is in the assessment of the underlying causes that manifest themselves in the indicator trends and that is the context for the NRC performance indicators individually or as a set. Although our reference to the indicators is meant with this implicit understanding, such an understanding is not universal.

SALP and the Performance Indicator Program are distinct NRC programs, the results of which are among the factors that NRC senior management uses to assess plant safety performance just as INPO uses its plant and corporate evaluations and its performance indicators to evaluate performance. However, each program has the potential for, and has likely been perceived at one time or another as, making judgements based solely upon the numerical values of its performance indicators. We will continue to promulgate our policy throughout our staff, the industry, and the public with the goal of always assuring a proper interpretation and use of all elements of our programs for assessing overall licensee performance. Of course, certain words or technical jargon such as "scram" cannot be avoided in discussing operating experience. Such terms cannot be reserved solely for use in the context of performance indicators, and their use per se should not be interpreted as reference to performance indicators.

6. Encourage state safety and economic regulators to adhere to the principles outlined in this letter and Announcement No. 30. Continue to use the NRC's authority under the Atomic Energy Act to discourage using performance indicators to put pressure on utility personnel in a manner that can be counter-productive to public health and safety.

Response:

The NRC's purview under the Atomic Energy Act embraces public health and safety, and the Commission watches with concern any developments which have the potential for adversely affecting safety. As a result, the NRC has been monitoring the potential impact of local regulation, involving a tie between economic incentive and the safety of operations, for several years. In July of 1985, the staff began an active review in the area of plant incentive programs and periodic reports have been generated. Most, if not all, incentive programs use some measure of capacity factor or availability, similar to the INPO Equivalent Availability Factor, as the gauge of economic performance. We note that the NRC Performance Indicator Program does not directly track a capacity or availability factor.

Local regulators have also developed proposals that link economic incentives directly to NRC safety evaluations. In response to one such proposal that would use SALP numerical ratings, the NRC has made it clear that any proposal that appears to focus on nuclear safety as an end result rather than economic operation may interfere improperly with exclusive Federal regulatory authority over nuclear safety matters. However, as determined by the NRC Office of the General Counsel, under the Atomic Energy Act, state economic regulation is preempted only to the extent that it actually conflicts with federal law. States may exercise their traditional authority over economic questions affecting nuclear reactors, such as ratemaking. The use of publicly available information in that economic regulation process is not precluded. (We note that capacity factor information has been gathered for many years, and the use of such information predates the establishment of certain data as "performance indicators.")

In the final analysis, economic performance need not be inimical to safety performance, in that safely run plants are more likely to be economically run plants as well. It is the responsibility of each licensee to emphasize throughout its organization that safety must not be compromised by economics. You may, however, wish to consider stating your concerns directly to these state safety and economic regulators in writing or by direct participation in their proceedings.