

October 13, 1989

*Seq 89-317*

For: The Commissioners  
From: James M. Taylor  
Acting Executive Director  
for Operations

Subject: RESPONSE TO INPO LETTER REGARDING THE USE OF  
PERFORMANCE INDICATORS

Purpose: To provide the Commission with the staff's proposed response  
to the INPO letter of September 8, 1989.

Discussion: On September 8, 1989, the president of the Institute of Nuclear  
Power Operations (INPO) wrote to the NRC requesting the support  
of the Executive Director in addressing what INPO perceived  
as the inappropriate regulatory use of nuclear plant  
performance indicators. The staff's proposed response to  
INPO is enclosed.

The proposed response consists of a cover letter that speaks to  
the two major issues that were raised and an enclosure that  
addresses the six specific proposals that were listed at the  
end of the INPO letter. The first major issue was 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 to  
develop among the operations personnel at commercial power  
reactor facilities. Secondly, INPO urged that we adopt the  
recently selected set of international performance indicators.  
Their proposals involved the reshaping of NRC's Performance  
Indicator Program to change the current indicators, to abandon  
the development of maintenance indicators, and to exert  
our influence to assure the proper use of performance indicators  
by economic regulators.

In general, we do not agree with INPO that the NRC staff is  
making inappropriate regulatory use of performance indicators.  
The examples cited by INPO are not indicative of widespread  
misuse of performance indicators by the staff. However, in  
view of the widespread use of performance indicators by

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industry, individual licensees, the NRC, and the attendant potential for misinterpretation, we intend to reaffirm the policy stated in Announcement No. 30, and to issue revised and clarified guidance.

On September 26, 1989, Commissioner Roberts requested staff comments regarding INPO's claim that the staff overemphasizes the indicators in many regulatory activities, especially in the staff's evaluation of licensee performance. The proposed staff letter is intended to be responsive to Commissioner Roberts' concerns.

Recommendation: That the Commission:

1. Note that a proposed response to INPO is enclosed (Enclosure 1). The staff intends to send this letter 10 working days from the date of this paper unless otherwise instructed by the Commission. It would be desirable for INPO to receive our response prior to the CEO conference on November 2 and 3, 1989.

Coordination: The letter and enclosures had input from the Regional Offices. NRR contributed and concurred in the package and OGC has no legal objection.

Original Signed By  
James M. Taylor

James M. Taylor  
Acting Executive Director  
for Operations

Enclosure:  
Letter to Mr. Zack T. Pate

\*See previous concurrence

OFC	: TPAB	: TPAB	: DSP	: AEOD	: NRR	: OGC	: EDO
NAME	: DHickman*	: MWilliams	: TMNovak*	: ELJordan*	: TMurley*	: JScinto*	: JMTaylor
DATE	: 10/6/89	: 10/ /89	: 10/6/89	: 10/6/89	: 10/ /89	: 10/6/89	: 10/12/89

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James M. Taylor  
Acting Executive Director  
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Letter to Mr. Zack T. Pate

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DATE :	10/6/89	1/89	11/6/89	10/6/89	1/89	10/6/89	1/89



*Commission Paper*

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555  
EDO Principal Correspondence Control

# ACTION

FROM:

DUE: 10/06/89

EDO CONTROL: 0004743  
DOC DT: 09/08/89  
FINAL REPLY:

ZACK T. FATE  
INPO

TO:

JAMES M. TAYLOR

FOR SIGNATURE OF:

\*\* GRN \*\*

CRC NO:

ACTING EXEC. DIR.

DESC:

ROUTING:

VIEWS ON REGULATORY USE OF PERFORMANCE INDICATORS

TAYLOR  
THOMPSON  
BLAHA  
MURLEY  
BECKJORD  
REGIONS I - V

DATE: 09/13/89

ASSIGNED TO:

AEDD

CONTACT:

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SPECIAL INSTRUCTIONS OR REMARKS:



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September 8, 1989

Mr. James M. Taylor  
Acting Executive Director for Operations  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Taylor:

The purpose of this letter is to request your support in addressing the critical issue of what we view as inappropriate regulatory use of nuclear plant performance indicators. INPO has had several longstanding concerns with NRC's continuing focus on performance indicators as a method of comparing plants and for exerting regulatory pressure on utilities and their nuclear plant staffs. This letter and its attachments describe the following:

- 1) the history of the industry performance indicator program
- 2) our concerns with NRC's use of these indicators
- 3) recommended actions concerning the NRC's use of performance indicators

Beginning in 1980, nuclear utilities, through INPO, embarked on an effort to identify and define mutually agreed upon quantitative indicators of plant performance. These indicators were intended to be used by utility line management to monitor progress, establish goals, and spur healthy competition and emulation by comparing results and trends with other utilities. By 1983, most utilities had implemented performance indicators of their own selection using an INPO Good Practice as a starting point. By 1985, a set of industrywide plant performance indicators was agreed upon, and each nuclear utility then established challenging 1990 goals for those indicators where sufficient data were available. The industry has made impressive progress over the past few years as measured by these indicators and as frequently acknowledged by the NRC. Attachment 1 provides a detailed history of the industry's development and use of performance indicators. It should be evident from this attachment that the industry (and INPO) has invested substantial time and resources in the development and subsequent refinements of this program.

Through the cooperative but extensive efforts of UNIPED, WANO, and INPO, broad international agreement has now been achieved on ten overall performance indicators for international use beginning in 1990.

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More important than the effort and resources expended, however, are the principles/policies that have been developed over the years regarding the use of performance indicators by INPO and the industry. These are as follows:

- o INPO communicates with utilities regarding performance indicators primarily at the senior executive level. We purposefully avoid actions that could overemphasize the indicators at the middle management, operator, or technician level. For example, INPO has an established policy that evaluation findings are not written with a focus on performance indicator comparisons. Each finding must focus on the performance shortfalls, and not on a possible symptom.
- o Utilities set their own goals with respect to the performance indicators. INPO has explicitly designed its approach so that utility managers retain this important prerogative.
- o The importance of managing the plant, and not seeking to manage the indicators, is frequently stressed in correspondence, at workshops, and in other forums.
- o The potential pitfalls of putting too much emphasis on a single or a few indicators are routinely emphasized.
- o Performance indicators provide useful additional perspective but are not used as the principal basis for conclusions or recommendations. Performance indicators can lag actual performance by several months, or even years. Therefore, INPO's process for evaluating and assessing station performance relies primarily on site visits by experienced evaluation teams.
- o We have discouraged the use of performance indicators by outside organizations that are not directly involved in, or sufficiently knowledgeable of, nuclear plant operations, and that seek to use these indicators for their own purposes.
- o Throughout this industry initiative, we have actively sought the involvement and input of international nuclear utility organizations to achieve international consensus and avoid confusing or conflicting performance comparisons or trends.

Beginning in 1984, the NRC began to get involved in the use of quantitative indicators. Attachment 2 chronicles the NRC's efforts (and NRC/INPO interactions) in this area. INPO has spent hundreds of hours in meetings and correspondence with the NRC in an attempt to keep the NRC effort from being duplicative of industry efforts or counter to the principles listed above. One of the NRC's justifications for its effort was that some new insightful indicators might be developed. This has not occurred. The industry's overall performance indicators have stood the test of time in that NRC's efforts have not identified any new overall performance indicators that provide significant additional insight.



We have been attempting to reach an agreement with the NRC since March 1987 on the appropriate use of performance indicators. Furthermore, as shown in Attachment 2, we have consistently expressed concern about the potentially adverse safety implications of the NRC's use of performance indicators. However, we have not reached an agreement on the fundamental issues.

In fact, from our perspective, NRC's misuse of performance indicators continues despite the Commission's and senior NRC management guidance to the staff. Specifically, in contrast to the guidance to the NRC staff in NRC Announcement No. 30 of February 5, 1988, regarding use of performance indicators, NRC activities are frequently breaching the principles that we believe are vitally important:

- o We continue to receive reports that regional personnel are employing the indicators to put direct pressure on nuclear plant personnel.
- o A review of 61 recent SALP reports showed that unplanned automatic scrams (or scrams per 1,000 hours critical) were mentioned in over half (37) of the reports. For plants with perceived high scram rates, the SALP reports typically state or imply the need to reduce the number of scrams. In addition, collective radiation exposure or forced outage rates were discussed in many of these reports.
- o Recent SALP reports have included statements as follows (direct quotes):
  - November 1988 - "Operations displayed both new strengths and continued weaknesses during this assessment period. (Plant) -- increased the capacity factor for Unit 1 from 65.7% to 83.5% and for Unit 2 from 53.5% to 57.2% over the previous assessment period. Particularly noteworthy and a contributor to the above accomplishments was the effectiveness of the licensee's scram reduction program."
  - March 1989 - "A comparison with the previous SALP shows that the unit forced outage rate increased from 4.01 to 6.20 percent. The outage rate is above the industry mid-1988 one year median of 4.8. The reactor trips (scrams), when compared with the previous SALP increased from seven to eight. The trip (scram) rate, even though some improvement was shown in 1988, is still above the industry one year median of approximately two."
  - March 1989 - "Added management attention is also needed to reduce the number of reactor trips."
  - April 1989 - "During this assessment period only one reactor scram occurred, compared with ten during the previous two assessment periods, indicating a significant improvement in performance."

- June 1989 - "Performance in this area was rated Category 2 with a declining trend in the previous SALP assessment. Although the trip (scram) rate had been significantly reduced it was concluded that it could be further reduced through better procedural control of operational activities and attention to detail by the operators. . . . In contrast to the previous SALP period no trips (scrams) were caused by deficiencies in operations during the current SALP period. This reflects a significant improvement from previous SALPs."
- August 1989 - "Plant Operations was rated as a SALP Category 2 during the previous assessment period. Licensee strengths included a strong management team and an improved trip frequency. . . . During the current SALP period there were 16 reactor trips between the two units (5 on Unit 1, 11 on Unit 2), including six trips directly or indirectly attributable to the operations functional area. The 16 reactor trips were more than twice as many as during the previous assessment (seven). The number of trips two SALP cycles ago was 18. The licensee's trip reduction efforts appear to have been ineffective since the last SALP...."
- o The indicators are being widely discussed among NRC staff personnel during their visits to nuclear plants, with the clear potential for putting pressure on plant operators to avoid scrams, avoid plant or equipment forced outages, etc.
- o NRC concerns over certain performance indicator results are routinely discussed in the trade press, again with the potential to put undue pressure on plant operating staffs. During the staff briefing of the Commission of December 21, 1988, regarding status of nuclear plants, a regional administrator's comments on the high number of scrams at a particular nuclear unit were subsequently reported by INSIDE NRC as the reason for that unit being added to NRC's list of problem plants. (See Attachment 2)
- o The NRC continues to use definitions of some performance indicators (and publish data) that are similar but not identical to the industry developed performance indicators. This results in confusing and conflicting reports regarding performance trends.

It is not in the best interest of reactor safety for the NRC, as the regulator, to put direct pressure on utilities to operate their reactors (e.g. to avoid scrams, or to reduce forced outages, or increase availability). In clear contrast to the recent activities by the NRC, the Federal Aviation Administration (FAA) does not put pressure on airline flight crews to conduct scheduled flights (or to reduce flight cancellations or deviations due to equipment problems). The FAA requires that certain equipment be operable before a departure can be made, but beyond that it is left to the prerogative of management and the pilot in command.



Pressure by the NRC to avoid a scram, or a forced outage, or to achieve high capacity factor or availability is surely just as unwise as FAA putting pressure on a pilot to "go," or NASA putting pressure on middle management to "launch." This principle is illustrated in an article by Jerome Lederer, former director of the Flight Safety Foundation, published in the December 1987 issue of AVIATION SAFETY (Mr. Lederer was director of safety for NASA during the very successful Apollo Program and was a member of INPO's Advisory Council for six years). In this article, Mr. Lederer, in reference to the aviation industry states:

"I still keep my eye on things and one of the things that disturbs me is that when . . . (the Secretary of Transportation) . . . put out an edict requiring the airlines to report deviations from schedule, but not because of mechanical problems. That's a very dangerous thing, because it puts pilots under pressure. That's the reason we killed so many pilots in the U.S. Mail Service - because of the pressure put on them by the post office department, which had to prove to Congress that air mail was reliable."

Former NRC Commissioner John Ahearne expressed a similar view in the October 30, 1986 issue of Public Utilities Fortnightly. After summarizing serious concerns about the use of performance incentives in safety or economic regulation of nuclear utilities he went on to say:

"Performance incentives are basically a sound idea. People work best if they know in advance the standard against which their performance will be measured. But I would not want to fly on airlines where the incentive system established by their regulators was based on how many hours could an airplane be in operation per day."

In the same article he quoted 1983 remarks by Dennis Wilkinson, the first president of INPO, as follows:

"If emphasis is placed on safety and reliability, a good capacity factor is a natural result. If however, the principal emphasis is on capacity factor, adequate safety is not a natural result."

Of particular concern, we believe that continued NRC emphasis on the number of reactor scrams as a measure of nuclear plant regulatory performance can, over time, establish a mind-set among nuclear plant personnel that is detrimental to reactor safety. Reducing the number of unnecessary scrams without eliminating a necessary scram is a delicate matter. A mind-set among nuclear plant personnel that any scram is a highly negative indicator of performance may lead to actions that preclude a needed scram (e.g., an operator may be hesitant to initiate a scram that he feels is warranted or other technicians may take unconservative actions or make unconservative adjustments or calibrations). Thus, the purpose of the scram function as a primary means of preventing core damage could be defeated. This concept was



stressed in our July 10, 1985 letter to Bill Dircks and included in letters of November 5, 1986 and May 14, 1987 to Chairman Zech and has been the subject of discussions with NRC staff on a number of occasions since. (See Attachment 2 for copies of each of these letters.)

As a related matter, we are also concerned that the NRC is tracking, publishing, and speaking publicly about manual unplanned scram data. INPO has clearly and consistently objected to this practice as noted in our letter to the NRC of August 18, 1988 (see Attachment 2). This emphasis only adds to the worry that an operator will have about initiating a manual scram. For this reason, INPO does not publish manual scram data.

As an industry, with well over 100 operating nuclear units, the bottom line concern is that regulatory pressure to reduce scrams will eventually lead to the failure to get a necessary scram. If core damage occurs as the result of such improper use of a performance indicator, the cost to the industry and the nation will be enormous. A number of events have already occurred at nuclear plants since early 1988 where operators were slow in initiating a manual scram when plant conditions warranted rapid shutdown. While these delays cannot be directly attributed to NRC pressure on operators, a review of SALP reports shows that the NRC has and continues to emphasize scram trends at most of these plants. This practice is clearly pressuring plant management and operators and technicians to reduce scrams.

INPO continues, through the industry's long-term goals program, to encourage its members to understand the causes of unnecessary scrams and take appropriate corrective actions, but we constantly stress the need to manage for excellence using a broad set of performance indicators, of which scram performance is only one. We also consistently advise member utilities that in striving for improved performance against measurable objectives, they must keep these efforts in perspective for their operational and technical personnel. In the case of scrams, we cannot afford to have any operator feel concern over initiating a scram that he thinks is warranted. An attitude must be instilled in the operator that he is a key factor in taking actions to prevent or mitigate the consequences of an accident, and thereby protect the public. Regulatory use of this indicator is not consistent with this objective, and, in effect, bypasses the attempts of line management to keep this issue in perspective. The industry is making excellent progress in the area of reducing unplanned automatic scrams by addressing the causes, and this trend was clearly evident before the NRC became involved with the scram performance indicator. From 1980 to 1988 the number of unplanned automatic scrams per unit has been reduced by a factor of 3.5, and the projected industry unplanned automatic scram rate for 1989 is less than 2 per unit through the end of July. Thus, it appears that regulatory focus on this area was and is unnecessary, notwithstanding the more important reason cited above.

Another area of particular concern is the NRC's intent, expressed in SECY-89-143 of June 19, 1989, to "encourage the further development and use of maintenance performance indicators by the nuclear industry such that the Commissioners and the industry may closely monitor the progress of industry improvement initiatives." SECY-89-143 also directs the NRC staff to invite

participation by a group of utilities in identifying quantitative indicators of maintenance performance and to proceed with the development and validation of a "maintenance effectiveness indicator" based on NPRDS data. These NRC activities are an unnecessary duplication of previous industry (and NRC staff) work and current industry initiatives and represent another area where NRC emphasis on specific indicators can lead to undesirable actions by utilities. For example, it was noted recently at a nuclear station that emphasis by the NRC region on reducing the backlog of maintenance work orders resulted in station personnel being reluctant to submit work requests on identified deficiencies. As a result, the INPO evaluation team found that an exceptionally large percentage of materiel deficiencies identified by the team were not in the work order control system. As another example, excessive NRC focus on equipment reliability, as measured by NPRDS failure reporting, will tend to penalize the most conscientious reporters and could inhibit utility reporting of this important reliability data.

The industry-developed set of overall performance indicators currently reflects maintenance performance. A nuclear plant cannot achieve substantial progress and consistent performance as measured by this set of indicators without having an effective maintenance program. In addition to the development of these overall performance indicators, INPO worked with the industry to examine the feasibility of defining other quantitative indicators of maintenance performance that could be mutually agreed upon and shared among utilities. Some items (such as preventive maintenance overdue, corrective maintenance or work order backlog, maintenance overtime hours, etc.) have been tried on a pilot basis. INPO and utilities have expended substantial resources in defining and redefining these indicators, collecting and trending data, and correlating this data with maintenance performance as assessed by INPO evaluation teams, the overall performance indicators, and NRC inspections (SALP). From this effort, we have concluded the following (which has been shared with the NRC staff):

- o The other indicators do not correlate well with maintenance performance as determined by site visits (visits by both NRC and INPO).
- o Some potential indicators cannot be defined in a manner that facilitates consistent industrywide reporting.
- o Most of these indicators are readily subject to administrative manipulation (particularly when used for comparison among plants).
- o Such indicators are useful only to utility management on a plant-specific basis to help monitor selected maintenance activities. (We are encouraging and assisting utilities in development and use of internal methods to monitor progress and identify problems in key maintenance areas, including use of the NPRDS data base and other quantitative data.)



We understand that previous NRC staff work in this area (as part of the Maintenance Surveillance Program Plan, SECY-85-129, and in support of the recent deliberations on a maintenance rule) has essentially agreed with the above conclusions regarding the usefulness of other indicators that monitor maintenance processes.

In summary, experience has demonstrated that maintenance performance is best monitored by the industry set of overall performance indicators or by site visits. Further, while other quantitative indicators of maintenance can be a useful management tool on a plant-specific basis, they are not "performance indicators" per se, and they are not suitable for use by outside organizations to measure or compare the quality of maintenance at various sites. Because maintenance has such a broad impact on plant performance, the focus for monitoring maintenance effectiveness should be on the results of on-site inspections and the industry set of overall performance indicators, and not on any detailed maintenance indicators or even on a single overall performance indicator, such as scrams or equivalent availability.

As a related matter, the recent strong focus by the NRC on performance indicators has led some state safety regulators to develop an interest in the indicators. In many cases these personnel are interacting directly with the plants on this matter. In addition, economic regulators are becoming involved in performance indicators. Several are considering or have initiated schemes whereby the utility rate of return is tied to achievement of specific performance indicator values. Our view is that these activities undermine utility line management authority and ultimately have an adverse impact on nuclear safety. We are aware that the NRC staff and the Commission are periodically monitoring this area and share these same concerns.

In view of all the above considerations, and principally with respect to the potential nuclear safety consequences, we urge you to substantially reshape the NRC's use of performance indicators. In this regard, the following actions are recommended:

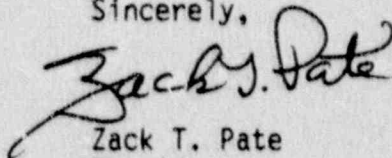
1. Recognize and encourage the use of the industry's internationally agreed upon set of overall performance indicators. Adopt this set of performance indicators for appropriate monitoring of industry and utility progress by NRC senior management. Discontinue using performance indicator definitions that are similar to (but not identical to) the industry performance indicators.
2. Refrain from emphasizing the number of reactor scrams. Discontinue tracking and publishing the number of manual scrams.
3. Discontinue using other quantitative indicators in a manner that drives nuclear utilities to manage the indicators and thus to take actions that can be adverse to plant safety and reliability.
4. Discontinue attempts to define other maintenance indicators. Avoid use of a "maintenance effectiveness indicator" based on NPRDS data for regulatory action.



5. Review and strengthen the guidance in NRC Announcement No. 30 and hold the NRC staff accountable for adhering to its guidance. Specifically, eliminate all reference to performance indicators in SAP reports.
5. Encourage state safety and economic regulators to adhere to the principles outlined in this letter and Announcement No. 30. Continue to use the RC's authority under the Atomic Energy Act to discourage using performance indicators to put pressure on utility personnel in a manner that can be counterproductive to public health and safety.

We firmly believe that an NRC approach to use of performance indicators as outlined, coupled with ongoing INPO and industry initiatives in this important area, best serves our mutual objectives and is in the best interest of the public. NRC senior management would have the benefit of the insight that performance indicators provide. But utility line management use of quantitative indicators to achieve better overall plant performance would not be undermined. More importantly, regulatory and other outside pressure at the plant staff and working level, and thus the potential for a nonconservative safety action by plant personnel could be avoided.

Sincerely,



Zack T. Pate  
President

ZTP:lar

Attachments (as stated above)

cc/w: Chairman Kenneth A. Carr  
Commissioner James R. Curtiss  
Commissioner Thomas M. Roberts  
Commissioner Kenneth C. Rogers  
Members of the Advisory Committee on  
Reactor Safeguards

HISTORY OF THE INDUSTRY'S DEVELOPMENT  
AND USE OF PERFORMANCE INDICATORS

- May 1980                      First CEO Workshop - Pat Haggerty, a member of the Kemeny Commission and INPO's Advisory Council, pointed out the need to measure industry progress:
- "I simply would not be satisfied, if I were you, until there is an adequate, quantitative measure of the status and progress of the entire industry and of each utility within it."
- October 1982                      CEO Workshop - INPO President discussed nuclear operations parameters that a CEO could monitor. A set of such parameters was provided to the participants and discussed as part of workshop activities.
- November 1982                      INPO President directed the INPO staff to develop a coordinated plan to collect, assess, and trend industry performance in selected areas.
- January 1983                      INPO established a Data Collection Task Force to define a package of data to be collected and analyzed to assess and trend industry performance.
- April 1983                      The Data Collection Task Force recommended data to be collected starting with the third round of INPO evaluations. It was anticipated that it would take approximately 18 months (one evaluation cycle) to visit each plant and collect baseline data.



May 1983 Appendix A of INPO's Institutional Plan describes INPO's role in collecting and trending nuclear station performance data.

August 1983 Preliminary INPO Good Practice OA-102, "Performance Monitoring Management Information," was distributed. This good practice provided directions and procedural guidance for utilities on how to implement a comprehensive and effective performance monitoring program. An example set of performance indicators and graphical presentations was included.

September 1983 CEO Workshop - A package containing the definitions, descriptions, and historic data for potential performance indicators was provided to the participants. Performance monitoring and the use of performance indicators were the subjects of a panel discussion.

June 1984 Final Good Practice OA-102, "Performance Monitoring Management Information" was published.

July 1984 In a letter to NRC Executive Director for Operations (EDO), INPO President expressed concern about erroneous scram data released publicly by the NRC and the difficulties this had caused.

August 1984 The INPO Advisory Council completed an in-depth review of activities relating to performance indicators and data gathering. The subject had been under continuing and active council consideration since February 1980.

October 1984 INPO President, in a speech to AIF, stated that INPO, in concert with the industry, had developed selected performance indicators to help executives and



managers track performance. Also discussed was the industry quest for excellence by using five example performance indicators. Industry progress in these five indicators was noted.

November 1984

CEO Workshop - INPO's Chairman presented current and historic information on six "overall" performance indicators. In addition, development of the performance indicator program received considerable attention, especially in trending year-to-year performance. INPO President, in summarizing the workshop, noted that the industry needs a quantitative record of improving performance.

INPO issued a report, "Nuclear Power Plant Operational Data," that was used in conjunction with CEO workshop. This report included 45 parameters that reflected industrywide performance and provided each utility with specific data on their plants. The report included yearly data from various sources through 1983 and data collected during evaluations for one evaluation cycle.

December 1984

An INPO letter to CEOs requested that utilities develop goals for those indicators listed as "overall" indicators in the November 1984 report, "Nuclear Power Plant Operational Data."

January 1985

Development of industry long-term goals was discussed by the INPO Board of Directors. An action plan for implementation was developed.

January 1985

Three ad hoc review groups comprised of (1) utility representatives (selected to represent size, location, plant type, and the INPO Industry Review

Groups), (2) the senior nuclear executive from each U.S. nuclear steam system supplier (NSSS), and (3) independent experts (Joe Hendrie, Tom Pigford, Norm Rasmussen, Forrest Remick) began work in concert with INPO to develop a uniform set of "overall" performance indicators and long-term goals as mechanisms to support achievement of "benchmarks of excellence."

February 1985

INPO President briefed the Commission on the major areas in which INPO is involved including performance monitoring activities and the program for establishing long-term goals for the industry.

March 1985

INPO's 1984 Annual Report discussed performance indicators and goal setting. Six industrywide performance indicators were displayed to show historic performance.

April 1985

Ad hoc utility group and NSSS group (including a representative from EPRI) met separately at INPO to consider candidate indicators and possible long-term goals and to review domestic and international quantitative performance.

During a visit to INPO, the ACRS chairman and four members were briefed on the efforts to date on performance indicators and the development of long-term goals for the industry.

May 1985

The concept of using performance indicators and data to assist the utilities in establishing long-term goals was added to Appendix A of INPO's Institutional Plan.



Ad hoc group of independent experts met at INPO to review efforts to select overall performance indicators and establish long-term goals. INPO updated the ad hoc utility group and sought input from all of its established review and advisory mechanisms including the Advisory Council, supplier and international advisory committees, and technical division Industry Review Groups.

INPO issued a brochure, "Performance Indicators for the U.S. Nuclear Utility Industry," showing historic performance for nine indicators through the end of 1984.

June 1985

In testimony to the Senate Subcommittee on Nuclear Regulation, INPO President discussed nine "overall" performance indicators and provided industry performance and progress in these areas.

INPO issued "Nuclear Power Plant Operational Data Update," which provided updates for 19 quantitative indicators provided in the November 1984 report.

July 1985

Final proposed package on overall performance indicators and long-term goals was mailed to the ad hoc review groups and the INPO Board of Directors for review and comment. The proposal introduced the concept of INPO providing background information to assist utilities in setting long-term goals and then determining industrywide goals based on individual utility goals. On July 11, 1985, the Board approved the proposed approach.

An INPO letter to CEOs proposed a uniform set of "overall" performance indicators and provided

information and guidance on setting long-term performance goals. The letter emphasized the need to use a set of overall performance indicators rather than a narrow set or one indicator. INPO also requested that preliminary 1986 and long-term (1990) goals be set for each nuclear unit in preparation for discussions at the 1985 CEO workshop. The concept of "baseline goals"--goals that most plants should be able to achieve over time--was introduced for the following indicators:

- o equivalent availability factor
- o unplanned automatic scrams while critical
- o collective radiation exposure
- o volume of low-level solid radioactive waste
- o industrial safety (lost time accident rate)

In a letter to NRC EDO, INPO President expressed concern about the impact of increasing NRC pressure on the industry to reduce scrams. He stressed that, "we cannot afford to have any operator feel concern over initiating a scram that he thinks is warranted."

August 1985

Quarterly data reporting by utilities was initiated. All operating plants were requested to submit data directly to INPO starting from January 1985. Detailed maintenance indicator data and data necessary to support the industry long-term goals program were incorporated into data collection efforts.

November 1985

CEO Workshop - The workshop focused on the industry initiative to develop and use performance indicators and long-term goals to monitor and improve performance of their nuclear units. The 10 "overall" performance indicators were presented and utilities



were requested to establish long-term goals for as many of the "overall" performance indicators as feasible. INPO President traced the development of the performance indicator effort since the first CEO Workshop and discussed goals related to performance indicators. In a panel discussion, members of the Advisory Council also stressed the development and implementation of performance indicators and long-term goals.

December 1985

Utilities were requested to provide 1986 and five-year (1990) goals. Utilities were provided data sheets showing their plant data and industry values for key parameters included in the industry long-term goals effort.

March 1986

INPO's Annual Report entitled "Focus on Performance," concentrated on performance indicators and their application. Nine industrywide performance indicators were displayed to show historic performance.

April 1986

INPO issued "Industry Nuclear Power Plant Performance Indicator Report" with 32 parameters and data through 1985. This report was based on the data provided in the quarterly data reports and selected historical data from previous reports.

May 1986

In a presentation to the Commission, INPO President provided information on performance indicators and goals and discussed how these efforts are imperative to the improvement of plant safety and reliability performance. The development and use of "overall" indicators and long-term goals was discussed in the context of performance data that had been collected through the end of 1985.

June 1986

INPO issued annual brochure "Performance Indicators for the U.S. Nuclear Utility Industry," which showed historic performance for nine indicators through the end of 1985.

An INPO letter to CEOs updated industry on development of long-term goals and provided industry averages and histograms related to long-term goals.

In testimony to the Senate Committee on Energy and Natural Resources, INPO President discussed INPO's efforts to promote excellence in the industry using performance indicators to provide a measure of progress.

An INPO letter to international participants encouraged them to set long-term goals and to adopt as much of the INPO program relating to performance monitoring as possible.

August 1986

An INPO letter to utility executive points of contact provided an update on the development of the safety system unavailability performance indicator and transmitted Safety System Unavailability Monitoring, (INPO 86-021). Informed utilities of pilot program to be completed by mid-1987.

September 1986

An INPO letter to utility executive points of contact provided information on industry efforts to monitor and improve nuclear fuel integrity and noted INPO's efforts to refine the fuel reliability indicator to compensate for the effects of past fuel failures and allow more meaningful unit-to-unit comparisons.



October 1986

INPO issued "Industrywide Nuclear Power Plant Performance Indicators, 1986 Mid-year Report" with results for 28 indicators through the second quarter of 1986.

An INPO letter to the ad hoc utility group, NSSS group, and independent expert group involved in the development of long-term goals requested comments on several alternative definitions for the fuel reliability and thermal performance indicators. Also provided an update on safety system unavailability.

November 1986

In a letter to NRC Chairman, INPO President expressed INPO's concerns about the potential adverse consequences of the adoption of a formal performance indicator program by the NRC.

CEO Conference - Performance indicator results and long-term goals were emphasized in several sessions. Possible alternative definitions for the fuel reliability and thermal performance indicators were presented.

December 1986

After incorporating comments from the long-term goal review groups and discussion at the CEO Conference, revised definitions for the fuel reliability and thermal performance indicators were transmitted to INPO Industry Review Groups for review and comment.

An INPO letter to CEOs requested that utilities provide their 1987 overall performance indicator goals for operating units to INPO.

In a letter to IAEA Nuclear Safety Director, INPO President urged IAEA not to adopt a proposed performance indicator assessment process. He urged that quantitative indicators be preserved as a utility management tool and offered to share generic overall performance indicator data.

February 1987

After resolution of Industry Review Group comments, revised definitions for the fuel reliability and thermal performance indicators were transmitted to utility executive points of contact along with revised quarterly data report forms.

March 1987

INPO's Annual Report included a foldout section with performance data from 1980 to 1986. Industrywide goals for 1990 based on individual utility goals were displayed on the annual trend graphs.

April 1987

The 1986 Year-end Report on Industrywide Nuclear Power Plant Performance Indicators was issued to member utilities and international/supplier participants.

A detailed description of the overall plant performance indicators was developed in preparation for inviting INPO's international participants to begin submitting performance indicator data.

June 1987

An analysis of possible approaches for the safety system unavailability performance indicator was completed and three viable approaches were found. The INPO Analysis and Engineering Industry Review Group was briefed on the results.



August 1987 Information on the status of the Safety System Performance indicator was mailed to the industry ad hoc review groups on performance indicators, the INPO Industry Review Groups, the Supplier Participant Advisory Committee, and the utility participants in the pilot program for safety system unavailability monitoring.

September 1987 The 1987 mid-year Industrywide Nuclear Power Plant Performance Indicators report was mailed to the industry.

October 1987 The mid-year performance indicator results and the status of development of the safety system performance indicator were presented at the Supplier Participant Advisory Committee meeting.

August 1987 Preparation began on a year-end mailing to utilities to provide clarifications and additions to the industry's performance indicator definitions and reporting instructions. This included reporting guidance for the safety system performance indicator, and associated revisions to the data collection form.

November 1987 A final definition and reporting instructions were developed for the safety system performance indicator, taking into account comments from the industry ad hoc review groups on performance indicators and other reviewing organizations.

December 1987 A revised quarterly plant performance indicator data reporting form (Revision 4) and detailed descriptions of the overall plant performance indicators and the other indicators were sent to the utility executive points of contact. The data collection form was

revised to include the new safety system performance indicator and to reflect revisions, based on utility comments, to certain maintenance, chemistry, and radiation protection indicators.

February 1988

A letter was sent to the international points of contact providing detailed descriptions of the industry's overall performance indicators.

March 1988

The 1987 year-end report, "Industrywide Nuclear Power Plant Performance Indicators," was sent to the industry. INPO discontinued presentation of trend graphs for the other indicators because the aggregation of this data was generally not a meaningful indicator of industrywide performance trends.

Computer software development began for an international performance indicator data base. International performance indicator data (covering from 3 to 8 indicators) for 1987 was received from Brazil, Canada, France, Japan, Korea, Taiwan, Spain, Sweden, and the United Kingdom. An international performance indicator report was planned for mid-1988.

April 1988

Preliminary international performance indicator data and proposed formats for an international performance indicator report were prepared and presented at a meeting of the International Participant Advisory Committee. Software development proceeded for data entry and for data summaries, graphics, and reports.

Work began to recommend overall performance indicator definitions for use after 1990. As a part of this effort, a letter was sent to Electricite de France



(EDF) proposing that INPO work with EDF and International Union of Producers and Distributors of Electrical Energy (UNIPED) to develop a uniform set of overall performance indicators for both INPO and UNIPED member utilities.

A letter from INPO President to the Director General of the International Atomic Energy Agency requested support in achieving optimum worldwide use of performance indicators and expressed concern about IAEA use of performance indicators during a recent OSART visit.

A letter from INPO to IAEA expressed continued concerns on IAEA's plans to conduct a workshop on the Operational Safety Indicators Program since significant international progress had been made by the joint efforts of INPO and UNIPED.

May 1988

A detailed action plan was developed for re-examining the plant performance indicator and long-term goals program for use beyond 1990. As part of this effort, each INPO Group Vice President was requested to review the current overall indicators for possible revision, taking into account the desire to develop a uniform set of overall performance indicators for worldwide use that would be consistent with those proposed by UNIPED.

Work began in May on a draft international performance indicator report. Each international member of INPO was contacted to ensure that the data requested was complete and to identify any inconsistencies with the INPO definitions.

June 1988

A meeting was held at INPO with representatives of IAEA to discuss the agency's plans to hold a workshop on development of performance indicators. IAEA agreed to recognize, support, and not duplicate the work done by INPO and UNIPEDDE on overall performance indicators.

June 1988

A letter was sent to all utility CEOs discussing the economic benefits achieved by improvement in the industry overall performance indicators. Industry improvements in unplanned automatic scrams, thermal performance, and volume of low-level solid radioactive waste had produced an industrywide estimated savings of \$900 million annually. Potential economic benefits from progress in other performance indicators were also noted. The overall performance indicators therefore strike a reasonable balance for monitoring economic as well as safety performance.

A new industry ad hoc review group on performance indicators and long-term goals was selected to advise INPO on the use of performance indicators and goals after 1990. The group included members from the INPO Industry Review Groups, Advisory Council, International and Supplier Participant Advisory Committee, Academy Council, World Association of Nuclear Operators (WANO), NUMARC, EPRI, UNIPEDDE, and U.S. utilities.

July 1988

The draft report, "International Nuclear Power Plant Performance Indicators," was sent to International Participant Advisory Committee members for review and comment. The report presented overall performance indicator data for 12 countries.



August 1988

A meeting of the new industry ad hoc review group on performance indicators and long-term goals was held at INPO. The purpose of the meeting was to obtain industry comments and suggestions on performance indicators and approaches to goal setting to be used after 1990.

September 1988

Revised proposals for performance indicator definitions and an approach for long-term goals for use beyond 1990 were mailed for comment to the INPO Industry Review Groups, Supplier Participant Advisory Committee, International Participant Advisory Committee, UNIPED, and an industry ad hoc review group. The proposals were revised based on comments and suggestions from the industry ad hoc review group meeting held at INPO in August 1988.

The 1988 mid-year performance indicator report, "Industrywide Nuclear Power Plant Performance Indicators," was issued.

INPC attended an IAEA workshop on "Approaches to Quantitative Assessment of Operational Safety Performance of Nuclear Power Plants." As a result of discussions at the workshop, participants recommended that IAEA encourage utilities to use a common set of performance indicators being developed by INPO and UNIPED.

October 1988

As part of the reevaluation of the plant performance indicator and long-term goals program for use beyond 1990, comments on proposed indicator definitions and approaches to goal setting were obtained at meetings of the INPO Industry Review Groups and the Supplier Participant Advisory Committee.

November 1988

The safety system performance indicator detailed description was updated for use in 1989 and mailed to utilities. The indicator was revised to include component unavailability due to all causes.

As part of the reevaluation of the plant performance indicator and long-term goals program for use beyond 1990, comments on proposed indicator definitions and approaches to goal setting were obtained at the International Participant Advisory Committee meeting.

December 1988

An updated version of the Detailed Description of Overall Performance Indicators and Other Indicators, and a revised data collection form for use in 1989 were mailed to the utilities. Several other maintenance indicators were discontinued because they were generally not representative of maintenance performance.

January 1989

A meeting was held with the Chairmen of groups of UNIPED experts to develop final definitions of overall performance indicators for use after 1990.

March 1989

A draft proposal of overall performance indicator definitions, for use beginning in 1990, was mailed for final review to the industry ad hoc review group, the INPO Analysis and Engineering Industry Review Group, and UNIPED. The proposed indicator definitions were developed through the combined efforts of INPO, UNIPED, and their respective members and participants. Copies of the proposed indicator definitions were also sent for information to the chairman of the WANO steering committee, IAEA, and the North American Electric Reliability Council.



The international performance indicators are as follows:

- o unit capability factor
- o unplanned capability loss factor
- o unplanned automatic scrams per 7,000 hours critical
- o safety system performance
- o thermal performance
- o fuel reliability
- o collective radiation exposure
- o volume of low-level solid radioactive waste
- o chemistry index
- o industrial safety lost time accident rate

The 1988 year-end report, "Industrywide Nuclear Power Plant Performance Indicators," was sent to INPO members and participant.

May 1989

The first Governing Board Meeting of WANO adopted the INPO/UNIPED proposal as a first draft of WANO performance indicators and requested the Atlanta Center of WANO to take the lead in assembling a final document to be provided to WANO for final review and acceptance.

The draft report, "International Nuclear Power Plant Performance Indicators, 1988 Year-end Report" was provided for review and comment to members of the International Participant Advisory Committee and the international points-of-contact.

July 1989

The 1988 year-end report "International Nuclear Power Plant Performance Indicators" was mailed to all INPO members and participants. The report provided data for the industry's overall performance indicators for the U.S. and 179 operating units in 12 international participant countries.

Present

The performance indicator and goals programs have achieved a reasonable level of maturity.

- o Ten overall performance indicators, are now monitored and trended for the industry by INPO on a quarterly basis.
- o There is participation from all of INPO's international participants
- o There is 100 percent support and participation from the U.S. nuclear industry.
- o Industrywide recognition of a set of overall performance indicators has been achieved.
- o A common set of ten overall performance indicators has been internationally agreed upon. Many of INPO's international participants are using the overall performance indicators and some have established long-term performance goals.
- o Long-term goals for most of the overall indicators have been established by U.S. utilities for each operating unit.
- o The average of 1990 goals established by utilities is better than the recommended baseline in every case.
- o Utilities are using data, trends, goals, and other information in monitoring and improving plant performance.



HISTORY OF THE NRC'S INVOLVEMENT IN PERFORMANCE INDICATORS

- July 16, 1984 Letter from President of INPO to NRC Executive Director for Operations (EDO)
- INPO expressed concern about erroneous scram data released publicly by the NRC and the difficulties this had caused.
- September 1984 R. C. DeYoung memo to Denton, Stello, and NRC Regional Administrators
- Proposed to replace "current requirement for a QA Program Description with a requirement for tracking of performance indicators in key functional areas." As benefits of this proposal, the memo stated "these changes should serve to identify those plants above and below the industry average and so allow the NRC to better allocate its inspection resources. More importantly, it will require licensees to identify and trend the most significant indicators of plant performance and give NRC an objective method for measuring utility management effectiveness." Example given was a utility's effort based on INPO Good Practice OA-102
- July 10, 1985 Letter from President of INPO to EDO (see Appendix A)
- Informed the NRC that INPO is seeing examples of increasing NRC pressure on the industry to reduce scrams. Noted that it is not in the best interest of reactor safety to pressure utilities on scrams. Warned that such NRC use of scram information could result in nonconservative or incorrect decision by operating personnel.
- February 24, 1986 Letter from Utility CEO to President of INPO
- CEO discussed recent meeting with NRC Regional Administrator. Administrator told CEO that his Region was tracking the performance of nuclear power plants under fourteen different criteria [including weighting factors for different types of unusual events]. The CEO also told INPO that NRC is reducing number of NRC

inspections at certain plants in the Region and that there would not be more inspections unless brought about by an increase in personnel errors or scrams.

May 5, 1986

SECY-86-144; PERFORMANCE INDICATORS

Stated that the staff was recently asked to submit a proposal to Commission for approval. Noted that several parts of the staff "are using and developing performance indicators for various purposes." SECY asked for Commission approval of plan which includes establishment of interoffice task group, development of a trial indicator program, and a final proposal by September 1986. SECY stated that interoffice group will discuss coordination with industry groups such as INPO.

June 11, 1986

Meeting of NRC task group on performance indicators with INPO representative in attendance

INPO employee in trip report stated "it appears that the NRC is undertaking a massive effort to reinvent the (performance indicator) wheel. I heard many questions being asked that INPO has struggled with for a long time and finally resolved."

At the meeting, it was pointed out that the industry would be reluctant to accept these indicators because of the redundancy of the effort with industry efforts.

July 7, 1986

Letter from E.L. Jordan (NRC) to attendees at June 11 meeting

Reported that task group has selected 17 indicators for the trial program.

August 15, 1986

NRC/INPO meeting on performance indicators

The definition of each INPO and NRC indicator was discussed. There were seven [of 17] indicators common to INPO and NRC programs. There were differences in definitions of some indicators.



INPO senior management reviewed INPO's concerns with NRC use of indicators.

September 12, 1986 Telephone conversation between INPO and NRC staff

NRC informed INPO that eight of 17 indicators discussed at August 15, 1986 meeting had been selected for trial use by NRC. NRC would monitor trends in the eight indicators they had chosen and provide these trends to the regions and NRC top management. The regions would be asked to explain adverse trends to NRC management.

September 15, 1986 NRC meeting on performance indicators with INPO representative present

NRC stated that the trial program had been conducted with eight indicators being chosen. Further, the intended use of the program was stated to be to provide quarterly indicator reports to the regions and to identify outliers in performance.

October 28, 1986 SECY-86-317; PERFORMANCE INDICATORS

The EDO submitted staff's final plan on performance indicators for approval by the Commission. Plan identified eight performance indicators to be tracked and outlined an action plan to produce the first quarterly report on indicators by February 1987.

November 5, 1986 Letter from President of INPO to Chairman NRC (see Appendix B)

Letter requested the Commission not to adopt a separate set of performance indicators for use in a regulatory sense. INPO offered to share plant-specific data on industry overall performance indicators. Letter also reiterated INPO's safety concerns with NRC focus on indicators leading to nonconservative action by plant personnel.

November 7, 1986 NRC Commissioner meeting

NRC staff presented performance indicator program to the Commissioners. Following the

meeting the Commissioners voted to approve the staff plan (SECY-86-317).

November 19, 1986 INPO/NRC meeting on performance indicators

Various details of the NRC's final program were discussed with the INPO staff including a detailed review of the NRC indicators and how the NRC planned to use the indicators in monitoring plant performance. The NRC offered a memorandum of agreement with INPO. This agreement requested that INPO and the NRC share plant data so that burden on the industry would not be increased by multiple data collection efforts. The proposed agreement was not clear enough on how the NRC would use the data shared. INPO offered to prepare a revised agreement for NRC/INPO discussion.

March 26, 1987 Meeting between INPO President and Chairman of NRC

Discussed NRC use of performance indicators at length.

April - May, 1987 Numerous interactions between INPO and NRC staff

Attempted to develop an appendix to the NRC/INPO Memorandum of Agreement which would describe NRC/INPO use of performance indicators.

May 7, 1987 SECY-87-117; COORDINATION PLAN FOR NRC/INPO USE OF PERFORMANCE INDICATORS

The EDJ requested Commission approval of the proposed appendix to the NRC/INPO Memorandum of Agreement. (Approval was never obtained.)

May 13, 1987 INPO briefing of NRC Commissioners

During periodic briefing of NRC Commissioners by INPO senior managers, NRC Chairman described how he saw the NRC using performance indicators. **INSIDE NRC** quoted the Chairman: "I think that they [performance indicators] can be used by us as a tool in regulation ... to trigger inspections and the further analyses." The President of INPO stated that he is in



close philosophical agreement with the Chairman except that the indicators are best used as a management tool and should not be used, for example, in SALP ratings.

May 14, 1987

Letter from President of INPO to Chairman of NRC (see Appendix C)

Asked the NRC to refrain from tracking the performance indicators that the industry was using. INPO indicated willingness to work out agreement with NRC staff on performance indicators that assured pressure would not be put on operators to make nonconservative actions and that line utility management prerogatives were preserved. Reemphasized that best role for NRC was to monitor and encourage strong industry program that was in place and progressing.

May 21, 1987

Letter from President of INPO to Chairman of NRC

Follow-up letter to May 14 letter. Pointed out that NRC's current course of action in performance indicators tended to undermine INPO's ability to undertake new initiatives. Stated "An NRC initiative in an area where INPO had taken aggressive action, and where industry involvement and progress is clearly impressive, has the certain potential to cause utilities to be less receptive and less aggressive in responding to future INPO initiatives."

June 9, 1987

NRC staff briefing of the Commission

The staff briefed the Commission on the performance indicator program. The program now included seven indicators of which four were also industry indicators. Staff planned to expand the program to include risk basing, maintenance indicators, training indicators, administrative performance and others.

August 13, 1987

SECY-87-207; POLICY FOR USE OF PERFORMANCE INDICATORS

The EDO requested the Commission to review the staff's policy for use of performance indicators.

December 2, 1987	Commission response to SECY-87-207
	Approved issuance of SECY-87-207 subject to four major revisions which stress that the indicators must be used by NRC senior management only and must be used carefully.
February 5, 1988	NRC Announcement No. 30
	Promulgated NRC employee guidance on the use of performance indicators.
	Relative to INPO's earlier concerns and the draft appendix to the NRC/INPO Memorandum of Agreement, the guidance addressed several key points but fell short in several areas:
	<ul style="list-style-type: none"> <li>o not enough emphasis on preserving use of indicators as a utility line management tool</li> <li>o no explicit recognition that the use of certain indicators such as unplanned scrams and forced outage rate is particularly sensitive with respect to pressure on the plant staff</li> <li>o emphasized use of indicators as a tool by senior NRC management but did not specifically mention that interactions with a utility on performance indicators should be also at senior management level</li> </ul>
January 1988 - present	Numerous interactions between NRC and INPO staffs
	Ongoing discussions occurred on the draft appendix to the NRC/INPO Memorandum of Agreement on performance indicators and on NRC's proposed maintenance indicators. INPO attempted to include sufficient principles for proper use along the lines discussed in Announcement 30.
March 1988	Meeting with NRC staff (NRR, RES, AEOD)
	INPO and NRC staff exchanged information on the development of NRC's safety system performance indicator. INPO expressed concerns that this



NRC effort duplicated and undermined considerable industry effort in safety system monitoring which began in 1985 and was implemented in January of 1988. Also, INPO reiterated concern with NRC using performance indicators in SALP ratings.

April 15, 1988

Letter from INPO to NRC

Data for four of the industry overall performance indicators (unplanned automatic scrams while critical, unplanned safety system actuations, forced outage rate, and collective radiation exposure) for the period 1985 through 1987 was provided to NRC.

August 18, 1989

Letter from INPC to NRC (see Appendix D)

Provided comments on draft AEOD report on industry scram reduction. Stated that INPO's primary concern with the report was its exclusive focus on a single indicator (scrams) and the inclusion of manual scrams. Tone of report emphasized continued scram reduction efforts without consideration of negative effects.

October 7, 1988

SECY-88-289; PRELIMINARY RESULTS OF THE TRIAL PROGRAM ON MAINTENANCE PERFORMANCE INDICATORS

The EDO informed the Commission of the preliminary results of the staff's efforts to develop maintenance performance indicators. The NRC staff concluded that process indicators had merit for plant-specific monitoring and control, but not industry-wide monitoring by NRC. However, the use of NPRDS to constructing maintenance effectiveness indicators "provided reasonable and encouraging results." Recommended that the staff continue to develop and validate maintenance effectiveness indicators using NPRDS.

May 18, 1989

Meeting between INPO and NRC staff

Differences in published values of common indicators between industry and NRC reports were discussed. The differences were largely attributed to different criteria for data selection and different rules for exclusion of plants from averaged values.

June 26, 1989

SECY-89-143/COMLZ-89-21; AMENDMENT TO 10 CFR  
50 RELATED TO MAINTENANCE OF NUCLEAR POWER  
PLANTS

The Commission directed the staff to proceed with the validation and implementation of maintenance performance indicators on an expedited basis.

July 24, 1989

## Meeting at NUMARC

NRC, NUMARC, and INPO staffs met at NUMARC headquarters to discuss NRC development of maintenance performance indicators. INPO reiterated previous concerns and expressed specific concern with NRC's proposed use of the NPRDS data base to develop a maintenance effectiveness performance indicator as follows:

- o the development and use of performance indicators should be preserved as an industry initiative instead of regulatory initiative
- o detailed indicators (such as maintenance indicators) should be kept at the plant for internal management use -- experience shows these indicators are not particularly useful in providing meaningful industry comparisons
- o monitoring of plant performance should focus on a set of overall indicators, not on maintenance indicators or individual indicators (like scrams)
- o using NPRDS as a source of information for a maintenance effectiveness indicator may impact reporting of failures to NPRDS





Institute of  
Nuclear Power  
Operations

Attachment 2  
Appendix A

1100 Circle 75 Parkway  
Suite 1500  
Atlanta, Georgia 30339  
Telephone 404 953-3600

July 10, 1985

Mr. William J. Dircks  
Executive Director for Operations  
United States Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear <sup>Bill</sup> Mr. Dircks:

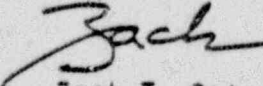
We are beginning to see examples of increasing NRC pressure on the industry to reduce unnecessary scrams, especially since Dennis Wilkinson's letter to the industry on this subject in early 1984, a copy of which was furnished to the NRC.

Reducing the number of unnecessary scrams without (ever) eliminating a necessary scram is a delicate matter. At INPO, we are continuing to encourage the industry to reduce unnecessary scrams, but we constantly stress the need to manage for excellence using a broad set of performance indicators, of which scram performance is only one. We also constantly stress to member utilities that in striving for improved performance against measurable objectives, they must keep these efforts in perspective for their operational and technical personnel. For example, in the case of scrams, we cannot afford to have any operator feel concern over initiating a scram that he thinks is warranted.

I do not believe that it is in the best interest of reactor safety for the NRC, as the regulator, to put pressure on utilities to reduce scrams. I believe senior NRC management can encourage industry progress in general discussions relating to a wide range of performance indicators. But specific regulatory programs or activities that put pressure on the utility to reduce scrams, reduce forced outages, or increase availability could result in an unconservative or incorrect decision by personnel involved in operating a nuclear station.

Using quantifiable performance indicators is, in fact, a good example of an area where the industry, with INPO assistance, is making progress, but which is not amenable to the regulatory process. We have been working in this area for some four years now and are beginning to see some encouraging results. A copy of a recent summary we prepared is enclosed. We will try to manage our activities in this important area to best serve the utilities, the NRC, and the public. Your support, along the lines I have discussed, will be helpful in achieving our mutual objectives.

Sincerely,

  
Zack T. Pate  
President

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adw  
Enclosure



Institute of  
Nuclear Power  
Operations

Suite 1500  
1100 Circle 75 Parkway  
Atlanta, Georgia 30339  
Telephone 404 953-3600

November 5, 1986

The Honorable Lando W. Zech, Jr.  
Chairman  
United States Nuclear Regulatory Commission  
1717 H Street, N. W.  
Washington, D.C. 20555

Dear Chairman Zech:

The purpose of this letter is to express our views on the use of performance indicators to support improved performance of U.S. nuclear power plants. INPO is prepared to cooperate with the NRC in this important area, but we do have concerns over how performance indicators are used. In our view, the adoption of a formal performance indicator program by the NRC has potential adverse consequences.

As you are aware, INPO has been working with the industry on the development and use of performance indicators for several years, and we have worked closely with the NRC staff as they have explored the use of such indicators. Industrywide recognition of a set of ten overall performance indicators has been achieved, and utilities are using these and other indicators as an aid in monitoring plant performance. Each U.S. utility with an operating unit has set challenging short and long-term goals for most of the ten overall performance indicators. In addition, many of INPO's international participants are using these performance indicators and some have established long-term performance goals. We have made considerable progress in arriving at common definitions -- not only in the U.S., but internationally for several of our overall indicators.

Experience has shown that NRC focus on a particular issue or parameter exerts a powerful influence on licensee behavior. Our concerns about the implication and impact of NRC's use of performance indicators in a formal regulatory sense can be summarized as follows:

- a. Strong NRC focus on minimizing scrams and safety system actuations or reducing forced outages will send the wrong message to utility middle management and working level personnel, and could result in a nonconservative decision with serious safety consequences. This vitally important concern is discussed in more detail in my July 10, 1985 letter to Bill Dircks (Attachment 1).

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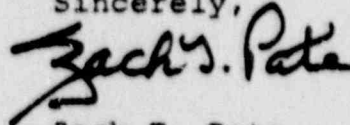
- b. Use of performance indicators as a formal regulatory mechanism will lead to utilities placing undue emphasis on "managing the indicators" instead of managing the plant.
- c. NRC use of a set of indicators that is different from those widely recognized and in use throughout the industry can detract from this important industry initiative and the healthy competition to achieve goals for improved performance. My letter of July 16, 1984 to Bill Dircks (Attachment 2) reflects an example of the kind of difficulty that can arise in this regard.

Our experience in working with utilities over the past five years is that even a carefully chosen set of overall performance indicators cannot provide a real time, reliable measurement of plant performance. Nevertheless, we understand your desire to use quantitative performance indicators to help gain additional perspective on the performance of licensed nuclear units. INPO's response to one of the Sillin Task Committee recommendations (Attachment 3) reflects our willingness to share plant-specific performance indicator results with the NRC and summarizes our position.

In summary, we urge the Commission not to adopt a separate set of performance indicators for use in a formal regulatory sense. Instead, we request that you consider our offer to share plant-specific data on the overall performance indicators that are widely recognized and used throughout the industry. We further recommend that you reserve use of performance indicator data to enhance senior NRC management and Commission perspective on plant performance as opposed to incorporating this effort into more formal regulatory interactions with licensees.

We hope these views are useful to the Commission in your deliberations on this important matter. We would be happy to discuss this further with you or the Commission at your convenience.

Sincerely,



Zack T. Pate  
President

ZTP:tk

cc/w: The Honorable James K. Asselstine  
The Honorable Frederick M. Bernthal  
The Honorable Kenneth M. Carr  
The Honorable Thomas M. Roberts  
Mr. Victor Stello

Institute of  
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Operations1100 Circle 75 Parkway  
Suite 1500  
Atlanta, Georgia 30339  
Telephone 404 953-3600

July 10, 1985

Mr. William J. Dircks  
Executive Director for Operations  
United States Nuclear Regulatory Commission -  
Washington, D.C. 20555

Dear <sup>Bill</sup> Mr. Dircks:


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Sincerely,

  
Zack T. Pate  
President

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Enclosure



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July 16, 1984

Mr. William J. Dircks  
Executive Director for Operations  
United States Nuclear Regulatory  
Commission  
Washington, DC 20555

Dear <sup>Bill</sup> Mr. Dircks:


A May 28, 1984 INSIDE NRC article stated that a new NRC compilation showed an increase in the average number of scrams per plant from 5.5 for the 1980, 81 and 82 three-year average to 6.5 for 1983. We understand that this data was made public by a senior member of the Division of Human Factors Safety during a May 11, 1984 ACRS General Meeting. As you may know, a recent INPO study indicated a decline in the average number of automatic plant scrams for 1983 from the 5.5 average for 1980-82 (source: NRC Gray Book). Copies of the INSIDE NRC article and the INPO letter are enclosed for convenient reference.

After extensive review, we conclude that the 6.5 average for 1983 as quoted to the ACRS must have included all trip-related data from the informal daily "50.72" phone report (this data includes manual trips, start-up test scrams, and reactor protection system actuations), whereas the 5.5 average for 1980-82 (that has been quoted widely) comes from NRC Gray Book data. If the "non-automatic scram" data is subtracted from the raw "50.72" data, the 1983 scram rate corroborates the Gray Book automatic scram data and agrees with the INPO report.

Bill, we received many questions about our report on the trend of scrams after the inaccurate statement before the ACRS. As you know, after such a "media release" occurs, it is difficult to set the record straight and some damage to INPO's credibility is an inevitable result. I would appreciate it if you would set the record straight with your staff and with the ACRS.

We are a bit slow in addressing this matter but I asked my people to check and recheck the data before writing to you. Thank you for your support.

Sincerely,

  
Zack T. Pate  
President

8408220314 ZPP

EXTRACT FROM INPO RESPONSES TO THE AUGUST 1986 REPORTLEADERSHIP IN ACHIEVING OPERATIONAL EXCELLENCESillin Task Committee Recommendation C:

Continue its development of performance indicators and other means (that correlate with evaluation results):

- (1) for use in tracking performance between evaluations; and,
- (2) for determining the need for action where adverse trends are indicated.

The performance indicator results, on an industrywide basis and for each unit, should be made available to the nuclear utility industry and to the NRC.

INPO Response:

The Institute will continue to refine the Plant Performance Indicator Program, including performance indicator correlation with evaluation results. Currently, all member utilities are reporting data on a quarterly basis to INPO on nine overall performance indicators and several other selected indicators. A report of generic performance indicator results will be issued semi-annually on an industry-wide basis.

In INPO's view, the Performance Indicator and Long Range Goals programs have three purposes as follows:

- (1) They allow utility managers to trend the performance of their nuclear units. The performance indicators, and the "other" indicators, thus serve as a management tool for utility managers.
- (2) They provide a basis for healthy competition between nuclear stations and between utilities in the industrywide quest for improved performance.
- (3) The performance indicators can serve as useful leads for INPO evaluation teams, on a selective basis, and can be helpful to senior INPO management in assessing overall performance patterns, on a limited basis (INPO learns far more about a plant's performance and safety margin from an evaluation team visit than from a review of performance indicators).

At this point in time, the first two purposes are by far the most important.

For these reasons, and because of the inherent time delays in information determined from performance indicators, INPO does not believe they can or should be used for determining when corrective action is needed at a nuclear station by INPO (or by the NRC). Instead, this type of use should be reserved for utility managers, thus reserving the use of these indicators as utility management tools, in keeping with the relative importance of the purposes discussed above.

The semi-annual report of generic performance indicator results will be shared with the NRC as recommended. In addition, INPO will seek to work out arrangements with the NRC whereby plant-specific results for the overall performance indicators are furnished to the NRC on a periodic and timely basis, subject to the NRC's agreement on the purposes of this important effort and the understanding that the NRC will not allow the indicators to become regulatory tools, or regulatory-type measurements of plant performance.

October 22, 1986





Institute of  
Nuclear Power  
Operations

1100 Circle 75 Parkway  
Suite 1500  
Atlanta, Georgia 30339  
Telephone 404 953-3600

May 14, 1987

The Honorable Lando W. Zech, Jr.  
Chairman  
United States Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

During INPO's briefing of the commissioners yesterday, you described your thoughts with respect to the use of performance indicators and asked for my views. I understood your discussion to be of a philosophical nature related to the use of these indicators in the nuclear power business, but my staff concluded that you were expressly describing how NRC would use the indicators.

We generally agree with the philosophical approach you described (subject to my points that the performance trends indicated by these indicators are very time late, and that their principal use should be reserved to utility line management for their own goal setting, etc.). However, we continue to believe that the best overall approach from a nuclear safety standpoint is for the NRC to refrain from tracking and avoid using the performance indicators that the industry and INPO are utilizing.

Notwithstanding this, in recognition of NRC's apparent determination to use some of the indicators already put in place by the industry, we have been and will continue to seek working agreements with the NRC staff that:

- minimize duplication
- reduce the possibility of a non-conservative decision at the working level in a nuclear plant (for example, as a result of perceived pressure to reduce scrams or forced outage rate)
- preserve utility line management prerogatives, and
- encourage utilities to continue to set aggressive goals for their nuclear plants, based on the performance indicators.

We re-emphasize, however, our conclusion that the best role for the NRC is to monitor and encourage the strong industry initiative that is in place and progressing well, and not use the same indicators in NRC activities. We stress that this industry initiative began in 1980, and has resulted in every utility's setting year-to-year as well as long-term goals, using the indicators developed by INPO. We also stress the impressive progress the

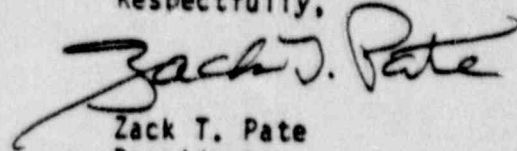
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The Honorable Lando W. Zech, Jr.  
May 14, 1987  
Page 2

industry has made over the past few years as measured by these indicators; as shown in INPO's successive annual reports, and as frequently acknowledged by the NRC.

We respectfully request that you consider the above points as we continue to work toward a coordinated approach that is in the best interest of nuclear plant safety and reliability.

Respectfully,

A handwritten signature in cursive script that reads "Zack T. Pate". The signature is written in black ink and is positioned above the printed name and title.

Zack T. Pate  
President

adw





Institute of  
Nuclear Power  
Operations

Suite 1500  
1100 Circle 75 Parkway  
Atlanta, Georgia 30339  
Telephone 404 953-3600

August 18, 1988

Mr. Thomas M. Novak, Director  
Division of Safety Programs  
Office for Analysis and Evaluation  
of Operational Data  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Novak:

Thank you for the opportunity to review the draft report entitled, "Operating Experience Feedback Report - Progress in Scram Reduction." The report is a useful compilation and review of scram data for the period January 1984 to January 1988. Our review of scram data through the end of July 1988 indicates continued industry progress with a 1988 projected scram rate of 2.3 unplanned automatic scrams per unit-year.

Our primary concerns with the report are its exclusive focus on a single indicator and the inclusion of manual scrams. On page 2 of your cover letter (in the fourth paragraph) you state that continued improvement in the scram reduction rate "will require increased dedication and effort." This same general tone of emphasis on scram reduction without consideration of possible negative side effects is reflected in the report. While efforts to reduce scrams should continue, determining an appropriate balance in the allocation of resources among scram reduction efforts and other efforts to improve nuclear safety is a utility line management prerogative.

As we have noted before, strong regulatory focus on a narrow set of indicators or a single indicator can be counterproductive to safety. For example, trying to drive the number of scrams to zero sends the wrong message to utility management and working level personnel and could result in a non-conservative decision with serious safety consequences, particularly when manual scrams are included. We cannot afford to have any operator feel concern over the initiation of a scram or other safety system actuation that is warranted. This vitally important concern is discussed in more detail in Zacklate's July 10, 1985 letter (see Attachment) to Bill Dircks, then Executive Director for Operations of the U.S. NRC.

It is recognized that the focus on a single indicator cannot be avoided if the report is to be published. However, manual scrams should be excluded and additional perspective along the lines noted above should be provided.

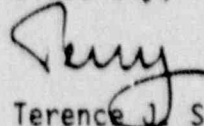
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The following additional comments on the report are provided for your review and consideration:

- o In trying to compare the data in the report with the data we have collected in the INPO scram database, we did not make detailed comparisons for technical accuracy. Although slight differences in data were noted, these discrepancies are probably due to different data classifications and different criteria used by INPO and the NRC to classify scrams.
- o On page 67, Section 3.3.4.9, item 1 and page 84, Section 4.2.3, the following statement is made: "since they (Combustion Engineering NSSS's) constitute just 14 percent of the critical hours, it is possible that the industry as a whole can reach its goals without improvement in scram performance by plants with CE NSSS's as long as the major vendors do more than their share prior to 1990." These types of statements should be deleted. They serve no useful purpose and could be counterproductive to the industry's initiative in this area.
- o On page 18, Table 3-6, the pre-commercial value for scrams per 1000 critical hours at Waterford 3 is incorrect. Based on the data shown in the table, the correct value should be 5.82 and not 11.59

If you would like to discuss our concerns further or if there are any questions, please feel free to call me.

Sincerely,



Terence J. Sullivan  
Group Vice President  
Analysis and Engineering

TJS:mp

Attachment: (1) Draft "Operating Experience Feedback Report -  
Progress in Scram Reduction"  
(2) Zack Pate letter of July 10, 1985 to W. J. Dircks, NRC

cc/wo: J. M. Taylor  
E. L. Jordan  
Z. T. Pate  
P. M. Beard, Jr.