

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

March 1, 2002

**NRC REGULATORY ISSUE SUMMARY 2002-04  
RESULTS OF THE PILOT TEST OF THE PROPOSED CHANGES TO  
THE UNPLANNED SCRAMS PERFORMANCE INDICATOR AND  
THE SCRAMS WITH LOSS OF NORMAL HEAT REMOVAL  
PERFORMANCE INDICATOR**

**ADDRESSEES**

All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

**INTENT**

The U.S. Nuclear Regulatory Commission (NRC) is issuing this Regulatory Issue Summary (RIS) to inform power reactor licensees of the results of a 6-month pilot test of proposed changes to the "unplanned scrams per 7,000 critical hours" and the "scrams with loss of normal heat removal" performance indicators (PIs) in the Reactor Oversight Process (ROP).

The NRC/Industry Working Group evaluated the pilot results using the guidelines in RIS 2000-21, "Changes to the Unplanned Scram and Unplanned Scram With Loss of Normal Heat Removal Performance Indicators." Based on the results of the pilot test, the NRC has concluded that the replacement indicators would not be as effective or reduce the potential for unintended consequences. Therefore, the current unplanned scrams per 7,000 critical hours PI will not be changed. The definition of the unplanned scrams with loss of normal heat removal PI will be slightly revised.

**BACKGROUND INFORMATION**

On March 28, 2000, senior NRC and industry managers met to discuss industry's concern regarding potential adverse impact of the current scram indicators. Some industry representatives indicated that including manual scrams in the current scram PIs could potentially result in nonconservative decision-making by operators during a plant event for which a manual scram is warranted. To address these concerns, the industry proposed two replacement PIs, "unplanned reactor shutdowns per 7,000 critical hours" and "unplanned reactor shutdowns with loss of normal heat removal."

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The NRC/Industry Working Group, which consists of NRC management and staff, Nuclear Energy Institute (NEI) management, and senior industry representatives, met in monthly meetings to refine the proposed replacement scram indicators, plan a pilot test, and develop the criteria to be used to evaluate the pilot results. In developing and evaluating the proposed replacement PIs, the NRC/Industry Working Group followed the formal process that is documented in Inspection Manual Chapter 0608, "Performance Indicator Program."

The 6-month pilot test began in October 2000. The plants that participated in the pilot were James A. FitzPatrick; Salem Units 1 and 2; Hope Creek; Shearon Harris; Joseph M. Farley Units 1 and 2; Vogtle Units 1 and 2; Edwin I. Hatch Units 1 and 2; Dresden Units 2 and 3; Prairie Island Units 1 and 2; Palo Verde Units 1, 2, and 3; Diablo Canyon Units 1 and 2; and Fort Calhoun. Upon completion of the pilot, the data was evaluated to determine if the proposed replacement PIs were as effective as the current PIs at indicating performance in the initiating events cornerstone and more effective at minimizing the potential for unintended consequences.

## ISSUE SUMMARY

Some industry representatives expressed the concern that including manual scrams in the current PIs could potentially result in nonconservative decision-making during a plant event for which a manual scram may be warranted. As a result of these concerns, the NRC and Industry pilot-tested proposed replacement PIs to evaluate their effectiveness and accuracy to determine if they should be adopted.

The NRC/Industry Working Group used the five criteria delineated in RIS 2000-21 to evaluate the data from the 6-month pilot test. The criteria and results of the evaluation are as follows:

- Criteria:** Differences between data collected for the "unplanned reactor shutdowns per 7,000 critical hours" and "unplanned scrams per 7,000 critical hours" PIs.

**Results:** There were no differences between the data collected in the pilot test of the proposed unplanned reactor shutdowns per 7,000 critical hours PI and the current unplanned scrams per 7,000 critical hours PI. The same 8 scrams were reported by the 13 pilot plants under each indicator. The NRC staff also reviewed the licensee event report (LER) database for all scrams reported by the industry in 2000 (before the pilot test) to identify any events that would likely not have been reported under the replacement PIs if they had occurred during the trial. The staff found 13 such scrams (about 14 percent of the 92 scrams that year). As a result, the NRC determined that implementation of the proposed replacement PI as proposed would likely not have captured all reactor scrams. Needed changes to the proposed PI to address this concern would not be simple or necessarily effective.
- Criteria:** Comparability of the data reported for the "unplanned reactor shutdowns with loss of normal heat removal" and the "scrams with a loss of normal heat removal" PIs. Additionally, the NRC would compare the rate of occurrence of "unplanned reactor shutdowns with loss of normal heat removal" and the scrams with loss of normal heat

removal results presented in NUREG/CR-5750, "Rates of Initiating Events at U.S. Nuclear Power Plants 1987 - 1995," (Sections: Loss of Feedwater and Loss of Heat Sink Events), to identify differences.

**Results:** According to NUREG/CR-5750, the expected number of scrams with loss of normal heat removal for the pilot plants is 2.42 events per 6 months. Two of these events were reported during the pilot (a good correlation), but none were reported under the existing ROP guidance. The two events captured in the pilot should have been captured in the existing PI data. Early in the initial implementation of the ROP and before the pilot, the NRC/Industry Working Group became aware of problems in the definition of "loss of normal heat removal" in the existing guidance. Consequently, the NRC/Industry Working Group developed a revised definition and tested it during the pilot, along with a revised definition of "scrams." The pilot results demonstrated that the revised definition of "loss of normal heat removal" should be included in the ROP guidance regardless of which PI is employed.

3. **Criteria:** Ability of licensees to report the requested data accurately and with minimal need for clarification.

**Results:** The pilot test results did not favorably indicate the licensee's ability to report the replacement PI data accurately and with minimal need for clarification. A significant number of reactor scrams would likely be missed by the proposed replacement indicators. A simple clarification in the guidance would have captured 6 of the 13 scrams in the year 2000 that might have been missed. The NRC/Industry Working Group attempted but was not able to develop a simple and effective clarification for the other seven scrams. Therefore, the staff concluded that the proposed replacement indicators would likely not provide the same data as provided by the current PIs.

4. **Criteria:** Ability of each alternate PI to reduce the potential for unintended consequences without introducing other unintended consequences.

**Results:** The proposed alternative PIs did not demonstrate the ability to reduce the potential for creating unintended consequences below those which might be postulated using the existing scram PIs. For example, it has been suggested that continued use of the current scram PIs may result in operators not initiating a manual scram when needed to avoid a PI "hit," which would be counter to safety-conscious operation. However, the proposed replacement PIs do not resolve this concern.

5. **Criteria:** Whether there are minimal changes in reporting burden for licensees.

**Results:** Based on the review of the pilot experience, the proposed replacement indicators would not increase the regulatory burden of reporting data. However, two clarifications would be needed to ensure that accurate data is reported. One clarification would be straightforward, the other would not. The more complex clarification could increase licensee reporting burden by requiring more interaction with the staff to ensure data accuracy.

In summary, the replacement PIs would likely miss some of the scrams that would be captured by the existing PIs. Changes to address this concern would further complicate the PIs and would require increased effort on the part of the NRC and the Industry to ensure that they are reported accurately. Finally, the replacement PIs would not decrease and would likely increase any potential for unintended consequences.

Based on the results of the pilot test, as evaluated by the NRC/Industry Working Group in accordance with the formal change process, the NRC has decided to retain the existing scram PIs and not to adopt the proposed replacement PIs. However, the definition and the clarifying notes in the current "loss of normal heat removal" PI were revised in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Rev. 2. This document was made available to the public on January 1, 2002.

## **BACKFIT DISCUSSION**

This RIS requires no action or written response. Any action on the part of addresses to collect and transmit PI data is strictly voluntary and, therefore, is not a backfit under 10 CFR 50.109. Therefore, the staff did not perform a backfit analysis.

## **FEDERAL REGISTER NOTIFICATION**

A notice of opportunity for public comment on this RIS was not published in the *Federal Register* because the NRC has worked closely with NEI, industry representatives, members of the public, and other stakeholders since early 1998 on the development of NRC's ROP, including the collection of PI data. A January 10, 2001, *Federal Register* notice solicited written comments by April 13, 2001, on all aspects of the new ROP. A 3-day public workshop for external stakeholders was held in late March, 2001. Monthly public meetings on the PI process and other ROP issues were held during Spring 2001, at which time, the pilot PI effort was discussed and interested stakeholders were given the opportunity to comment.

**PAPERWORK REDUCTION ACT STATEMENT**

This RIS does not request any information collection; therefore, this RIS is not subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

If you have any questions about this matter, please telephone or email the technical contact listed below.

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Attachment: List of Recently Issued NRC Regulatory Issue Summaries

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LIST OF RECENTLY ISSUED  
NRC REGULATORY ISSUE SUMMARIES

Regulatory Issue Summary No.	Subject	Date of Issuance	Issued to
2002-03	Guidance on the Content Measurement Uncertainty Recapture Power Uprate Applications	01/31/2002	All holders of operating licenses for nuclear power reactors, except those that have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.
2002-02	Lessons Learned Related to Recently Submitted Decommissioning Plans and License Termination Plan	01/16/2002	All NRC licensees.
2002-01	Changes to NRC Participation in the International Nuclear Event Scale	01/14/2002	All NRC licensees and certificate holders.
2001-25	NEI-099-02, Revision 2, Voluntary Submission of Performance Indicator Data	12/12/2001	All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.
2001-24	Status of Receipt of NRC Mail Following the Closing of the Brentwood Postal Facility	12/06/2001	All NRC licensees
2001-23	Resetting Fault Exposure Hours for Safety System Unavailability Performance Indicators	12/03/2001	All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel