

May 12, 2004

MEMORANDUM TO: Stuart A. Richards, Chief  
Inspection Program Branch  
Division of Inspection Program Management  
Office of Nuclear Reactor Regulation

FROM: John W. Thompson */RA/*  
Performance Evaluation and Assessment Section  
Inspection Program Branch

SUBJECT: FORTHCOMING MEETING WITH INDUSTRY TO DISCUSS THE  
MITIGATING SYSTEMS PERFORMANCE INDICATOR AND ONGOING  
REACTOR OVERSIGHT PROCESS ISSUES

DATE AND TIME: May 26 and 27, 2004  
9:00 a.m. - 4:00 p.m.

LOCATION: U. S. Nuclear Regulatory Commission  
One White Flint North  
Rooms O10B4 a.m./O9B4 p.m. (May 26) and O16B4 (May 27)  
11555 Rockville Pike  
Rockville, Maryland 20852

PURPOSE: To conduct a combined public meeting on the Mitigating System  
Performance Index (MSPI) program and the monthly Reactor Oversight  
Process (ROP) Working Group. Group participants will discuss issues  
and concerns with the piloted MSPI as documented in SECY-04-0053.  
The combined meeting will also discuss ROP issues involving proposed  
Significance Determination Process (SDP) proposed changes, ROP  
issues, and open and new Frequently Asked Questions (FAQs).

CATEGORY 2:\* This is a Category 2 Meeting. The public is invited to participate in this  
meeting by discussing regulatory issues with the Nuclear Regulatory  
Commission (NRC) at designated points identified on the agenda.

AUDIO-TELE-  
CONFERRING: Interested members of the public can participate in this meeting via a  
toll-free audio teleconference. For details, please call the NRC  
meeting contact listed on the NRC web site or call the NRC's toll-free  
number, 1- 800-638-5642, and ask the operator to be connected to  
the meeting contact.

PARTICIPANTS: Participants from the NRC include members of the Office of Nuclear Reactor Regulation (NRR), the Office of Research (RES), and Regions 1, 2, 3, and 4.

NRC

B. Boger  
J. Thompson  
J. Andersen  
D. Wrona  
D. Hickman  
D. Dube

INDUSTRY

T. Houghton, et.al.

Attachments: (1) Agenda  
(2) Issue/Concerns Documented in SECY-04-0053

MEETING CONTACT: John W. Thompson  
(301) 415-1011  
jwt1@nrc.gov

\* Commissions' Policy Statement on "Enhancing Public Participation in NRC Meetings,"  
67 *Federal register* 36920, May 28, 2002

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NAME	JThompson
DATE	05/12/04

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# **MSPI WORKING GROUP PUBLIC MEETING AGENDA**

May 26, 2004

9 -11:30 a.m. (O10B4)

12:30 - 4:00 p.m. (O9B4)

9:00 - 9:15 a.m.	Introduction and Purpose of Meeting	(NRC staff)
9:15 - 11:30 a.m.	Discussion of Internal Stakeholder Issues as Documented in SECY-04-0053	(All)
11:30 - 12:30 p.m.	Lunch	
12:30 - 2:00 p.m.	Discussion Continued, if Necessary	(All)
2:00 - 2:15 p.m.	Break	
2:15 - 4:00 p.m.	Discussion Continued, if Necessary	(All)
4:00 p.m.	Adjourn	

# ROP MONTHLY WORKING GROUP MEETING

## AGENDA

May 27, 2004  
OWFN 9B4

- 9:00 a.m. Welcome and Introduction
- 9:05 a.m. Engineering Team Inspection Pilot Discussion
- 9:20 a.m. Discussion on SDP Timeliness Issues  
-Industry to evaluate examples for ways to improve the SDP process  
-Further discussion on proposed summer workshop
- 9:45 a.m. Discussion of Sections of NEI 99-02 that Need Clarification for Revision 3
- 10:15 a.m. Public Discussion & Break
- 10:30 a.m. Discussion of Safety System Functional Failures (SSFFs) PI Issues to be Addressed by the ROP Working Group  
-Industry to provide status of LER data review
- 10:45 a.m. RCS Leakage Performance Indicator Improvement Initiative  
-staff and industry to discuss objectives and purpose  
-staff and industry to exchange ideas on how to improve the indicator
- 11:00 a.m. Top Ten Action Items List
- 11:30 a.m. Discussion of Improvements to the FAQ Process
- 12:00 p.m. Break for Lunch
- 1:00 p.m. Discussion of Scrams with Loss of Normal Heat Removal PI
- 1:30 p.m. Discussion of FAQs
- 2:15 p.m. Public Discussion & Break
- 2:30 p.m. Discussion of other PI FAQs
- 4:00 p.m. Adjourn

## Issues/Concerns Documented in SECY-04-0053

### 1. **Concern with Use of a Front Stop (Risk Limiter) for Risk-Significant Single Failures**

The MSPI is designed to preclude a single risk significant failure from causing an NRC response beyond the baseline inspection program (the “Front Stop” concept). This concept was designed to address a concern for the “false positive” situation, where failures not indicative of current licensee performance with risk significance could inadvertently trip performance thresholds. However, occurrences of these types of failures are very infrequent and the vast majority of demand failures are associated with performance deficiencies.

### 2. **Concern with Component Failure Rates and Use of a Constrained Non-informative Prior (CNIP) and Bayesian Updating over a 12 Quarter Time Window**

MSPI estimates a change in core damage frequency (CDF) over 12 quarters of performance through use of generic industry failure means for the historical (prior) component failure distribution that is Bayesian updated with current performance data. The MSPI is characterized as a statistically significant, long-term performance trend indicator and it is influenced by two design features, use of a constrained, non-informative prior (CNIP) as a term in the component failure probability distribution, and Bayesian updating of the component prior with current, plant-specific failure data. Both of these features are desirable when attempting to identify a statistically valid, three year adverse trend in performance where site specific data is sparse. However, rapidly declining current performance over one or two quarters can be completely masked by the integration of average (or better than average) performance over the three years of performance monitoring. For components that have high reliability (and high risk worth), the CNIP approach may require a relative large number of failures before its mean value will significantly change. This causes a “pillow effect” (averaging of site and industry performance) that could mask some risk-significant failures. This “pillowing” effect creates a situation where there is an increase in the likelihood that the component failure would not trip a MSPI threshold, especially when combined with the Front Stop concept.

### 3. **Concern with Masking Subsequent Failures in MSPI’s White Band**

Once the MSPI Green/White performance threshold is crossed, additional failures, even if risk-significant, could occur without the MSPI triggering additional regulatory response through the Action Matrix. Only when the Yellow band is crossed would additional regulatory response be generated.

### 4. **Concern with the MSPI Not Including Risk from External Events, Internal Flooding, Shutdown Risk, Large Early Release Frequency (LERF), and the Limitations of MSPI Fussell-Vessly Risk Coefficients**

The MSPI does not include the risk contribution due to external events, internal flooding, shutdown, large early release frequency (LERF), and risk contribution from other component failures. For example, in the case of one pilot plant, two-thirds of the overall plant risk is due to external events; at a non-pilot plant this fraction was over 80%. The SDP considers Large Early Release Frequency (LERF); MSPI as currently proposed, does not. Under the current ROP guidelines, LERF and external events are required to be evaluated. The current MSPI as

piloted, would in a defacto sense, prevent this assessment from occurring. Additionally, the Fussell-Vessly (F-V) coefficient used in MSPI is calculated by holding all other equipment failures constant, except for one component. The F-V ratio term used in the MSPI equation does not account for other component failures. The F-V ratio term also does not account for operator recovery of failed equipment, when appropriate.

**5. The Projected Costs for the NRC Associated with Implementing MSPI if SDP is Eliminated Without Suitable PRA Standards and Models are High and Not Included in Current Budget Projections**

a. 2-Year Initial Implementation (all four regions)

(3) 3day(8hr/day) wkshops + 3 day training course =  $(72 + 72 \text{ hrs})/\text{site} * 2 \text{ inspectors} * 70 \text{ sites} = 20,160 \text{ hrs}$   
(3) 3day(8hr/day) workshops + 3 day training course =  $(72 + 72 \text{ hrs}) (40 \text{ reg. and hqs. staff}) = 5760 \text{ hrs}$   
Regional TI DIE expenditure = 200 hrs/site for 70 sites = 14000 hrs  
Prep and Doc = .75 (14000 hrs/site) 70 sites = 10,500 hrs  
FAQ resolution = 40 hours/month hqs + 80 hrs/mo regions = 120 hrs/mo \* 24 months = 2880 hrs  
Contractor/TI support = 1 FTE/yr for 2 years  
**Total: = 53300 hrs/1140 hrs/FTE = 46.7 FTE**

b. Long term MSPI Verification and Oversight (all four regions)

PI Verification baseline inspections = 50 hrs (70 sites) = 3500 hrs/yr (3.1 FTE)  
Prep and Doc = .75 (3500 hrs/yr) = 2625 hrs/1150 hrs = (2.3 FTE)  
FAQ resolution (hqs + regions) = 10 hrs/mo (hqs) + 20 hrs/mo (regions) = 360 hr/yr (.3 FTE)  
SPAR periodic upgrades = + 300 K/yr  
**Total: = 5.7 FTE & 300K** (note: Total with using SSU PIs = 3.2 FTE)

c. Concern with SPARs for the Non-MSPI Pilot Plants that Need to be Upgraded to the Level of Fidelity and Quality Similar to the MSPI Pilot Plants

During the MSPI pilot, the staff and pilot licensees exchanged information and performed detailed comparison studies between the existing SPAR rev 3i models and with the PRAs. The pilot effort identified discrepancies in both the SPAR models and with the assumptions in the PRA models. The pilot effort was successful in part due to industry providing a level of commitment that enable the staff to fully understand the differences between SPAR and PRA. Although not part of the current tasking and effort to upgrade SPARs, the level of industry commitment to provide information demonstrated during the MSPI pilot needs to be extended for the rest of industry.

d. Lack of a Suitable PRA Standard for MSPI

Both the Unreliability Index (URI) and Unavailability Index (UAI) portion of the MSPI equation use two multipliers that relate directly to the particular PRA model that is used by the licensee. However, no PRA quality standard has been established for the various licensee PRA models. The limited reviews between the NRC's SPAR models and the pilot program licensee's PRA models have already revealed modeling differences that would likely result in different regulatory responses due to the model used. In lieu of a suitable PRA standard, a standardized set of PRA guidelines as agreed to by the staff and industry should be in place prior to MSPI implementation.

e. Concern with the Staff Receiving Large Numbers of Frequently Asked Questions (FAQs) During MSPI Initial Implementation and Long Term Oversight

The staff is concerned that because MSPI is a complex PRA-based indicator, numerous FAQs would be generated that would create inefficiencies and resource issues. Part of minimizing this impact is to revise the FAQ process that allows for a finite period to discuss and resolve the issue, with the staff having the final decision authority to decide the outcome in a reasonable period of time. This process needs to be in place prior to implementing a revised, acceptable version of MSPI.

**6. Concern with the Elimination of SDP for Areas Covered by MSPI**

Prompt evaluation and assessment of performance deficiencies is a major premise of the Reactor Oversight Process (ROP) and is currently only performed by the Significance Determination Process (SDP). Implementing the Mitigating Systems Performance Index (MSPI) with the elimination of the SDP, as currently proposed, would prevent this goal from being met, and would constitute a major fundamental change in the ROP. MSPI is blind to the presence of performance deficiencies and not focused on identifying individual event significance. Additionally, risk assessment under MSPI (the detection of statistically significant adverse trends in performance), and risk assessment under the SDP (the evaluation and assessment of individual events), would cause a dichotomy in how the ROP treats MSPI-monitored components and those components that would still be assessed under the SDP process.

**7. Concern with the ROP's Enforcement Policy**

Enforcement will not be based on the significance of the specific issues but on an accumulated significance over a 3 year period. Identical issues on different units could result in different NRC responses, and less significant issues could result in higher NRC responses than a more significant issue (depends on order of occurrence). Even similar issues on the same unit could result in different enforcement, especially where fault exposure hours occur.

**8. Concern with Fault Exposure Unavailability**

The MSPI does not include system unavailabilities due to fault exposure hours; consequently, a potentially significant portion of the risk contribution due to actual unavailability is unaccounted for in the indicator. Unlike the MSPI, the SDP evaluates the risk increase using the true exposure time and, if it is not known, the program reasonably defaults to one-half the time since the function was confirmed to be operational. This exposure time is not part of MSPI even though the system function was lost (unavailable) for that time frame. Instead, the MSPI would take a demand and demand failure as a surrogate for the lost fault exposure unavailability. While this is a reasonable action to take for purposes of estimating unreliability, the risk contribution from the system being unavailable due to the fault exposure hours for long periods of time could be significantly underestimated by MSPI.

**9. Concerns with Maintaining Public Confidence**

The MSPI concept will be difficult for the public to understand. The data will not be available for public review. Currently, the licensee reports for the SSU PI unavailability hours with each monitored system. Using this information, the public can understand how the color for a performance indicator was determined. Under the MSPI, the impact on the unavailability index due to an out of service unavailability is not intuitively obvious. The diminished ability of the public to understand MSPI raises a question regarding the level of NRC independent verification that would be necessary to enhance public confidence and ensure that the MSPI would be correctly reported.