An NEI ROP Task Force Publication

ROP News and Information

February 2008

FUTURE MEETING DATES:

ROP Task Force Meetings

March 18
April 15
May 13

ROP Task Force/ NRC Meetings

February 20
March 19
April 16
May 14

Industry and NRC will also meet on April 17th to discuss Safety Culture.

Please contact Julie Keys (*jyk@nei.org*) if you have questions or would like information on the ROP Task Force.

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PENDING SECURITY PI REMOVAL

NRC is proposing to remove two of three PIs from the Physical Protection Cornerstone of the ROP. The Personnel Screening Program Performance and the Fitness-for-Duty/Personnel Reliability Program Performance PIs will no longer be reported by licensees under the proposed change. A Regulatory Issue Summary is being developed to communicate this change. Additional information will be communicated as it is received.

YOUR ROP TASK FORCE (ROPTF)

Julie Keys – NEI, ROP Task Force Chair
Allan Haeger – Exelon
Ken Heffner – Progress Energy
Duane Kanitz – STARS
Roy Linthicum – Exelon
Fred Mashburn – Tennessee Valley Authority
Glen Masters – INPO
Dave Midlik – Southern Nuclear
Charles Thomas – Duke Energy
Pat Baranowsky – ERIN
James Peschel – FPL
Robin Ritzman – FirstEnergy
Gerry Sowers – Arizona Public Service
Lenny Sueper – NMC
Bryan Ford – Entergy
Nicola Conicella – Constellation

Charles Thomas of Duke Energy, Nicola Conicella of Constellation and Robert Hanley of Dominion have recently joined the ROP TF. Kay Nicholson of Duke and Lou Larragoite of Constellation have moved on to other positions. We appreciate Kay and Lou's commitments to ROP and wish them great success in their future endeavors. We are looking forward to Charles, Robert and Nicola's task force participation. Welcome!

If you are a member company and would like to participate on the ROP TF, please contact Julie Keys at *jyk@nei.org*.

STATUS OF MSPI ASSESSMENT RECOMMENDATIONS

The Reactor Oversight Process (ROP) Task Force completed an assessment of the Mitigating Systems Performance Index (MSPI) in October 2007. The assessment resulted in 13 recommendations. The following table provides the status of these recommendations.

Photo: San Onofre

INDUSTRY ASSESSMENT OF MSPI

	Recommendation	Status
1	Re-evaluate the treatment of baseline unavailability to account for the risk worth of planned unavailability and simplify management of unavailability data.	Industry proposal being developed. NRC is also reviewing industry data to identify issues. NRC/Industry will work together on this recommendation.
2	Simplify the indicator as much as possible to reduce workload and complexity.	INPO is developing a method to derive WANO SSU data from MSPI data. Target implementation is December 2008. Proposed simplifications to other portions of the guidance are being developed.
3	Clarify "time of discovery" as it relates to failures.	Proposed guidance change presented to NRC/Industry working group in January 2008 and will be updated in March 2008.
4	Resolve the excessive impact of EDG run failures.	Proposed guidance change to revise EDG mission time presented to NRC/Industry working group in January 2008.
5	Revise the guidance for issues found during PMT.	Industry proposal being developed.
6	Clarify NEI 99-02 guidance for miscellaneous issues.	Proposed guidance changes for selected items presented to NRC/Industry working group in January 2008 and a revision will be prepared for the March meeting.
7	Develop an industry template for results reporting.	Proposed templates are attached to this newsletter.
8	Develop a prioritized schedule for CDE improvements.	Two items are in progress – Clarification of EPIX failure mode selection and allowance to revise CDE mid-quarter. Other potential changes will be discussed at the upcoming workshop.
9	Communicate the results of the assessment to senior plant managers, including explanation of the key performance drivers in MSPI.	Communicated in October 2007 and February 2008 ROP newsletter.
10	Provide periodic initial and ongoing training on MSPI.	Industry workshop planned for late August 2008 will include training.
11	Conduct a post-implementation workshop.	Industry workshop planned for August 2008.
12	Improve the usefulness of the MSPI web board.	Changes and improvements are underway.
13	Maintain an up-to-date list of station MSPI contacts and publish the results of ROP Task Force meetings, including FAQ status.	MSPI list has been obtained. Periodic emails will attempt to confirm their validity. Meeting minutes, including FAQ status are routinely published.

One recommendation was to provide plants with a template for an internal reporting tool that clearly displays margin to white for MSPI systems. MSPI performance is largely driven by component failures, and plants that do not have robust methods for reviewing margin in MSPI performance may not take adequate preventive actions if they are not aware of the number of failures remaining to white. The ROP Task Force collected

samples of reporting tools from a number of plants. An attachment to this newsletter contains examples from two utilities – Exelon and FPL. These two examples were chosen because they contain easily readable presentations of information at two different levels of detail.

MSPI/CDE TIPS

The translation from CDE selected failure mode to MSPI monitored component failure mode is documented on page 172 of the CDE Data Element Manual (available for download from the CDE home page). The conversion information is as follows:

Failure Modes Assigned to Each Failure Category for MSPI Monitored Devices

Component Type	MSPI Failure Mode	CDE Failure Mode Selected
Valves – all types	Demand	All
Circuit Breaker	Demand	All
Pumps – all types	Run Time	– Tripped/stopped after warmup (>1 hr.) – Discovered to be unable to run for mission time
	Demand	All modes other than above
Emergency Diesel Generator & Emergency Hydroelectric Generator	Start Demand	All modes other than the modes listed below for Load-Run and Run Time
	Load-Run	– EDG tripped during auto loading and warmup (<1hr.) – EDG tripped during manual loading and warmup (<1hr.) – Discovered to be unable to load
	Run Time	– EDG tripped after warmup (>1hr.) – Discovered to be unable to run for mission time

MSPI MARGIN ASSESSMENT IN CDE

Recent industry experience highlights that trending the MSPI value is inadequate for assessing margin to a color change for MSPI. This is particularly true because of the "risk cap" feature of the calculation. The design intent of the risk-cap was to prevent the index from going white based on a single failure in three years with a reasonable amount of unavailability. Another way to express this is, if your index value is less than half way to white (<5E-07) based on unavailability alone, then a single MSPI monitored component failure will not drive the indicator white. The risk cap has the following characteristics:

- It is only invoked if the calculated MSPI value (UAI + URI) is in the white performance band.
- If invoked, it replaces the single highest risk worth failure (if that failure is worth more than 5E-07) with a risk value of 5E-07 in the calculation.
- If the calculated MSPI value crosses into the yellow performance band, the risk cap is removed.
- The risk cap can cause jumps in MSPI value particularly if you have very high risk worth monitored components.

Your primary tool to assess margin is the MSPI Margins Report in CDE. If you see a 0 for number of failures remaining in green anywhere on that report, the MSPI system is in eminent danger of a color change. Please see the example below:

Period Ending Dec 2007

System ROP-MSPI-EAC MSPI Emergency AC Power System

Color	MSPI	UAI	20% Deviation from UAP Baseline	URI	Risk Cap Invoked	PLE
Green	-7.9E-07	1.1E-07	Yes	-9.0E-07	Yes	No

Maximum number of additional unavailable hours

Train Name	Unplanned UA Hrs		Planned Hrs to Baseline	Planned UA Hrs	
	Actual	Remaining in Green		Actual	Remaining in Green
A	17.80	1,133	0.00	199.00	1,133
B	87.90	729	75.91	273.61	805

Maximum number of additional failures

Component Group	Demand/Start Demand		Load Run		Run Time		Before PLE
	Actual	Remaining in Green	Actual	Remaining in Green	Actual	Remaining in Green	
Emergency Diesel Generator	0	2	1	2	1	0	8

Note: Margin remaining in green takes into account the risk cap and performance limit exceeded.

- For the EAC system shown in the example:
  - The large negative URI typically indicates high risk worth components
  - The risk cap is invoked
  - The next run failure will drive the system out of green
- Each "remaining" number on the margins report is calculated assuming only the associated "actual" number changes. For example the emergency diesel generators can sustain 2 more load run failures if no additional unavailable hours or other failures are assumed.

This can also be seen on the associated MSPI Derivation Report:

MSPI Overview

Color	MSPI	UAI	20% Deviation From UAP Baseline	URI	Risk Cap	PLE
Green	-7.9E-07	1.1E-07	Yes	-9.0E-07	Yes	No

Note: Risk Cap is only envoked when $1.00E\text{-}06 < URI_{calculated} + UAI <= 1.00E\text{-}05$ and $URI_{calculated} <> URI_{limited}$

URI = If $(1.00E\text{-}06 < (URI_{calculated} + UAI) <= 1.00E\text{-}05)$ Then $URI_{limited}$ Otherwise $URI_{calculated}$ = **-9.0E-07**

- $URI_{calculated} = URI_{EDG}$ = **2.1E-06**
  - $URI_{EDG} = X_z + (N_d * X_D) + (N_r * X_R) + (N_l * X_L) - URIBL$ = **2.13E-06**
    - $X_z = ([a_d / (a_d + b_d + D)] * W_d) + ([a_r * TM / Tr + b_r] * W_r) + ([a_l / (a_l + b_l + D_l)] * W_l)$ = **2.46E-0**
    - N_d = **0**
    - $X_D = (1 / (a_d + b_d + D)) * W_d$ = **7.74E-07**
    - N_r = **1**
    - $X_R = (TM / (Tr + b_r)) * W_r$ = **3.53E-06**
    - N_l = **1**
    - $X_L = (1 / (a_l + b_l + D_l)) * W_l$ = **6.47E-07**
    - $URIBL = (W_d * URBLC_d) + (W_r * URBLC_r * TM) + (W_l * URBLC_l)$ = **4.51E-**
  - UAI = **1.1E-07**
- $URI_{limited} = URI_{calculated} - X_{max} + Min(X_{max}, 5.00E\text{-}07)$ = **-9.0E-07**
  - $X_{max} = Max(X_{L\ EAC\ EDG}, X_{R\ EAC\ EDG})$ of X's with N's > 0 = **3.53E-06**
- Potentially Related Failures

 # demand failures

Risk worth of each demand

 # run failures

Risk worth of each load run demand

 # load run demand failures

Risk worth of each run failure

From the above example:

- The difference between risk cap invoked and not is X_R – 5E-07 = 3.53E-06 – 5E-07 = 3.03E-07.
- This means if in the previous quarter, MSPI calculated = URI calculated + UAI were 9.9E-07 (just below white) with one run time failure, and for this quarter, there was a lot of unavailability pushing MSPI calculated to 1.1E-06 (just above the white threshold) and there was still one run time failure, then the MSPI indicator value (with risk cap invoked) would be 1.1E-06 – 3.03E-07 = 8.0E-07. So in this case, the MSPI indicator value looks better with more unavailability.
- This same effect can result in the indicator jumping from just barely green to yellow (skipping white) based on only one additional failure.

In summary, if you see one or zero remaining failures in green on the MSPI margins report, then the system is in jeopardy of a color change. Note that it is possible to jump from green to yellow. You should look at the X values in the derivation reports and identify systems that may be subject to this. In general, any X value >1.0E-05 can result in jumping from green to yellow with one additional failure.

MSPI WORKSHOP

The ROP TF completed an assessment of the Mitigating Systems Performance Index (MSPI) last fall. The assessment was based on an industry survey and review of actual MSPI source data and results. As a result of that assessment the ROP TF had developed several action items including developing an MSPI Workshop. This workshop will be held later this year and will cover: lessons learned, maintenance rule and MSPI differences, CDE training sessions and more. Additional conference information will be conveyed as we develop it.

If you have suggestions on topics you would like to see covered in this workshop contact Julie Keys at (202) 739-8128 or *jyk@nei.org*.

SELECTED FAQ SUMMARIES

The FAQ process is the mechanism for resolving interpretation issues with NEI 99-02. Draft FAQs are reviewed by the task force prior to NRC review. FAQs and responses are posted on the NRC web site at *www.nrc.gov/NRR/OVERSIGHT/ASSESS/index.html* and on INPO's Consolidated Data Entry web page. They represent NRC-approved interpretations of performance indicator guidance and should be treated as an extension of NEI 99-02.

Selected FAQ summaries are paraphrased and presented below. Please see the above NRC web site for complete FAQs.

Plant: Perry
Performance Indicator: IE03

Question Section:
This FAQ was submitted to determine if an unplanned power change exceeding 20% occurred.

A planned plant shutdown was commenced to repair a valve associated with a reactor recirculation pump. The shutdown was intended to be completed with a manual scram.

At approximately 43.1% core thermal power, Operations performed a Reactor Recirculation Pump downshift. Operations expected to observe a power reduction of approximately 12%. The "B" Reactor Recirculation Pump tripped instead of shifting to slow speed. This resulted in a power change that leveled out at approximately 26.1% core thermal power. The shutdown was then completed with a planned manual scram from approximately 23% in accordance with normal plant procedures.

This was not counted as an Unplanned Power Change because the power change met the 72-hour criterion established on NEI 99-02 which states that if during the implementation of a planned power reduction, if power is reduced by more than 20% of full power beyond the planned reduction, then an unplanned power change has occurred. In this case, power was not reduced by more than 20% of full power beyond the planned reduction.

Proposed Resolution of FAQ
Since the unexpected portion of this unplanned power change was not more than approximately 10% of full reactor power, it should not count toward the Unplanned Power Change PI.

This FAQ was tentatively approved during the February ROP meeting. A final approval is expected during the March ROP meeting.

SUMMARY

This News and Information letter will be issued quarterly, with supplemental issues as warranted. It is designed to keep you informed on NEI ROPTF activities. Additional information can be found at *www.nrc.gov/NRR/OVERSIGHT/ASSESS/index.html*.

If you would like to be added to the distribution or have suggestions for future newsletters, please contact Julie Keys at *jyk@nei.org*.

Thanks to Al Haeger and Glen Masters for providing input into this newsletter. Thank you for your support!

MSPI MARGIN REPORT SAMPLES

U1 MSPI Margin to WHITE Summary

Sep 2007	MSPI	UAI Margin (Available hours/AOT hours)	URI Margin	Failures (IR# and date)
EAC (DG)	-2.03e-06	4933 /168 hrs	2 fail to run	None
HPI (SI,CV)	4.40E-08	913 / 168 hrs (SI) 913 / 168 hrs (CV)	4 fail to start (SI) 4 fail to start (CV)	None
HRS (AF)	-1.0E-06	81 / 72 hrs	1 fail to start	None
RHR (RH)	-1.6E-07	463 / 168 hrs	2 fail to start	None
CWS (CC,SX)	-7.5E-07	95 / 168 hrs (CC) 40 / 72 hrs (SX)	4 fail to run (CC) 1 fail to run (SX)	None

Thresholds: WHITE > 1.0E-06 ; Yellow>1.0E-05; RED>1.0E-04
Action Region: Lowest allowable hours < AOT, - or - Failures < 2
Note: Margin data does not assume combination of failures and unavailability

U2 MSPI Margin to WHITE Summary

Sep 2007	MSPI	UAI Margin (Available hours/AOT hours)	URI Margin	Failures (IR# and date)
EAC (DG)	-2.03e-06	4933 /168 hrs	2 fail to run	None
HPI (SI,CV)	-5.9E-08	998 / 168 hrs (SI) 998 / 168 hrs (CV)	4 fail to start (SI) 5 fail to start (CV)	None
HRS (AF)	1.8E-06	0 / 72 hrs	0 fail to start	1) 308024 03/03/05 2) 394647 11/04/05 3) 438938 01/05/06
RHR (RH)	-1.9E-07	486 / 168 hrs	2 fail to start	None
CWS (CC,SX)	-6.6E-07	91 / 168 hrs (CC) 38 / 72 hrs (SX)	6 fail to run (CC) 1 fail to run (SX)	None

Thresholds: WHITE > 1.0E-06 ; Yellow > 1.0E-05; RED > 1.0E-04
Action Region: Lowest allowable hours < AOT, - or - Failures < 2
Note: Margin data does not assume combination of failures and unavailability

NOTES FOR MARGIN DATA

- Column labeled "MSPI" presents the current MSPI value and color.
  - An asterisk in this column (if needed) indicates that the risk cap is invoked
- Columns labeled UAI and URI present the smallest available margin to white
  - UAI also presents the value of the AOT for the system as a reference
  - URI presents the smallest number of failures of the various failure modes
  - These columns are green unless the criteria for the "action" region are met (as noted in the text at the bottom of the slide)
- Column labeled "failures" lists any significant failures in the current three year period (component and IR #)
- Notes below the tables provide the MSPI thresholds and the internal action region criteria for low margin
- It is important to emphasize that a combination of unavailability and failures may lead to exceeding the green threshold before reaching the published number of hours or failures.