Enclosure 2

Meeting Summary Handouts of the January 17, 2013 ROP Public Meeting

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Significant Determination Process Planned Updates to Risk Assessment Standardization Project Handbook (Vol. 1)

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Objectives

- Acknowledge NEI Response to Question #7 of Survey on ROP (January 13, 2012).

- Inform staff actions on subsections 1, 2, and 3 of the answer to Question #7 on SDP and RASP.

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From Page 4, 5 of NEI Letter Jan. 13, 2012

- *"In general the SDP results in an appropriate regulatory response to performance issues."*

- Additional Comments:

"… We believe that improvements in the NRC guidance (e.g., RASP) could provide greater transparency and efficiency..."

1. *Human Recovery Credit, 2. Common Cause Failure, 3. Initiating Event Frequency modeling. 4…5…6…7 8… 9…"*

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Objectives

- Inform participants about the purpose of RASP Handbook.
  - Provide a *"flavor"* of the content of the RASP handbook (as opposed to complex technical details)

- Inform participants about planned changes (five new modules added) to RASP Handbook Volume 1.

- Inform participant about the pending public meeting (objectives, estimated schedule).

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Risk Assessment Standardization Project (RASP) Handbook

- RASP Handbooks are internal, publicly available NRC documents (similar to inspection guidance).
- It documents methods and guidance for staff when performing risk assessments.
- It represents best practices based on feedback and experience from Accident Sequence Precursor and Significant Determination Process related analyses.

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EXAMPLE TO ILLUSTRATE NATURE OF GUIDANCE in RASP HNADBOOK

Section 8 *"Initiating Event Analysis"*

- The Performance Deficiency (PD) caused an initiating event with subsequent reactor trip. The PD does not cause other complications.

- The PD caused an initiating event with a reactor trip. PD also caused a subsequent system unavailability.

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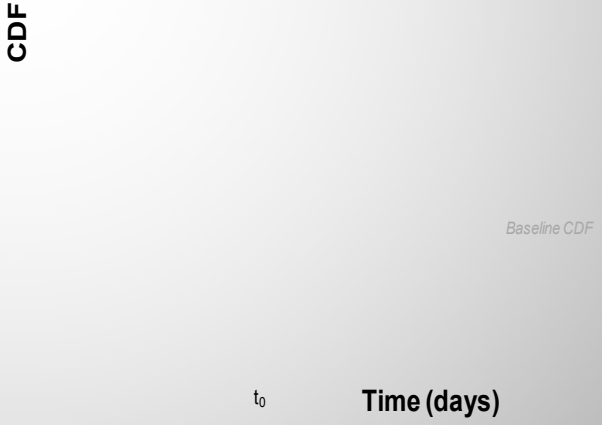
PD Caused an Initiator



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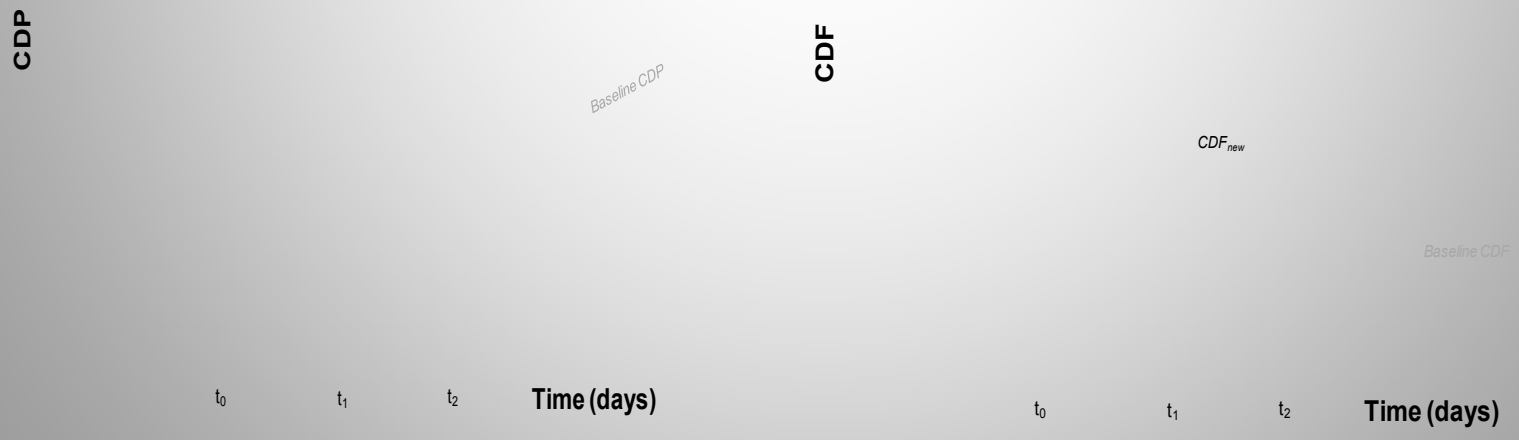
PD Triggered Initiator and Revealed a non-concurrent Unavailability of a SSC



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Planned Updates to RASP Handbook

- New module on Common Cause Failure (CCF) Modeling
  - Consistent with draft CCF NUREG
- New module on Initiating Event Analyses
  - Articulates approaches (Delta CDF or equivalent CCDP used to assess additional risk)
- New module on modeling of Support System Initiating Events
  - Improved assessment of risk increases associated with Support System(s) problems using Support System Initiating Event Fault Trees

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Planned Updates to RASP Handbook (Continued)

- New module on Loss of Offsite Power Initiating Events
  - Use of event-specific HRA vs. generic recovery models
- New module on Human Reliability Analysis (HRA)
  - Provides consistent modeling of dependency between operator actions

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Next Steps

- Complete RASP Handbook update and include it in NRC public WEB (1/31/2013).

- Hold public meeting (Late Spring 2013).

Note: Staff does not routinely hold public meetings on RASP Handbook updates. Since staff has created five new modules to document methods used in SDPs and ASP, staff will hold public meeting on five new modules in Spring 2013 (for information Contact: Dr. See-Meng Wong, 301-415-1125, See-meng.wong@nrc.gov

Simulation of MSPI Indicator Reaction to Plant In Long Term Shutdown and Initial Startup

Background and Purpose

The MSPI indicator is a 12 quarter rolling index of system performance for five systems in each US power plant. It consists of the summation of an unreliability indicator (URI) and an unavailability indicator (UAI). URI is driven by component group failure rates that are largely immune to plant mode, but UAI is directly driven by critical hours and system train/segment unavailable hours that are only collected when the unit is at power. This study simulates the reaction of MSPI to an extended shutdown and following initial plant startup from construction.

Method

The simulation software is a Microsoft ACCESS© emulation of the Microsoft SQL Server© software that derives the URI, UAI, PLE, and MSPI values stations use in their ROP submittal files. There are two important differences:

- The rounding algorithms in ACCESS and SQL Server are not identical, so minor differences are to be expected in extended calculations. The differences between the SQL Server and ACCESS programs have been verified to be due to this rounding algorithm.
- The simulation software has the ability to use independently varying months of inputs for the UAI and URI calculations.

Both simulations use the industry's actual June 2012 MSPI values as a starting point, then modify the inputs and rerun the calculations to determine new MSPI values as the plant moves forward one quarter at a time, from normal operation to extended shutdown or from new construction to operation. Said differently, MSPI values are calculated for each of the five systems included in MSPI for each unit, for 11 trailing quarters plus the current quarter of the simulation. As the shutdown simulation window rolls forward to include another quarter of shutdown values to the front end of the 12 quarter calculation, the values from plant operation 12 quarters ago roll off. The simulation works by holding the 36 months of failures, demands and run hours constant. Since the number of demands and run hours on standby components will continue to be reported, this simulates the continuation of failure exposure for the components. The critical hours and unavailable hours are then removed one quarter at a time as though the experience were moving forward into a zone of 0 critical hours and unavailable hours.

For a startup simulation, the 12 quarter calculation begins with 12 quarters of values reflecting zero critical hours and 0 unavailable hours, demands and run hours and failures. After startup, the simulation then rolls in a new quarter of operation and rolls off the "zero critical hours" values from pre-startup conditions 12 quarters ago. This roll-in of operating hours and roll-off of the oldest month's data continues until 12 quarters of operating data fills the entire 12 quarter calculation window.

Units in Extended Shutdowns

The following characteristics are assumed:

- URI calculated values remain the same since most MSPI component groups have the same test requirements and failure opportunities after the shutdown.

- URI would only change if the calculated UAI value pushed the non-risk-capped MSPI above 1E-05. Since the simulation software checks for this and turns the risk cap off appropriately, this is covered in the calculation of the risk capped URI.
- No opportunities for additional critical hours or system train/segment unavailable hours exist after the unit enters extended shutdown.
- Competing effects may drive the MSPI value higher or lower over time
    - Quarters with extensive unavailable hours may drop off as the window of opportunity shrinks
    - A lowering number of critical hours may overwhelm the loss of quarters of unavailable hours
    - The unrisk-capped MSPI may exceed 1E-05, removing the risk cap.

The results are shown in the following table.

Table 1: Effects on MSPI of Long Term Shutdown

MSPI Metrics/Quarters Shutdown	0	6	8	10	11
>1E-06	4*/520	5/520	8/520	16/520	15/520
>1E-05	0/520	0/520	0/520	0/520	0/520
Less Positive	0/520	225/520	227/520	244/520	254/520
No Change	0/520	51/520	50/520	42/520	40/520
More Positive	0/520	244/520	243/520	234/520	226/520

* Means "4 MSPI values of 520 calculated for 104 units"

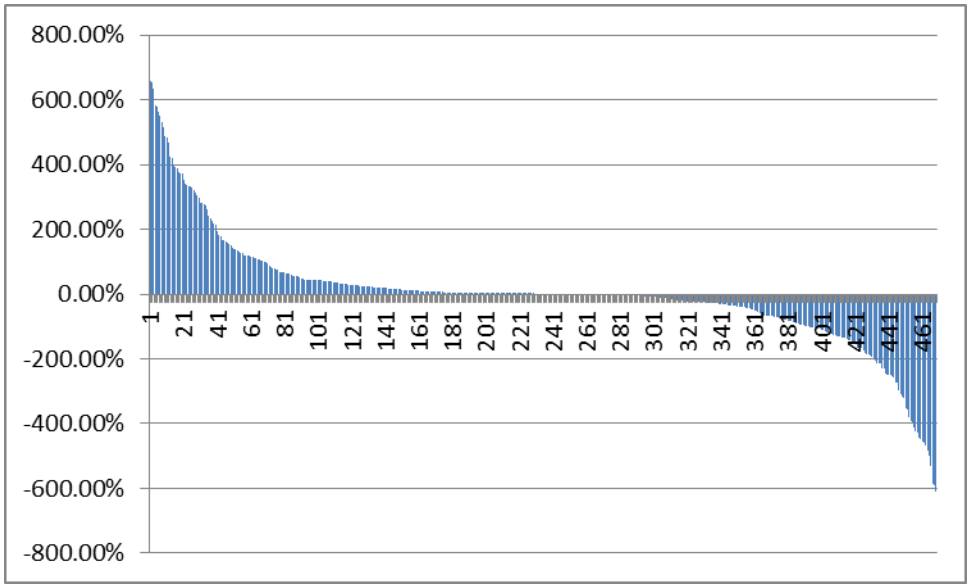
Several points should be made concerning these results:

1. Though the number of indices above the thresholds remains remarkably constant, the same indices for the same units are not in the group above the threshold as the shutdown extends. The indices do not go white for a specific unit and system, stay white and are joined by other units and systems as time goes on. The not green specific units and systems vary as time goes on with the competing influences of critical hours decreasing and chunks of unavailable hours roll off, moving different systems and units into the white zone.

2. In Figure 1 below, excluding the upper and lower 5% of the changes, the distribution of the changes at the 33 month shutdown point is very symmetrical. The initial hypothesis was that all MSPI values would to go up as the critical hours roll off, but that did not happen. The facts are that for about 10% of the indicators, there was virtually no change, of the others, half went up and half went down. For the majority, the change was less than an order of magnitude.

3. The hypothesis that all the values go up as critical hours roll off is not valid. The competing effects of the terms and parameters in the equations make the situation more complex. From the results, most units and indicators can sustain an 18-24 month extended shutdown without the indicator being driven white by changes in critical hours.

Figure 1: Distribution of Changes from Initial Individual MSPI Values after 33 Months Shutdown



The graph compares the original indicator value with the values after 33 months shutdown. The horizontal axis has one point for each of the 520 calculated indicators. It simply points out that distribution of the change in the indicators is symmetrical, unexpectedly.

Units in Initial Operation

The results of the simulated startup are shown in Table 2. The following characteristics are assumed:

- URI calculated values change after startup as operation proceeds because no opportunities for failures or successes exist before startup.
- No opportunities for additional critical hours or system train/segment unavailable hours exist before unit startup

Table 2: Effects on MSPI of Initial Startup

Metrics/Months Since Startup	3	6	9	12
>1E-06	15/520	11/520	7/520	3/520
>1E-05	0/520	0/520	0/520	0/520
Less Positive	0/520	377/520	380/520	374/520
No Change	0/520	0/520	0/520	0/520
More Positive	0/520	143/520	140/520	146/520

As seen in table 2, within 12 months, the number of indices exceeding 1E-06 is at or below the number in the 36 month calculation of the actual MSPI June 2012 indices (as shown in Table 1).

1. After 12 months of operation, the indicator produces relatively normal values.
2. For about 1/3 of the indicators, the indicator value gets worse after startup, not better.

ROP Task Force Recommendations

The data from this study (Figure 1) shows that MSPI is very reactive when critical hours are low. This indicates that these situations should be treated on a case-by-case basis. Fortunately, these situations have been uncommon over the life of the ROP, so that it is practical to consider a case-by-case approach. As a starting point for these case-by-case discussions, the ROP Task Force recommends the following decision rules for the display of MSPI on the NRC web page:

- Gray out MSPI when a unit has been shut down for six months.
    - On plant startup, if the calculated MSPI is greater than 1.0E-6 (White) for the quarter prior to startup, MSPI will remain grayed out until 12 months of operation have accumulated after startup.
    - On plant startup, if the calculated MSPI is less than or equal to 1.0E-6 (Green) for the quarter prior to startup, MSPI will remain grayed out until there is a total of 12 months of operation in the 3-year monitoring period.
- Gray out MSPI for the startup of new plants until 12 months of operation have accumulated.

Correcting Older ROP PI Data

Problem: The guidance in NEI 99-02 page 3 currently only requires the correction of performance indicator data to the extent necessary to accurately calculate the PI values for the current reporting period:

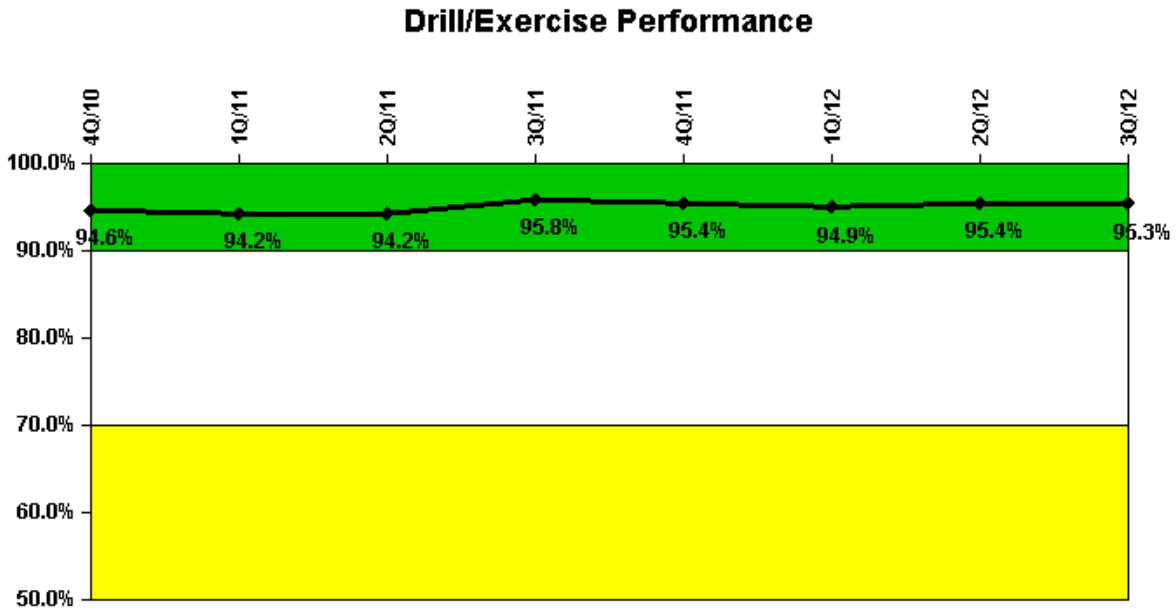
> "In instances where data errors or a newly identified faulted condition are determined to have occurred in a previous reporting period, previously submitted indicator data are amended only to the extent necessary to correctly calculate the indicator(s) for the current reporting period
>
> If a performance indicator data reporting error is discovered, an amended "mid-quarter" report does not need to be submitted if both the previously reported and amended performance indicator values are within the "green" performance indicator band. In these instances, corrected data should be included in the next quarterly report along with a brief description of the reason for the change(s). If a performance indicator data error is discovered that causes a threshold to be crossed, a "mid-quarter" report should be submitted as soon as practical following discovery of the error. PRA model changes are the exception to this guidance (see pages 33-34 for additional details)."

However, the NRC web site reflects data and the indicator values for the most recent eight quarters. As a result, the web site has the potential to show inaccurate values for previous quarters with known errors. During the May ROP meeting the staff asked the ROP TF for feedback on correcting errors in past PI data submittals. The question was prompted by discovery of a plant that learned it had been incorrectly reporting RCS leakage PI data since the beginning of the ROP.

Discussion: Even if the guidance in NEI 99-02 were to be changed to required corrected PI data for the current quarter and the seven previous quarters the calculated PI values on the NRC web page may still be inaccurate. This is because the calculated indicator values for the older quarters rely on prior data that has subsequently "rolled off" the chart and table.

Consider the situation below where an error is discovered of Emergency Preparedness drill and exercise performance that occurred in 3Q/10. Because DEP is an eight quarter indicator, the error would not affect the current quarter results or be reflected in a change to the web page data table but could nevertheless impact the calculated value for every quarter other than the most recent.

Correcting Older ROP PI Data



Thresholds: White < 90.0% Yellow < 70.0%

Notes

Drill/Exercise Performance	4Q/10	1Q/11	2Q/11	3Q/11	4Q/11	1Q/12	2Q/12	3Q/12
Successful opportunities	16.0	18.0	17.0	62.0	49.0	45.0	42.0	34.0
Total opportunities	17.0	19.0	17.0	67.0	52.0	47.0	42.0	36.0
Indicator value	**94.6%**	**94.2%**	**94.2%**	**95.8%**	**95.4%**	**94.9%**	**95.4%**	**95.3%**

Further, MSPI is a twelve quarter indicator so a guidance change would theoretically require change files be submitted to correct even minor data errors that are nearly five years old to ensure the calculated values for all eight quarters shown on the NRC web site are accurate.

Utilities maintain robust processes for preparing quarterly CDE reports that involve validation and multiple levels of review. Preparing and submitting change reports is not trivial for licensees and the effort would generally go unnoticed by the staff and public.

Recommendation: Make no changes to NEI 99-02. Changing the guidance would add complexity while providing no meaningful benefit to the staff or public**.**