Enclosure 3
February 2009 Meeting Handouts
Meeting Summary of the 02/11/09 Reactor Oversight
Process Working Group Public Meeting
Dated March 11, 2009

ROP Task Force Comments Following the NRC Working Meeting with Stakeholders to Discuss an NRC Proposal for Integrating Traditional Enforcement in the Reactor Assessment Program

The ROP Task Force appreciates the opportunity to provide additional input to the NRC's working meeting on integrating traditional enforcement into the Reactor Assessment Program.

The task force agrees with the staff proposal to split the Traditional Enforcement actions from the Significance Determination Process (SDP). It makes sense to determine the significance of an event in a timely manner without having to wait for a possible OIG investigation that should have no bearing on the SDP. The task force agrees that traditional enforcement should be followed up with inspection, but that these inspections would be outside of the action matrix. The task force also agrees that traditional enforcement results that are significant, i.e., SL III, II, or I, should be considered in the mid-cycle and annual assessments.

In general, the task force disagrees with the staff position that Severity Level IV violations should be aggregated. They are of very low regulatory significance just as Green Inspection Findings have very low risk significance in the Reactor Oversight Process (ROP) and are not aggregated or trended. In addition, the task force disagrees that all Traditional Enforcement (TE) violations should be of equal weight. Traditional Enforcement includes:

- Willfulness
- Impeding the Regulatory Process
- Actual Consequences

The task force position is that if a legacy 10 CFR 50.59 evaluation was done improperly and a change should have received NRC approval prior to implementation, it may impede the regulatory process but it should not carry the same weight as something that was willful or had actual consequences. Similarly, an error in PI reporting, if not willful, should not carry the same weight as something that was willful or had actual consequences.

If one of the staff's goals is to use certain TE items as a more integrated input into the assessment process, we feel that a better way to meet the goal that is to address TE issues using IP 71152 "Identification and Resolution of Problems" which is already integrated into the assessment process rather than IP 92702. Multiple traditional enforcement issues in the same area in a year's time suggest a failure of the corrective action process to prevent recurrence. This makes the IP 71152 a more appropriate inspection than the IP 92702.

The task force reviewed the attached flowchart "Proposal for Integrating Traditional Enforcement into Assessment." For the most part, our comments center around the block named "Proposed Criteria for Triggering Follow-up inspections." The staff proposal is to aggregate TE items over a two-year period. We propose the following alternative approach.

- The staff proposes that for one or two SLIVs in two years, that a follow-up inspection of four hours using IP 92702 be performed. We recommend that for two or more willful SLIVs within two assessment cycles (one year) that the staff conduct a four hour follow-up of the licensee's cause and corrective actions using IP 71152. For situations where the SLIVs are not willful, then if more than two exist within two assessment cycles (one year), the regional director, division of reactor projects would determine whether, based on the nature and relationship of the issues, a four-hour IP71152 review is necessary.

- The staff proposes that for three SLIVs or one SLIII over a two year period a more intrusive inspection be performed using IP 92702. We recommend that for any SLIII (time frame eliminated) that the staff conducts a follow-up inspection of eight hours using IP 71152 that would review the licensee's root cause, extent of cause, and extent of condition.

In the above two cases, the results of any follow-up inspections would be inputs integrated into the IP 71152 inspection report.

- The staff proposes that if there are four SLIVs, multiple SLIIIs, or any violation greater than SLIII over a two year period, that a follow-up inspection using IP 92702 be performed and that the proposed focus be expanded to include some aspects of safety culture. We recommend that for two SLIIIs over a two assessment cycle (one year) period or one SL II or SL I exist that the staff perform a review of related causal analyses in a follow-up inspection of 16 hours using IP 71152 or IP 92702. We do not think that the inspection focus should be expanded to include some aspects of safety culture.

The task force believes that the results of these inspections should be incorporated in integrated inspection reports and the semi-annual and annual assessment letters. .

Proposed Change to Risk Cap

Problem Statement

With several years of MSPI experience, the current treatment of statistical significance of failure (aka, Risk Cap) has resulted in several unanticipated conditions. These conditions can result in an unstable indicator or results that cannot be easily predicted. These problem areas can be summarized as follows:

- A single failure, even with no positive contribution to UAI, can result in White or Yellow index. Given the short (3 year) monitoring period, a single failure is not statistically significant and should not result in a change in color. This is due to elimination of the risk cap if the MSPI exceeds 1E-5.
- A single failure of one failure mode, in addition to failure of other failure modes (e.g., 1 FTR and several FTS) can result in a Yellow indicator, Treated separately, the FTS failures are not sufficient to warrant a change in color and the FTR is not statistically significant.
- The addition of a single failure can result in the MSPI jumping from Green to Yellow. This is due to elimination of the risk cap if the MSPI exceeds 1E-5.
- Increases in UAI can result in a decrease in MSPI. This can occur if there has been a failure and the additional UAI results in exceeding 1E-6, which invokes the Risk Cap, which was not previously invoked for the failure.

Background

As noted in NUREG-1816, the risk cap was developed to "balance a high rate of "true positives" (correctly identifying degraded performance) while minimizing "false positives". The risk cap was intended to have the following attributes:

- No single failure alone results in a WHITE indication.
- Two significant failures (each with a risk contribution greater than $5x10^{-7}$) would very likely result in a WHITE indication.
- One significant failure with other less-significant failures could exceed the GREEN/WHITE threshold.
- One significant failure with a significant UAI contribution could exceed the GREEN/WHITE threshold.
- A situation in which the URI is near zero but the UAI is greater than $1x10^{-6}$ would result in a WHITE indication.

NUREG-1816 also noted that no instances were identified by the pilot plants where a single failure resulted in a URI >1E-5 and only a few cases where 2 failures resulted in a URI >1E-5. It is important to note, however, that the values used for the NUREG-1816 study did not include the impact of other changes to the index, specifically the addition of common cause correction factors and initiating event impacts for cooling water systems. These other changes to MSPI have resulted in significantly larger Birnbaum values used for calculation the index. As a result, revisiting the treatment of the risk cap is warranted.

Proposed Resolution

A proposed resolution aimed at providing a more stable implementation of the risk cap is to limit the benefit of the risk to 7.5E-6/yr, rather than restricting any use of the risk cap when the total MSPI value exceeds 1.0E-5/yr. In addition, it is proposed that the risk cap

be applied any time there is a failure which has a risk impact greater than 5E-7 (application of the risk cap to the most significant failure was part of the original concept of the risk cap). The following examples show how the risk cap would work.

Example 1: EDG Failures

A plant has an MPSI with no failures of -9.00E-06. The risk worth of a failure for the 3 EDG failure modes are:

Demand = X_D = 2.51E-06
Run = X_R = 1.74E-05
Load/Run = X_L = 2.41E-06

It is assumed that the UAI associated with correcting an EDG failure is 2E-6.

Figure 1 shows the impact of each additional EDG failure to start. It should be noted that both the current and proposed risk cap treatment results in the same MSPI color regardless of the number of failures.

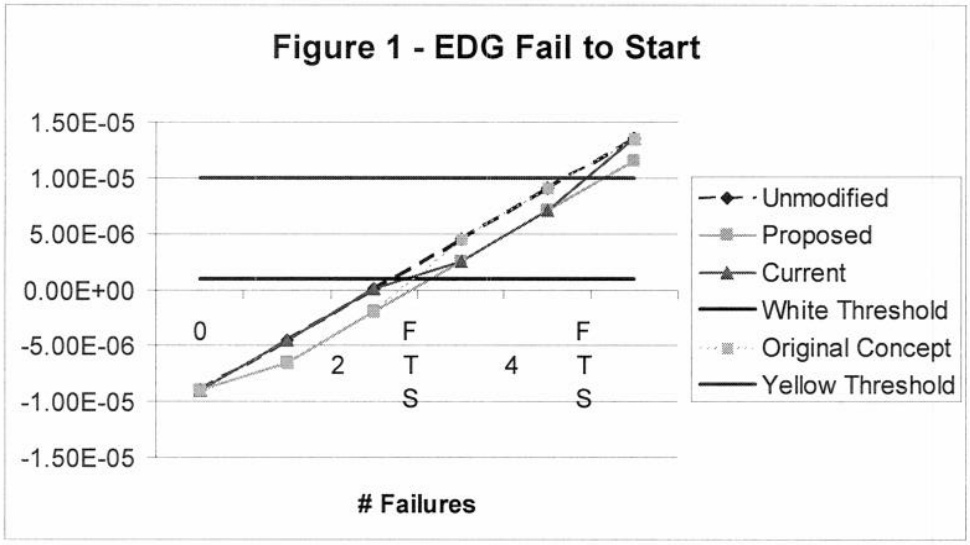


Figure2 shows the impact of each additional EDG failure to load/run. As with failures to start, both the current and proposed risk cap treatment results in the same MSPI color regardless of the number of failures.

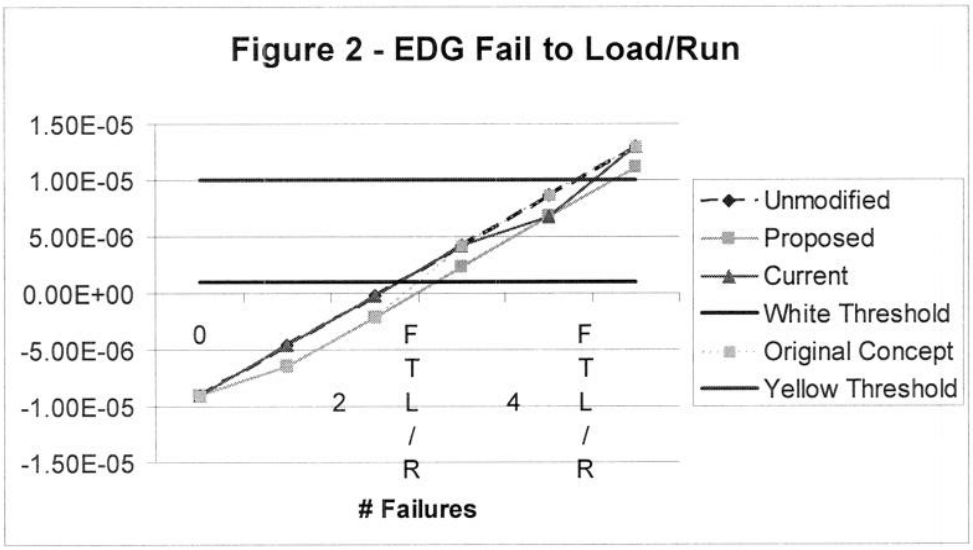


Figure3 shows the impact of each additional EDG failure to run. The primary difference between the current Risk Cap and the proposed Risk Cap is that under the current risk cap, a single failure (with the included contribution from unavailability) results in a Yellow MSPI, while under the proposed change to the Risk Cap, this results in a White Configuration. A second failure results in a Yellow MSPI from both approaches.

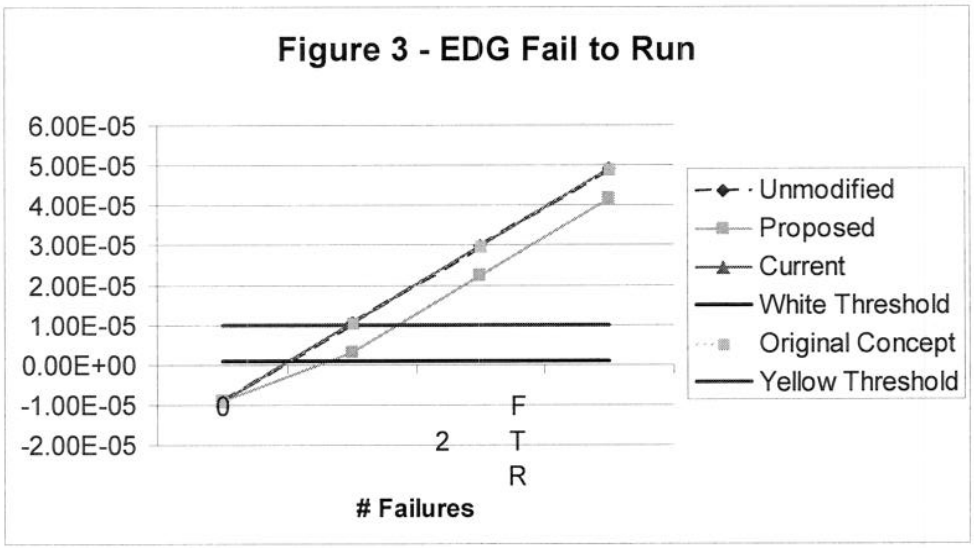
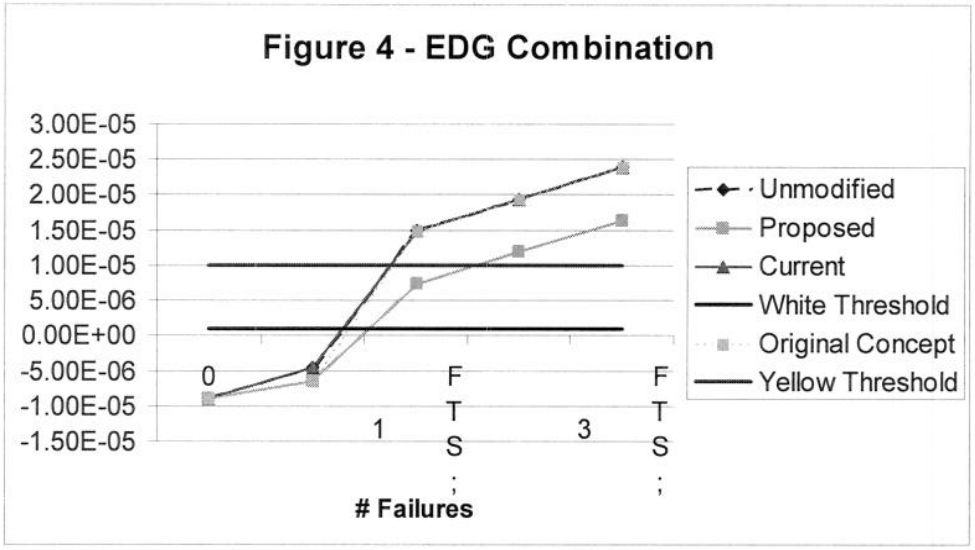
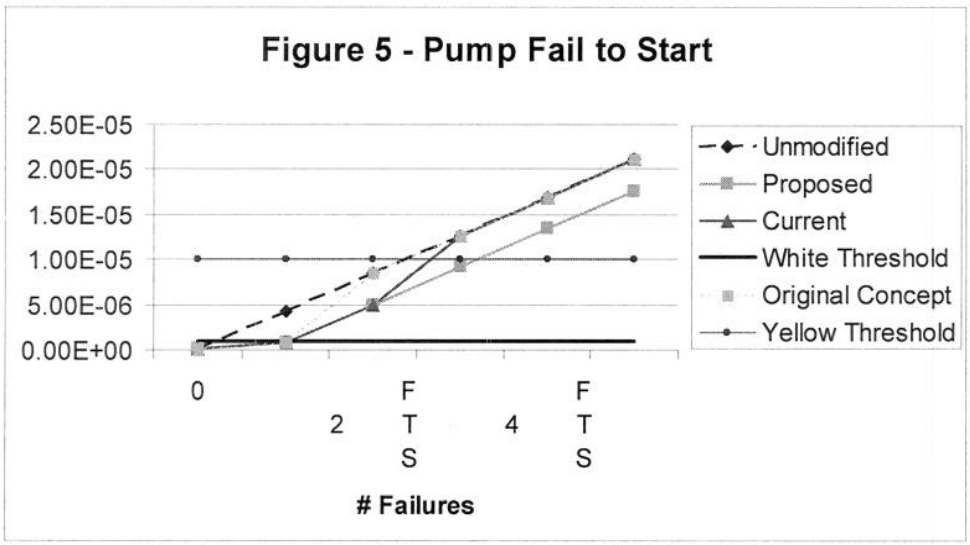


Figure 4 shows the impact of from different failure modes. The first failure is assumed to be a failure to start, followed by a failure to run then additional failures to start. Under the current Risk Cap treatment, the MSPI jumps from Green to Yellow following the failure to run, even though neither failure may be statistically significant. The proposed Risk Cap change results in a smoother transition (Green, White, Yellow) as additional failures are added.



Example 2: NUREG-1816, Case 1

For this example, a plant experiences a start failure of an Auxiliary Feedwater motor-driven pump. Prior to the failure, the UAI = $1x10^{-7}$. The delta URI associated with the start failure is $4x10^{-6}$. No other failures have occurred during this reporting period yielding an URI baseline of zero (this is a simplification since baseline could be below zero). The UAI contribution resulting from the repair unavailability is $2x10^{-7}$. For this scenario, both the current Risk Cap and proposed change result in exceeding the White Threshold after the 2nd failure. However, it does require 1 additional failure (4 failures versus 3 failures) to exceed the Yellow threshold under the proposed change to the Cap (See Figure 5).



Example 3 – Essential Service Water Pump Failure to Run

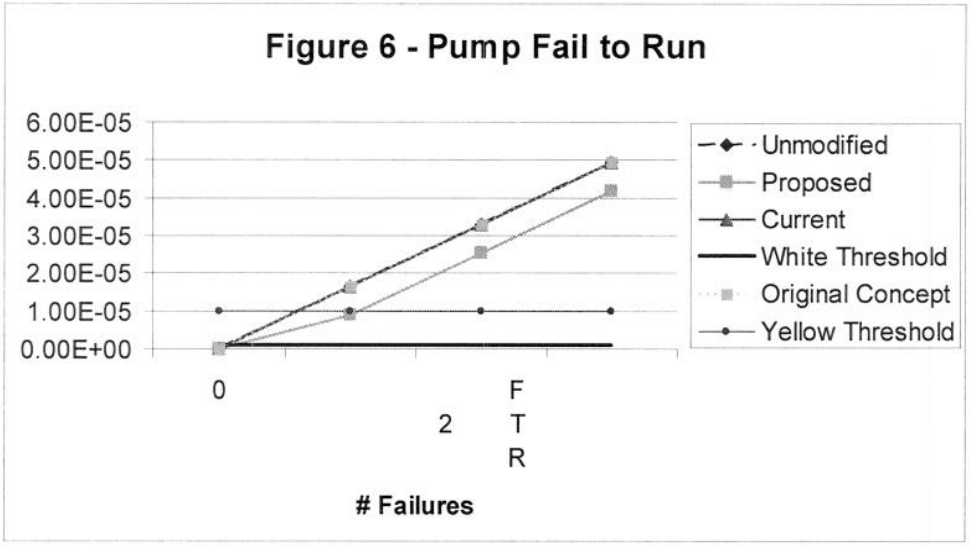
A plant has a URI with no failures of -4.50E-06. The MSPI value is –4.2E-6 with a UAI of 2.7E-7. (Note that there are 2 pump failures in the other CWS, each with a URI

contribution of 9.85E-9). It is further assumed that each failure results in a UAI contribution of 4E-7. The risk worth's of the two failure modes are:

Demand = X_D = 4.69E-07

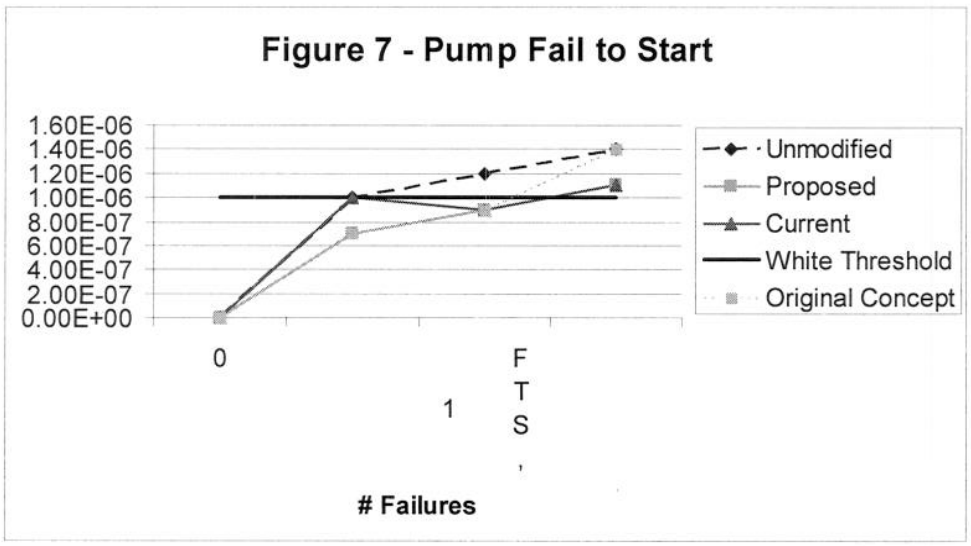
Run = X_R = 1.61E-05

For this plant, a single failure to run results in a Yellow MSPI under the current Risk Cap. With the proposed Risk Cap, the MSPI is White following a single Failure to Run and Yellow after the second failure (See Figure 6).



Example 4 – Increasing UA

For this example, it is assumed that the MSPI is at 0 and that a Failure to Start has a URI contribution of 8E-7. Following the first failure, the UA contribution is increase in 2E-7 increments. As can be seen in Figure 7, since the current Risk Cap is only applied once the MSPI exceeds 1E-6, increases in UAI can result in a decrease to the MSPI value. The revised Risk Cap eliminates this discrepancy.



Treatment of the 1E-5 Limit for applying the Risk Cap

The existing Risk Cap has an upper limit, above which, the Risk Cap is not applied. The Risk Cap is not applied if the unadjusted MSPI is greater than 1E-5. This treatment was developed to address a concern regarding identifying a delta URI that is greater than 1E-5. This limit is not applied in the proposed change, but by limiting the maximum benefit from the Risk Cap to 7.5E-6, a similar effect is achieved, while allowing the Risk Cap to be applied for any single failure. The following examples demonstrate how this is achieved.

Risk Impact >7.5E-6

If the risk impact of a single failure is greater than 1E-5, the first failure will likely result in a White indicator, as the URI associated with that failure will be 7.5E-6. This may still be a False positive, as it would be White index as the result of a single failure. Under the current Risk Cap, these failures could be Green, White or Yellow. Following a second failure, the MSPI would always be Yellow under both approaches, providing an appropriate regulatory response. The benefit of the proposed change is that it provides a sequential response to failures, avoiding the jump from Green to Yellow.

5E-6 < Risk Impact <7.5E-6

In this range, the MSPI under both approaches for a single failure would be Green. However, the 2nd failure under the current approach would most likely jump Green to Yellow, while the proposed approach would make a smoother transition (White on the 2nd failure and Yellow on the 3rd).

Summary

A comparison of the existing Risk Cap versus the proposed changes is provided below:

Risk Cap Goal	Current Approach	Proposed Approach
No single failure alone results in a WHITE indication.	Though no single failures result in White indication, there are single failures that can result in a Yellow indication	All single failures result in a Green indication
Two significant failures (each with a risk contribution greater than $5x10^{-7}$) would very likely result in a WHITE indication.	Two significant failures will likely result in White indication, but some higher worth failures (contribution greater than 5E-6) are likely to result in jumping from Green to Yellow.	Two significant failures will likely result in a White indication, even for higher risk worth failures

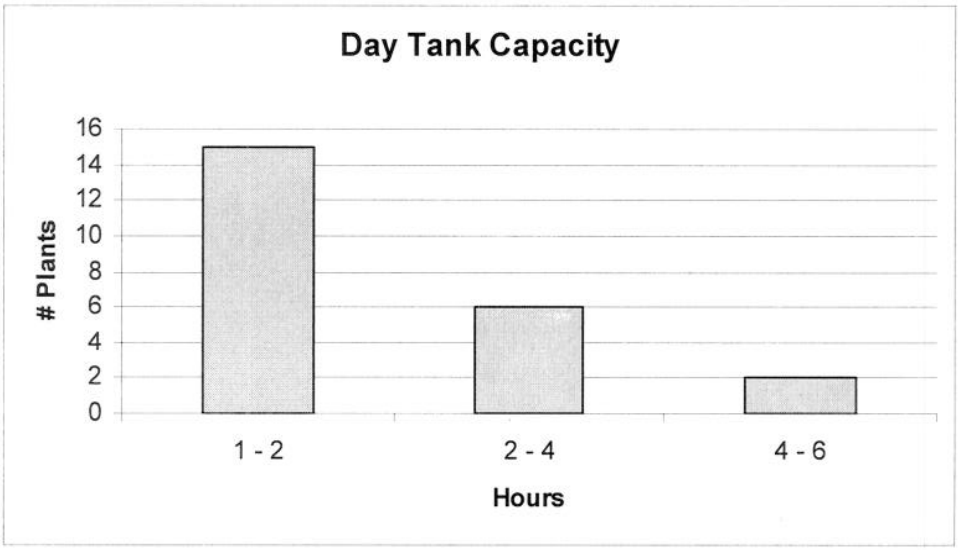
Proposed Change to Risk Cap

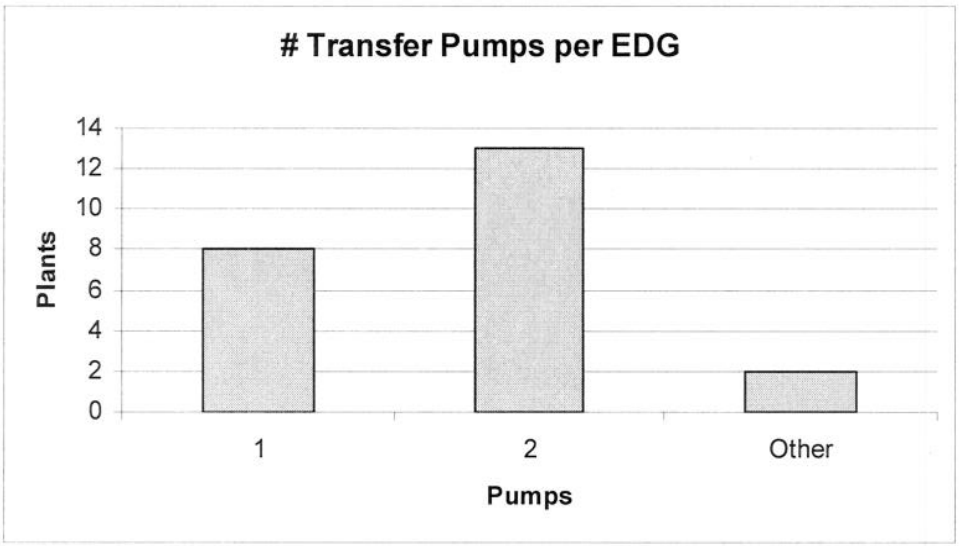
Risk Cap Goal	Current Approach	Proposed Approach
One significant failure with other less-significant failures could exceed the GREEN/WHITE threshold.	The goal is achieved if the risk contribution from other failures is greater than 5E-7.	For risk significant failures with risk impacts less than 7.5E-6, the goal is achieved if the risk contribution from other failures is greater than 5E-7. For risk significant failures with risk impacts greater than 7.5E-6, the required risk impact from other failures to reach the White threshold is less.
One significant failure with a significant UAI contribution could exceed the GREEN/WHITE threshold.	The goal is achieved if the risk contribution from UAI is greater than 5E-7.	For risk significant failures with risk impacts less than 7.5E-6, the goal is achieved if the risk contribution from UAI is greater than 5E-7. For risk significant failures with risk impacts greater than 7.5E-6, the required risk impact from UAI to reach the White threshold is less.
A situation in which the URI is near zero but the UAI is greater than $1x10^{-6}$ would result in a WHITE indication.	For failures that result in unadjusted MSPI values being near but below the White Threshold, increases in UAI can result in a decrease in the MSPI when the risk cap gets applied.	Any increases in UAI always result in an increase in MSPI and a White index once the White Threshold is exceeded.

The most significant differences between the approaches that the proposed approach may require one additional failure to reach Yellow for high-risk failures. This is balanced by having the MSPI transition from Green to White to Yellow versus the current approach, which can go directly from Green to Yellow. The proposed approach may also result in a few false positive Whites.

Proposed Guidance Changes
To be determined.

Based on a limited industry survey, the following information related to EDG Fuel Oil Transfer pumps and Day Tank capacity were identified.





Given the differences in Day Tank capacity, the number of transfer pumps per EDG, as well as the number of EDGs available at a unit, makes the risk worth (Birnbaum) of the FO Transfers pumps vary widely from plant to plant. The range of Birnbaum values for the FO Transfer Pumps is shown below:

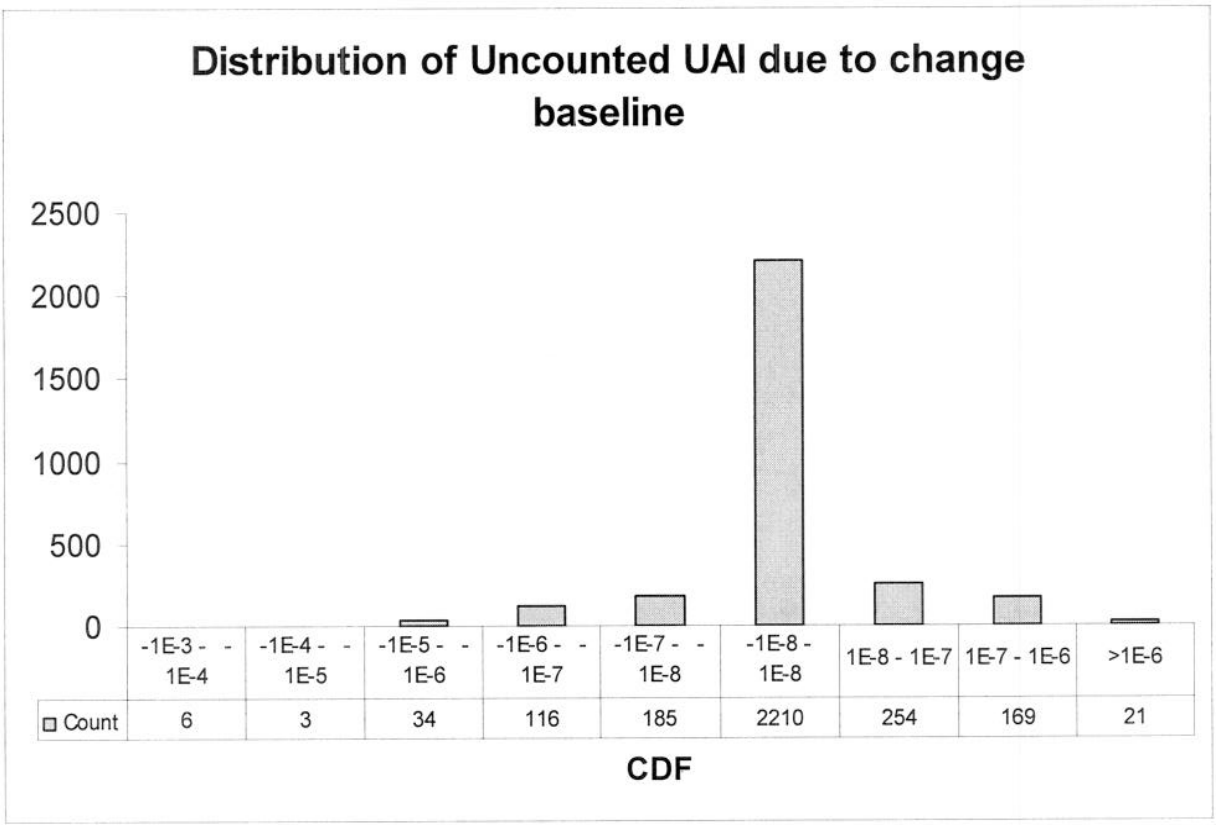
# FO Transfer Pumps per EDG	Low Birnbaum	High Birnbaum
1	3E-6	4E-5
2	Truncated1E-	6
Other Configurations	1E-6	2E-4

Given the variation in the importance of EDG Fuel Oil Transfer Pumps, with the potential for the pumps to have a significant risk contribution, the following recommendations are made:

1. The current scoping/boundary definition for the EDGs should remain unchanged.
2. The fuel oil transfer pumps should be added as separate monitored components to the EDG system.
3. The 1E-6 Birnbaum exclusion for breakers and valves should be applied to the FO Transfer Pumps

Baseline Unavailability Considerations

The distribution of UAI that is not being counted against the MSPI due to changes in the baseline planned unavailability data is provided below. This clearly shows that the overwhelming majority of the changes have an inconsequential impact on MSPI. However, there are some outliers. The large negative values (<1E-5) represents unavailability that is now being counted which wasn't prior to the change for a plant which changed segmented it's EAC system to better represent the unique features of that plant. The large positive values are discussed below. Given that unreliability remains the dominant contributor to MSPI, changing the guidance to require plants to revise their PRA if a change to the planned baseline unavailability results in a risk impact of 1E-7 or greater (per system) provides a reasonable assurance that the PRA information used for MSPI reflects the as-built, as-operated plant.



The chart below is a plot of the risk impact of the change to the planned unavailability baseline which is not being counted as compared to the actual planned unavailability baseline change for those changes which resulted in a risk impact greater than 1E-6. Some points to note:

1. All of these s changes were to the cooling water system
2. 17 or 21 changes were from the same plant. Given the large amount of unplanned unavailability not being considered by this plant, additional information should be obtained to determine why this plant needs such as large amount of unavailable for some very high-risk significant trains.
3. Consi deration should be given to capping the amount of planned unavailability that can be credited in MSPI.

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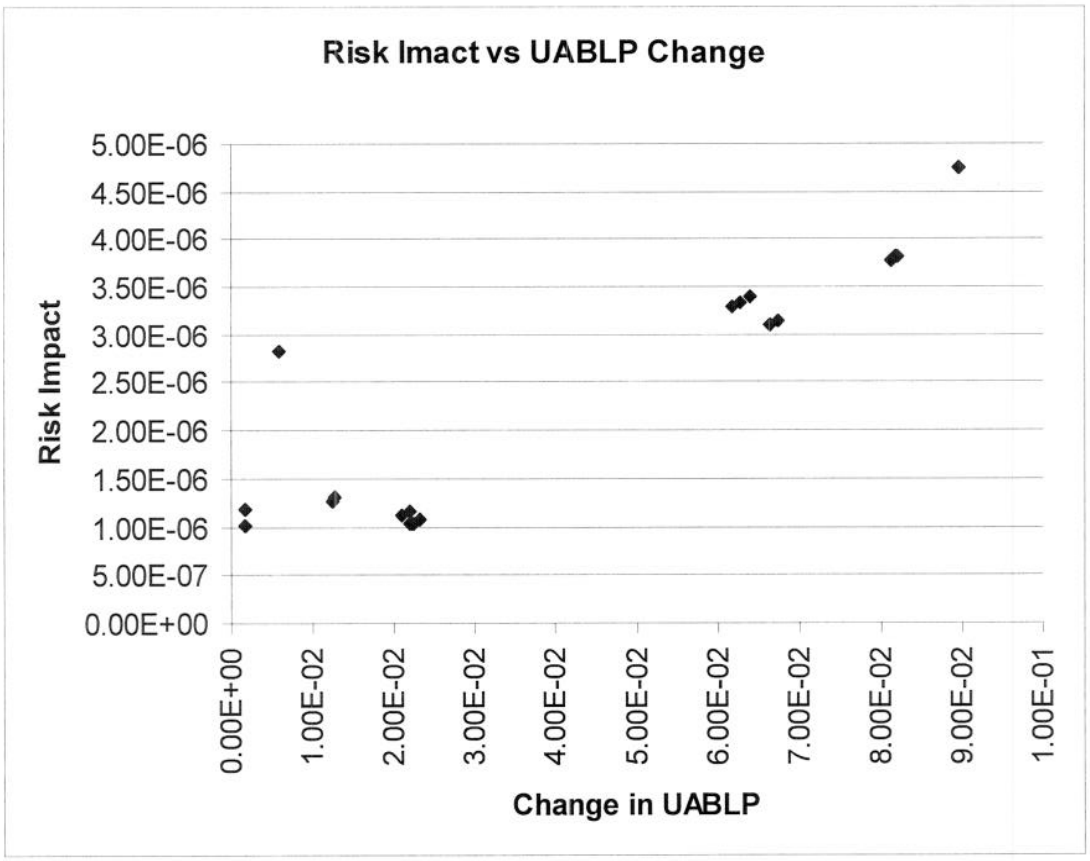
Risk Imact vs UABLP Change
Risk Impact
5.00E-06
4.50E-06
4.00E-06
3.50E-06
3.00E-06
2.50E-06
2.00E-06
1.50E-06
1.00E-06
5.00E-07
0.00E+00
0.00E+00
1.00E-02
2.00E-02
3.00E-02
4.00E-02
5.00E-02
6.00E-02
7.00E-02
8.00E-02
9.00E-02
1.00E-01
Change in UABLP

Staff White Paper on NEI 99-02 Guidance Changes for MSPI for Clarification of Planned UA Expectations (Industry proposed revision)

Background:

The staff conducted a review of MSPI planned unavailability (UA) baselines and found that there are some plants that have made large UA changes or continuous frequent baseline changes. The staff has also found indications that for many plants there are disconnects between the UA baseline values and the associated values contained in the PRAs.

MSPI does not penalize a licensee unless their UA exceeds the baseline UA value. The downside of constant baseline changes is that a licensee may never see any UAI contribution if the delta between actual and baseline UA is very small (or zero), as would be the case for frequent baseline revisions. NEI 99-02, Revision 5 provides guidance that allows licensees to revise their planned UA baseline with no periodicity restriction when changes in maintenance program philosophy occur. However, this should not be interpreted to mean it is desirable to change baseline planned unavailability to accommodate emergent work or frequent periodic maintenance activities.

NEI 99-02 also states that baseline UA values should reflect current maintenance practices. It is also an expectation of the ASME PRA Standard that the PRA reflects that as-built, as operated plant. Though it is not intended that the baseline UA value match the assumptions made in the PRA, it is expected that the risk impacts of maintenance activities reflect the as-built, as-operated plant. As a change in maintenance philosophy has the potential to impact the results of the PRA, consideration of this potential impact is required.~~As these objectives are similar, the expectation is that the MSPI baseline UA values should be consistent with the values used in the PRA.~~

Proposal:

To address the problem of having too frequent baseline revisions, the staff is proposing to clarify the definition of maintenance program philosophy and the addition of a requirement to ensure that changes in the UA baseline are consistent with the unavailability assumptions contained in the PRA.

Maintenance Program Philosophy

Section F.1.2.1 of NEU-99-02 Rev 5 states that "Planned unavailable hours: These hours include time a train or segment is removed from service for a reason other than equipment failure or human error. Examples of activities included in planned unavailable hours are preventive maintenance, testing, equipment modification, or any other time equipment is electively removed from service to correct a degraded condition that had not resulted in loss of function." Therefore, planned unavailability includes all

unavailability not related to failures and, as defined, is beyond those activities associated with preventive maintenance and testing which could be considered the typical scope of a maintenance program.

Section F1.2.2 states that "The initial baseline planned unavailability is based on actual plant-specific values for the period 2002 through 2004. (Plant specific values of the most recent data are used so that the indicator accurately reflects deviation from expected planned maintenance. These values are expected to change if the plant maintenance philosophy is substantially changed with respect to on-line maintenance or preventive maintenance. In these cases, the planned unavailability baseline value should be adjusted to reflect the current maintenance practices, including low frequency maintenance evolutions." The focus of changing the planned unavailability values is philosophy changes to the on-line maintenance or preventive maintenance program.

Section F1.2.2 also includes a discussion of significant maintenance events and states that "Some significant maintenance evolutions such as EDG overhauls, are performed at an interval greater than the three year monitoring period (5 or 10 year intervals). The baseline planned unavailability should be revised as necessary during the quarter prior to the planned maintenance evolution and then removed after twelve quarters." This guidance recognizes that some program variations can occur and should result in revisions to the planned unavailability values.

As this UA baseline definition includes all non-failure activities, the concept of making changes to the UA baseline tied solely to the maintenance program philosophy appears to have created inconsistencies in the implementation of maintenance program philosophy changes. It is the staff's expectation that the performance or condition of the SSCs is effectively controlled by preventive maintenance and testing programs (a maintenance rule expectation). These programs and condition monitoring activities should be periodically evaluated to ensure that the objective of preventing failures of SSCs through maintenance is appropriately balanced against the objective of minimizing unavailability of SSCs. Changes to the maintenance program philosophy refer to changes to the preventive maintenance and testing programs. Other additions of unplanned unavailability such ~~as equipment modifications or~~ responses to degraded conditions are not considered to be a change in maintenance program philosophy. Changes to baseline unavailability values to allow for equipment modifications are allowed as they were included in the originally baseline values. However, these changes should be removed at the conclusion of the 3-year monitoring period that encompasses the modification. Similarly, baseline unavailability values that included unavailability for modifications should also be removed.

~~This is not to say that hours associated with equipment modification, or any other time equipment is electively removed from service (to correct a degraded condition that had not resulted in loss of function) are not allowed in the baseline. The initial baseline planned unavailability is based on actual plant-specific values for the period 2002 through 2004 likely includes these types of activities.~~ However, it is expected that changes in these activities will reflect the appropriate balancing of preventing failures of

SSCs against the objective of minimizing unavailability of SSCs and as such the unavailability should not be increasing with time unless a maintenance program philosophy change has been implemented.

UA Baseline Changes Consistent with PRA

The Birnbaum values used in the MSPI are derived from plant-specific PRAs and are dependent, in part, on the unavailability values assumed in the PRA. The ASME PRA Standard Section 5 states the PRA configuration control requirements including the expectation that the PRA is to be consistent with the ~~as-built~~as built, as operated plant. Supporting requirement DA-D7 of the ASME PRA Standard includes requirements to limit the use of old data if modification to plant design or operating practice leads to a condition where past data are no longer representative of current performance.

Therefore, it is staff's expectation ~~that the UA baseline is consistent with that used in the PRA and that~~ changes to the UA baseline should only occur ~~as a result of or consistent with changes to the PRA~~after an evaluation is performed to determine the impact of the change on the PRA.

Recommended Changes

Change Section F1.2.2 (lines 35 to 41) from:

The initial baseline planned unavailability is based on actual plant-specific values for the period 2002 through 2004. (Plant specific values of the most recent data are used so that the indicator accurately reflects deviation from expected planned maintenance. These values are expected to change if the plant maintenance philosophy is substantially changes with respect to on-line maintenance or preventive maintenance. In these cases, the planned unavailability baseline value should be adjusted to reflect the current maintenance practices, including low frequency maintenance evolutions.

To:

The initial baseline planned unavailability is based on actual plant-specific values for the period 2002 through 2004. (Plant specific values of the most recent data are used so that the indicator accurately reflects deviation from expected planned maintenance. These values are expected to change if the plant maintenance philosophy substantially changes with respect to on-line maintenance, ~~or~~ preventive maintenance or implementation of an on-line modification. In these cases, the planned unavailability baseline value should be adjusted to reflect the current maintenance practices, including low frequency maintenance evolutions." Prior to implementation of an adjustment to the~~ed~~ planned unavailability baseline value, the impact of the adjusted values on all MSPI PRA inputs should be assessed. A change to the PRA model and associated changes to the PRA input values is required prior to changing the baseline unavailability if:

~~If the~~$\Delta CDF_{basline}$ > 1E-7/yr ~~PRA inputs change by 25% or greater, they are expected to be updated with the implementation of the updated UA baseline value.~~

Where:

$\Delta CDF_{basline} = \Sigma(\Delta UA_i * Birnbaum_i)$

$\Delta UA_i = UA_{current} - UA_{baseline}$ for segment i

$UA_{current}$ = proposed unavailability (expressed as a probability) to be used as the new baseline

$UA_{baseline}$ = the base unavailability (expresses as a probability) for 2002 – 2004.

$Birnbaum_i$ = Birnbaum value of segment i

The following changes are considered a "change in plant maintenance philosophy:"

- A change in frequency or scope of a current preventative maintenance activity or surveillance test.
- The addition of a new preventative maintenance activity or surveillance test.
- The occurrence of a periodic maintenance activity at a higher or lower frequency during a three year data window (e.g., a maintenance overhaul that occurs once every 24 months will occur twice 2/3 of the time and once 1/3 of the time)
- Planned maintenance activities that occur on a frequency of greater than 3 years (e.g., 5 or 10 year overhauls).
- The performance of maintenance in response to a condition-based preventive maintenance activity.
- The performance of an on-line modification.

The following changes are not considered a "change in plant maintenance philosophy:"

- The performance of maintenance in response to a degraded condition (even when it is taken out of service to address the degraded condition) unless this action is in response to a condition-based preventive maintenance activity.
- Planned maintenance activity that exceeds its planned duration or is the result of emergent work.

~~The performance of an on-line modification.~~