Enclosure 4
Staff White Paper on NEI 99-02 Guidance Changes for MSPI for Clarification of Planned UA Expectations
Meeting Summary of the 05/20/09 Reactor Oversight Process Working Group Public Meeting
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Background:

The staff conducted a review of MSPI planned unavailability (UA) baselines and found that there are some plants that have made large or frequent UA 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 licensees unless their UAs exceed the baseline UA values. Frequent baseline changes will result in a licensee never incurring a significant UAI contribution if changing baselines closely track actual values. 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 that it is appropriate 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 reflect the as-built, as operated plant. It is recognized that it is impractical to update the PRA constantly to capture short-term changes in maintenance philosophy, but the intent of the MSPI program requires that the assessed risk impacts of maintenance activities reflect the as-built, as-operated plant. In particular, it is necessary that the Birnbaum values used in the MSPI program adequately reflect the maintenance philosophy currently in effect.

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: "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 includes more than just those activities associated with preventive maintenance and testing.

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 point of changing the planned unavailability values is to account for 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. This interpretation is consistent with the definition of Maintenance contained in Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." This guidance states: "For the purposes of the maintenance rule, maintenance activities are as described in the "Final Commission Policy Statement on Maintenance of Nuclear Power Plants. This definition is very broad and includes all activities associated with the planning, scheduling, accomplishment, post-maintenance testing, and returning to service activities for surveillances and preventive and corrective maintenance." Other additions of unplanned unavailability, such as equipment modifications, except as discussed below, or responses to degraded conditions, are not considered to be a change in maintenance program philosophy. Changes to baseline unavailability for equipment modifications are allowed only if the modification is consistent with the assumptions in the PRA that were used to develop the MSPI Birnbaum values and are not already reflected in the MSPI UA baseline. That is, the unavailability values contained in the PRA include unavailability hours consistent with those needed for the proposed modification, and current maintenance and testing programs; and the hours in the MSPI UA baseline do not reflect this total unavailability. If the MSPI baseline is

adjusted as a result of a modification, the MSPI baseline changes should be removed at the conclusion of the 3-year monitoring period that encompasses the modification.

The initial baseline planned unavailability is based on actual plant-specific values for the period 2002 through 2004 and may not be fully consistent with current practices. However, it is expected that changes to baseline unavailability 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 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. As a minimum, an evaluation of a proposed change's impact on the PRA should be performed to determine that consistency is maintained.

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 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.)

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 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.)

Prior to implementation of an adjustment to the 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 MSPI PRA inputs values is required prior to changing the baseline unavailability if:

$\Delta CDF > 1E\text{-}8$

Where:

$\Delta CDF_{baseline} = \sum(\Delta UA_i * Birnbaum_i)$

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

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

$UA_{baseline}$ = the base unavailability (expressed 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 less than once every 3 years (e.g., 5 or 10 year overhauls).
- The performance of maintenance in response to a condition-based preventive maintenance activity.
- Performance of an on-line modification that has been determined to be consistent with the unavailability values contained in the PRA in that the PRA includes unavailability hours for the proposed modification, and current maintenance and testing programs; and the hours in the MSPI UA baseline do not reflect this total unavailability.

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.

- The performance of an on-line modification that do not meet the change in plant maintenance philosophy online modification criterion.

Note: Condition-based maintenance consists of periodic preventive maintenance tasks or on-line monitoring of the health or condition of a component (e.g., vibration analysis, oil analysis, MOVAT) and predefined acceptance criteria where corrective action is to be taken on exceeding these criteria. Condition-based maintenance does not include discovery of a degraded condition as a result of actions that are outside of the maintenance programs.