Reactor Oversight Process support: Mitigating Systems Performance Index

RES/DRA

The NRC's Reactor Oversight Process (ROP) uses a variety of tools to monitor and evaluate the performance of commercial nuclear power plants. The process is designed to focus on those plant activities most important to safety. The NRC assesses plant performance continuously and communicates its assessment of plant performance to licensees.

RES has supported the ROP by developing, piloting, and supporting the implementation of the Mitigating Systems Performance Index (MSPI). MSPI monitors risk associated with changes in performance of selected mitigating systems, accounting for plant-specific design and performance data. MSPI contributes to improvement of the safety of operating nuclear plants by addressing problems with the previous Safety System Unavailability Performance Indicator and providing a measure of both component (un)reliability and system (un)availability. The MSPI was implemented at all operating nuclear power plants in the 2nd quarter of 2006. In August 2007, the staff initiated an effort to conduct studies into the efficacy and effectiveness of MSPI as implemented, to consider ways to improve MSPI that could simplify the technical guidance, and to evaluate the reported data and compare it to plant risk models for insights into whether the data and risk coefficient values are representative of actual plant design and operation.

Project accomplishments over the past 6 months:

DOE contract/agreement with Idaho National Laboratory (INL) to identify trends relative to the frequency of changes to MSPI risk coefficient values and reported MSPI values; create a significant issues list and identify anomalies and outliers; evaluation criteria; decompose unavailability index (UAI) values into planned and unplanned values and determine anomalies or trends in planned and unplanned UAI contribution; analyze frequency and timing of re-baselining occurrences; analyze impact on MSPI if changes were made to the UAI contribution; evaluate selected failure data from the Equipment Performance and Information and Exchange System (EPIX) to determine if failure reporting – of MSPI and non-MSPI failures – is consistent with guidance; and make recommendations for changes to MSPI guidance and definitions.

- Project/contract modified to include detailed review of EPIX failure events for additional MSPI systems and components.
- Project extended until April 30, 2009 to allow for completion of modification items.
- Second modification issued to increase level of effort so that INL would be able to address issues uncovered during previous modification; project extended through June 30, 2009.
- Third modification issued to allow INL to complete study of EPIX failure classification and address remaining issues from earlier contract modifications; project extended through October 31, 2009
- Final letter report for Tasks 2 and 3 submitted June 2009.

Noteworthy Planned Activities:

MSPI Follow-on activities:

- Final project reports October 2009
- Transfer of MSPI support to NRR October 2009