

March 21, 2014

MEMORANDUM TO: Rani L. Franovich, Chief
Performance Assessment Branch
Division of Inspection and Regional Support
Office of Nuclear Reactor Regulation

FROM: Luis Cruz, Reactor Operations Engineer **/RA/**
Performance Assessment Branch
Division of Inspection and Regional Support
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF COMMISSION PAPERS ON THE RESULTS OF THE
INDUSTRY TRENDS PROGRAM FOR OPERATING POWER
REACTORS

On June 13, 2013, the Commission issued a staff requirements memorandum (SRM) on the May 28, 2013, Commission briefing on the results of the Agency Action Review Meeting (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13164A337) directing the staff to perform a review of the Industry Trends Program (ITP), as follows:

As part of the Reactor Oversight Process (ROP) Self-Assessment for calendar year (CY) 2013, the staff should review implementation of the Industry Trends Program over its history for lessons learned and inform the Commission of any program enhancements and/or resource reductions that may be warranted.

As part of the staff's review of the program, the staff studied previous Commission papers on the annual results of the ITP. The staff summarized and documented the results of these Commission papers in the enclosed table. The purpose of this summary is to support the staff's evaluation of the program and to capture this information as a knowledge-management resource.

Enclosure:

1. Summary of Commission Papers

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Summary of Commission Papers on the Results of the Industry Trends Program for Operating Power Reactors

Fiscal Year	Commission Paper	Long-term Trend Analysis	Short-Term Prediction Limits	BRIE Tier1 Prediction Limits	BRIE Tier2 Value (Δ CDF)	Additional Comments and Conclusions
		Performance Measure: (Statistically Significant Adverse Trend) $SSAT \leq 1$			Reportable to Congress if $>1.0 \times 10^{-5}$	
2000	SECY-01-0111	No SSAT	No Prediction Limits (PLs) Exceeded	N/A	N/A	<ul style="list-style-type: none"> The staff developed the Industry Trends Program, and presented the results for the program indicators using operating reactor data between FY1988 and FY2000.
2001	SECY-02-0058	No SSAT	2 PLs Exceeded	N/A	N/A	<ul style="list-style-type: none"> The Automatic Scrams while Critical and Collective Radiation Exposure indicators exceeded their short-term prediction limits. The staff did not identify any safety issues associated to exceeding either of these prediction limits. The staff suggested using risk-informed thresholds as part of the agency's performance measure of statistically significant adverse trends in nuclear industry safety performance.
2002	SECY-03-0057	No SSAT	No PLs exceeded	N/A	N/A	<ul style="list-style-type: none"> The staff revised the short-term prediction limits for all indicators using data starting in 1996, to be more representative of current industry performance. The staff proposed a complementary agency performance measure that would count the number of plants with significant performance issues based on the ROP Action Matrix. The staff started an interoffice working group to examine the feasibility of developing thresholds for indicators in all cornerstones of safety.

Fiscal Year	Commission Paper	Long-term Trend Analysis	Short-Term Prediction Limits	BRIE Tier1 Prediction Limits	BRIE Tier2 Value (Δ CDF)	Additional Comments and Conclusions
2003	SECY-04-0052	No SSAT	2 PLs Exceeded 1 PL Met	N/A	N/A	<ul style="list-style-type: none"> The Safety Systems Actuation (SSA) and Automatic Scrams while Critical indicators exceeded their short-term prediction limits. The Equipment Forced-Outage (EFO) Rate indicator met its short-term prediction limit. The staff considered the August 14, 2003, Northeast blackout as a driver for the increase in the SSA and automatic scrams indicators. The staff referenced the "Action Plan for Resolving Electrical Grid Concerns" letter dated February 2, 2004, to conclude that the staff did not identify any safety issue warranting immediate regulatory action. The staff did not identify any industry wide safety issues associated with reaching the prediction limit for the EFO indicator. The staff continued to develop more risk-informed indicators for the initiating events cornerstone, and concluded that the original ITP indicators are not easily risk-informed.
2004	SECY-05-0069	No SSAT	No PLs exceeded	N/A	N/A	<ul style="list-style-type: none"> The staff referred to the agency's performance measure, under the safety goal in the Performance and Accountability Report, related to the ITP as "the number of statistically significant adverse industry trends in safety performance." This performance measure was previously referred to as "no statistically significant adverse industry trends in safety performance." The staff started evaluating the validity of using a 10-year period for long-term trending. The staff started developing an Inspection Manual Chapter (IMC) for the ITP.

Fiscal Year	Commission Paper	Long-term Trend Analysis	Short-Term Prediction Limits	BRIE Tier1 Prediction Limits	BRIE Tier2 Value (Δ CDF)	Additional Comments and Conclusions
2005	SECY-06-0076	No SSAT	1 PL exceeded	N/A	N/A	<ul style="list-style-type: none"> The SSA indicator exceeded its short-term prediction limit. The staff did not identify any driving factors behind the increase in SSAs, and concluded that the trend in SSAs was not safety significant. The staff completed IMC 0313, "Industry Trends Program." The staff defined that a 10-year period will be used for long-term trending, to ensure that older data does not overly influence the trend determination. The staff revised the Significant Events indicator data with updated information from FY200-2004.
2006	SECY-07-0063	No SSAT	No PLs exceed	N/A	N/A	<ul style="list-style-type: none"> An expert panel reviewed the BRIE and concluded: (1) that the process maintains two levels, one for short-term trending, and one providing a risk perspective of industry performance, (2) representing the BRIE through three bar graphs, one for Pressurized Water Reactors, one for Boiling Water Reactors, and one for industry wide results, (3) report BRIE as change in Core Damage Frequency (ΔCDF) with Bayesian updating, and (4) using a threshold of ΔCDF $> 1.0 \times 10^{-5}$ to report to Congress. The staff indicated that this was the fifth report to the Commission on the ITP. The staff previously indicated that SECY-06-0076 was the fifth report on the ITP.

Fiscal Year	Commission Paper	Long-term Trend Analysis	Short-Term Prediction Limits	BRIE Tier1 Prediction Limits	BRIE Tier2 Value (Δ CDF)	Additional Comments and Conclusions
2007	SECY-08-0041	No SSAT	No PLs exceeded	N/A	N/A	<ul style="list-style-type: none"> The Commission approved the staff's recommendation to implement the BRIE. The staff observed an elevated number of plants in Columns 3 and 4 of the ROP action Matrix, which was discussed in the ROP self-assessment Commission paper.
2008	SECY-09-0048	No SSAT	No PLs exceeded	No PLs exceeded	-5.26×10^{-6}	<ul style="list-style-type: none"> The staff implemented Tier 1 and Tier 2 of the BRIE. The staff revised IMC 0313 to ensure appropriate updating of significant events data and incorporate BRIE.
2009	SECY-10-0028	No SSAT	No PLs exceeded	No PLs exceeded	-2.37×10^{-6}	<ul style="list-style-type: none"> No additional comments
2010	SECY-11-0044	No SSAT	No PLs exceeded	No PLs exceeded	-3.39×10^{-6}	<ul style="list-style-type: none"> The staff discussed an event that occurred at H.B. Robinson Steam Electric Plant on March 28, 2010, involving electrical fires, a reactor trip, a subsequent safety injection actuation, and an Alert emergency declaration. The event was considered as a potential <i>significant</i> precursor (i.e. Conditional Core Damage Probability $> 1 \times 10^{-3}$). The staff observed an elevated number of significant events. The staff and Industry observed issues related to human performance and training.

Fiscal Year	Commission Paper	Long-term Trend Analysis	Short-Term Prediction Limits	BRIE Tier1 Prediction Limits	BRIE Tier2 Value (Δ CDF)	Additional Comments and Conclusions
2011	SECY-12-0056	No SSAT	No PLs exceeded	1 PL exceeded	1.56×10^{-6}	<ul style="list-style-type: none"> The staff concluded that the March 28, 2010, Robinson event was not a <i>significant</i> precursor event. The Loss of Offsite Power BRIE indicator exceeded its short-term prediction limit. The staff noted that these events resulted from natural phenomena at multi-unit sites, and did not recommend program adjustments. The staff observed an elevated number of special inspections.
2011	2/4/2013 Memo	No SSAT	1 PL exceeded	N/A	N/A	<ul style="list-style-type: none"> The Significant events indicator exceeded its short-term prediction limit (i.e., 11 events). The staff indicated that 7 of the 13 events resulted from external initiators (i.e., natural phenomena) occurring at multi-unit sites. The staff concluded that these events did not represent degradation in overall industry safety performance mainly because the reliability and availability of safety systems, along with operator response, minimized the overall risk significance of each event. The staff indicated the Operating Experience Branch would review significant events from the previous five years to identify any trends of concern.

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2012	SECY-13-0038	No SSAT	No PLs exceeded	No PLs exceeded	-8.92×10^{-7}	<ul style="list-style-type: none"> The Operating Experience review used the following criteria to identify significant events: an Augmented Inspection Team was chartered, a Yellow or Red inspection finding was issued under the ROP, or a CCDF of 1×10^{-5} or higher was calculated by the ASP program. The study revealed that the number of events meeting at least one of these criteria has increased since 2009. In addition, the number of these events involving an initiator and subsequent complications has increased since 2010. The staff found that nonsafety-related system failures and corrective action program weaknesses contributed to most of those significant events involving an initiator and complications. The staff's insights are being considered as part of the ongoing ROP enhancement effort.
2013	-	No SSAT	No PLs Exceeded	No PLs exceeded	-2.52×10^{-6}	<ul style="list-style-type: none"> The staff completed a review of the ITP's implementation and identified potential enhancements and resources reductions in the program, which included: incorporating indicators from the ROP's Security and Public Radiation Safety cornerstone in the ITP, and evaluating further use of ROP PIs in the ITP.