

SIGNIFICANCE DETERMINATION PROCESS AREA

OVERVIEW

The staff evaluated 10 recommendations for the significance determination process (SDP) thematic area. The recommendations discussed here are associated with the Initiating Event, Mitigating Systems, and Barrier Integrity Cornerstones. The Emergency Preparedness (EP), Radiation Safety, and Security SDPs are discussed in their respective enclosures. Six recommendations were closed to no action for various reasons. Two recommendations are awaiting industry action, and two other recommendations have been completed. The disposition of all recommendations will be documented in a memo from Ho K. Nieh to Daniel H. Dorman and will be made publicly available when issued.

DISCUSSION

The staff evaluates the SDP program annually under the Reactor Oversight Process (ROP) self-assessment process in accordance with Inspection Manual Chapter (IMC) 0307, "Reactor Oversight Process Self-Assessment Program," dated November 23, 2015. The SDP program has undergone numerous changes based on recommendations from audits, independent self-assessments, and a previous ROP enhancement project. There are opportunities to improve the process based on continued experience with the program. The staff attempted to improve the risk-informed and performance-based features of the SDP to the extent possible, while aligning with the clarity, efficiency, and reliability principles.

COMPLETED ACTIONS

Staff evaluation and actions taken on the following two recommendations is complete:

Nuclear Energy Institute (NEI) Recommendation 3B

This recommendation suggested that all the appendices to IMC 0609, "Significance Determination Process," dated October 23, 2018, that are currently used for beyond-design-basis events should be combined into one SDP. The relevant appendices are IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," dated June 19, 2012; IMC 0609, Appendix O, "Significance Determination Process for Mitigating Strategies and Spent Fuel Pool Instrumentation," dated October 7, 2016; and IMC 0609, Appendix L, "B.5.b Significance Determination Process," dated December 24, 2009.

Staff Response

The U.S. Nuclear Regulatory Commission (NRC) staff was in the process of revising IMC 0609, Appendix O, before the start of the ROP enhancement initiative. The NRC will retire IMC 0609, Appendix O due to licensee's use of diverse and flexible coping strategies (FLEX) equipment in areas beyond compliance with Commission orders (e.g., outages, extension of limiting conditions for operation) and the ability to credit this equipment within probabilistic risk assessment (PRA) models. This will improve the timeliness and accuracy of decision-making by allowing the NRC staff to rely on the quantitative results of models reflecting FLEX equipment when evaluating the risk of inspection findings. This is consistent with direction provided by the Commission in staff requirements memorandum SRM-SECY-13-0137, "Recommendations for Risk-Informing the Reactor Oversight Process for New Reactors," dated June 30, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession

No. ML14181B398), that the “SDP should continue to place emphasis on the use of the existing quantitative measures of the change in plant risk for both operating and new reactors.” A forthcoming revision of IMC 0609, Appendix A, “The Significance Determination Process for Findings At-Power,” dated June 19, 2012, will incorporate lessons learned from use and the screening questions contained in Appendix O to address issues related to FLEX and spent fuel pool level instrumentation capabilities. IMC 0609, Appendix L, will remain as a separate SDP appendix because of the unique nature and security implications of findings associated with compliance with Title 10 of the *Code of Federal Regulations* 50.54(hh)(2). This equipment has not traditionally been modeled in PRAs, therefore, the NRC staff determined it is appropriate to remain in its own deterministic appendix for evaluation of potential findings. The staff intends to continue discussing ongoing and future revisions to the IMC 0609 appendices through routine ROP working group interactions.

NEI Recommendation 3C

Stop work on IMC 0609, Appendix M, “Significance Determination Process Using Qualitative Criteria,” and leave as-is.

Staff Response

This is a recommendation to stop work on IMC 0609, Appendix M, referring to an older draft version of IMC 0609, Appendix M. The staff added more precise entry conditions and guidance to use a decision-making management body (i.e., a planning Significance and Enforcement Review Panel) to approve the appropriate use of qualitative factors in the SDP noted in IMC 0609, Appendix M. The staff completed the revision to IMC 0609, Appendix M, in January 2019. During multiple ROP monthly public meetings, the staff and industry confirmed that this January 2019 revision of IMC 0609, Appendix M, does not pose any substantive issues of disagreement. Therefore, staff work on this recommendation is complete.

RECOMMENDATIONS REQUIRING ADDITIONAL EVALUATION

Transformation Initiative Recommendation 250

This recommendation stated that the ROP was designed to be a performance-based and risk-informed process, incorporating both qualitative and quantitative inputs for a more integrated regulatory outcome. However, the SDP for the initiating events, mitigating systems, and barrier integrity cornerstones uses numerical thresholds with little to no consideration for other qualitative information pertinent to the performance deficiency. The recommendation argues that the SDP needs a transformation to move the pendulum away from risk-based to risk-informed solutions, factoring in performance attributes (e.g., is the problem corrected, was the problem licensee identified, were there multiple opportunities to identify the problem, etc.), as appropriate.

Staff Response

The existing SDP is a blend of quantitative and qualitative considerations; even when a quantitative tool is used to arrive at a calculated risk result, qualitative assessments are associated with some of the inputs to the risk calculation, such as recovery credit and human error probability. The staff will continue to explore this area to determine if there are more efficient ways to arrive at the appropriate regulatory response, especially in situations where

there may be a wide band of uncertainty in the detailed risk evaluation, or where significant time or expense may be needed to quantitatively determine the overall risk.

The staff is considering revisions to the EP SDP, which are described in Enclosure 5. The EP SDP is deterministic and is risk-informed, vice risk-based.

STAKEHOLDER VIEWS

Transformation Initiative Recommendation 621 suggests the use of a deterministic or simpler SDP for those items that are initially scoped to be a less-than-Yellow risk. This recommendation has been closed without further NRC staff review because it is contrary to better risk-informing the ROP. The alternative view is that the staff should further examine the SDP to determine whether efficiencies can be realized, for example, in the use of an SDP Phase 2 approach that might be applied where either existing SDP assessment tools such as SAPHIRE might be used or more effective and efficient Phase 1 or Phase 2 screening questions might be developed. The basis for this view is the significant resources used and the time it takes the staff to evaluate greater-than-Green inspection findings, especially those determined to be White. This alternative view takes into account the need for the NRC to be more efficient while producing reliable decisions, consistent with the agency's Principles of Good Regulation.

Another alternative view raised was in response to the proposed resolution of the recommendation suggesting that Columns 1 and 2 of the Action Matrix be combined and stated that the staff should evaluate the industry's view that the existing risk threshold for White findings is out of touch with qualitative health objectives, and to determine whether some other threshold is more appropriate. In response to this view, staff noted that the bases for the existing risk thresholds are discussed in Regulatory Guide 1.174, which brings in the Regulatory Analysis Guidelines contained in NUREG/BR-0058 and Safety Goal Policy Statement published in 51 *Federal Register* 30028 on August 4, 1986. The use of core damage frequency and large early release frequency thresholds are surrogates for health effects, which are the principle metrics in the Safety Goal Policy Statement and consistent with metrics used in the Regulatory Analysis Guidelines. The risk metrics used in the ROP are used across multiple agency programs and re-assessment of those thresholds with respect to the qualitative health objectives, which the staff does not believe is necessary, would be a larger scope effort than ROP enhancement and is a matter of Commission Policy.

NEI disagrees with the proposed staff response to NEI Recommendation 3B. By merging Appendix O into Appendix A, their view is that staff blurs the distinction between design basis and beyond design basis events. The equipment subject to the mitigating strategies SDP has more in common with equipment subject to B.5.b scenarios than with at-power scenarios governed by Appendix A. In addition, the staff has provided a technical basis for the B.5.b SDP (Appendix L) that indicates the gradations in significance are based on expert judgment. In NEI's view, the staff has not provided a technical basis for the mitigating strategies SDP (Appendix O). Given the similarity of its use to that of the B.5.b SDP, they would expect the basis to be similar (i.e., expert judgment), and is difficult to reconcile with the quantitative risk analysis that predominates the At-Power SDP (Appendix A).