

December 16, 2014

MEMORANDUM TO: Sunil Weerakkody, Branch Chief  
PRA Operations and Human Factors Branch  
Division of Risk Assessment  
Office of Nuclear Reactor Regulation

FROM: Douglas Copeland, Reliability and Risk Analyst */RA/*  
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SUBJECT: SUMMARY OF NOVEMBER 20, 2014 PUBLIC MEETING TO  
CONDUCT A WORKSHOP BETWEEN THE NRC AND INDUSTRY  
TREATMENT OF UNCERTAINTY IN DECISIONMAKING  
WORKING GROUPS

On November 20, 2014, the U.S. Nuclear Regulatory Commission (NRC) staff held an eight-hour Category 2 public meeting with the Nuclear Energy Institute (NEI) Treatment of Uncertainty in Decision Making Working Group (WG). The purpose of this meeting was to conduct a workshop between the NRC staff and NEI on the Treatment of Uncertainty in Decisionmaking. This workshop was aimed at supporting the development of recommendations to the NRC and NEI Risk-Informed Steering Committees with the goal of identifying gaps and/or enhancements for improving the treatment and communication of uncertainties in risk-informed decisionmaking.

Doug True of ERIN Engineering and Research led the workshop with a presentation titled "Workshop on Treatment of Uncertainty in Risk-informed Decision making," available at Agencywide Documents Access and Management System (ADAMS) Accession Number ML14324A630. The general focus of the workshop was to evaluate available guidance in Draft of Revision 1 to NUREG-1855 ("Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision making") and companion industry documents against specific case examples that demonstrate challenges previously identified by the WGs.

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A total of eight cases were evaluated in the workshop. The first case was the “nominal case,” where all results were below acceptance guidelines. The purpose of this case was to simply address the guidance that exists for addressing uncertainties. The next five cases involved scenarios where the baseline values were below acceptance guidelines, but other issues called into question the role of uncertainties, including:

- Case 1A - Parametric uncertainty spans above acceptance guideline
- Case 1B - Sensitivity studies below/above acceptance guideline
- Case 1C - Risk profile incomplete
- Case 1D - Mean value not well characterized
- Case 1E - Conservative treatment masks  $\Delta$ Risk impact

The final two cases focused on scenarios where the baseline values were above acceptance guideline:

- Case 2A - Mean exceeds acceptance guideline
- Case 2B - Evidence of a conservatism-driven result

Key discussions occurred on potential gaps, enhancements, and recommendations. The more significant insights and issues shared during the workshop:

1. In general, the available guidance does address the subject of uncertainty, but the specific expectations on what to provide and how to interpret are not always clear. This applies to both the practitioners and decision-makers. Revision 1 of NUREG-1855 is a step in this direction, but it is generic in nature, so application-specific guidance is needed.
2. Some specific clarifications might be beneficial in explaining the way the decision making “regimes” described in Revision 1 of NUREG-1855 should be interpreted with respect to the manner in which Regulatory Guide (RG) 1.174 characterizes the acceptance guideline “regions”.
3. Some specific items were identified in Revision 1 of NUREG-1855 that could merit clarification, especially with respect to the interpretation of uncertainty distributions.
4. A “pilot” of Revision 1 of NUREG-1855 is recommended using one or more actual risk-informed decisions either prior to or shortly after issuance of Revision 1.
5. Revision 1 of NUREG-1855 provides guidance and insights that may be beneficial to consider incorporating into Inspection Manual Chapter (IMC) 609 for use in the Significance Determination Process (SDP).
6. The NEI WG provided a suggestion that some consideration should be given to the tradeoff of issuing Revision 1 of NUREG-1855 as-is vs. working to expedite the incorporation of the insights and recommendations from this working group into a near-term release. It is the opinion of the NEI WG that expediting the incorporation of the applicable insights and recommendations will require near-term resource commitments on the part of both industry and NRC.
7. Appendix M of IMC 609 provides a risk-informed framework for evaluating performance deficiencies, but the guidance is quite high-level and only applied in cases where quantification of risks is difficult or there is significant uncertainty that would impact a timely decision. Some of the concepts in Appendix M may be beneficial to consider in risk-informed decisions, even when quantification is possible. In addition, other parts of the ROP are largely risk-based and may benefit from some of the more qualitative risk-informed concepts in Appendix M.

8. A joint NRC-Electric Power Research Institute (EPRI) workshop is recommended upon issuance of Revision 1 of NUREG-1855 to help practitioners understand the expectations and supporting EPRI guidance. Such a workshop was held when the original NUREG-1855 was issued. This workshop could then be periodically followed by a periodic joint NRC-EPRI training workshop to help educate practitioners as well as decision-makers regarding the treatment of uncertainties in risk-informed decision-making; similar to the periodic training provided by NRC/EPRI on Fire PRA aspects.
9. A periodic joint NRC-EPRI meeting on risk-informed decision making would raise awareness of key issues and help educate practitioners as well as decision-makers; similar to the periodic training provided by NRC/EPRI on Fire PRA aspects.
10. Guidance should be enhanced to address situations where the quantitative results are not as meaningful as the other type of insights (e.g., risk significant contributors).
11. The NEI WG provided a suggestion that conservatism might complicate risk-informed decisionmaking. Additional guidance is needed to assist practitioners and decision-makers in addressing this issue.
12. Creating a means to address Mitigating Strategies in risk-informed decision-making is important in the post-Fukushima era. This guidance may be through incorporation in the PRA model, or through a separate means.
13. Additional guidance on aggregation of different risk contributors is needed. On-going EPRI work in this area may provide benefit to the WGs' activities. This same EPRI work provides some initial concepts for providing decision-makers the information necessary for a risk-informed decision. Sharing of the EPRI work with NRC should be expedited.

The WGs concluded the workshop with the follow-up actions of NEI drafting a workshop summary and recommendation for NRC review and comment.

The meeting was attended by 15 individuals, primarily representing industry, non-governmental organizations, and NRC staff and management. No feedback forms were received after the meeting.

The meeting notice is available in ADAMS Accession Number ML14310A431.

Enclosure:  
List of Attendees

decision. Some of the concepts in Appendix M may be beneficial to consider in risk-informed decisions, even when quantification is possible. In addition, other parts of the ROP are largely risk-based and may benefit from some of the more qualitative risk-informed concepts in Appendix M.

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