June 22, 2011

MEMORANDUM TO: Charles E. Ader, Director
Division of Safety Systems and Risk Assessment
Office of New Reactors

FROM: Donald A. Dube, Senior Technical Advisor /**RA**/
Division of Safety Systems and Risk Assessment
Office of New Reactors

SUBJECT: SUMMARY OF PUBLIC MEETING TO PERFORM TABLETOP EXERCISES REGARDING GUIDANCE ON RISK-INFORMED TECHNICAL SPECIFICATIONS INITIATIVE 4b AND MAINTENANCE RULE 50.65 (a) (4) FOR NEW REACTORS HELD ON JUNE 1, 2011

On June 1, 2011, a public meeting was held at Two White Flint North, Room 2B1, to conduct tabletop exercises regarding the adequacy of existing guidance on risk-informed technical specifications initiative (RITS) 4b and Maintenance Rule 50.65(a) (4) when applied to new reactor designs. These exercises were performed to address the Commission's Staff Requirements Memorandum (SRM) of March 2, 2011 on SECY-10-0121. The plan for the next workshop on June 29, 2011, are provided as Enclosure 1. A list of attendees is provided as Enclosure 2. A handout prepared by the staff is included in Enclosure 3. Handouts presented by industry representatives are provided as Enclosures 4 through 6.

The workshop was the third in a series in response to the Commission SRM to perform tabletop exercises that "test various realistic performance deficiencies, events, modifications, and licensing bases changes against current U. S. Nuclear Regulatory Commission policy, regulations, guidance and all other requirements (e.g., Technical Specifications, license conditions, code requirements) that are or will be relevant to the licensing bases of new reactors."

Staff began by summarizing the highlights of the May 26, 2011, workshop on the same topics. Staff agreed with comments at the previous meeting that the ICDP case study results from these exercises should be compared to a reference point, that being the existing standard technical specifications that provide fewer controls on the frequency of entering certain limiting conditions for operation (LCOs), especially risk significant configurations. A mathematical expression was provided to compare the results of the case studies to standard technical specifications. The positive results of risk-management experiences for the South Texas Project Units 1 and 2 in implementing RITS 4b are noteworthy.

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However, with only 8 reactor-years of operational performance, the data are too sparse at this point to reach any definitive conclusions on whether or not there might actually be a *decrease* in risk through implementation of risk-managed technical specifications across a fleet of new reactor designs. Staff noted it is conceivable that, like the experience with risk-informed inservice inspection of piping, implementation of RITS 4b eventually may be shown to be no worse than 'risk neutral. As discussed during the May 26, 2011 workshop, the key to ensure that risk does not creep up over time is to limit the frequency of entering higher risk maintenance configurations that could otherwise have the effect of increasing the baseline core damage frequency.

Representatives from Mitsubishi Heavy Industries (MHI), General Electric-Hitachi, and Areva presented the results of case study calculations for the US-APWR, ESBWR, and U.S. EPR designs, respectively. In addition, the Westinghouse representative provided comments on calculations he performed that generally confirmed staff calculations using the AP1000 SPAR model. Taken as a whole, the calculations indicated that two major features of RITS 4b tended to limit the potential risk increase from various maintenance configurations, specifically:

- The risk-informed completion time is limited to a deterministic maximum of 30 days (referred to as the backstop completion time) from the time the technical specification (TS) action was first entered.
- Voluntary use of the risk-managed technical specifications for a configuration which represents a loss of TS specified safety function, or inoperability of all required safety trains, is not permitted.

Regarding the last bullet above, technical specification 5.5.14 on the safety function determination program, and the bases for technical specifications LCO 3.0.6, are useful references.

There was general consensus that NUMARC 93-01, Section 11 on implementation guidance for 50.65(a)(4) did not appear to need substantive change to address new reactor designs. Of note is Section 11.3.7.2 that states:

> "Due to differences in plant type and design, there is acknowledged variability in baseline core damage frequency and large early release frequency. Further, there is variability in containment performance that may impact the relationship between baseline core damage frequency and baseline large early release frequency for a given plant or class of plants. Therefore, determination of the appropriate method or combination of methods as discussed above, and the corresponding quantitative risk management action thresholds, are plant-unique activities."

Most meeting participants, including key NRC staff involved in the regulatory review of technical specifications in general and RITS 4b in particular, were of the general opinion that no substantive changes to methodology were necessary to implement RITS 4b for new reactor designs. However, certain implementation and process issues may need to be addressed beforehand. Staff noted that the MHI application for RITS 4b in the US-APWR standard design, and Luminant's COL application for Comanche Peak Units 3 and 4 in particular, will in essence pilot this effort for new reactor designs. Lessons learned may, in effect, result in a formal or at the least informal supplement to the RITS 4b guidance in NEI 06-09. It was the consensus of participants that no additional analyses are necessary in support of the RITS 4b and 50.65(a)(4) assessments. At the end of the workshop, participants briefly discussed plans on tabletops exercises on RITS 5b, surveillance frequency program.

The schedule for the next two rounds of tabletop exercises are as follows:

1) June 29, 2011: RITS initiative 5b

2) August 9 or 10, 2011: 50.69, risk-informed categorization of structures, systems, and components (SSCs), including both passive and active SSCs.

Discussions are underway with the Advisory Committee on Reactor Safeguards staff to identify if and when a briefing of the subcommittee on Reliability and PRA would be appropriate, most likely in the mid to late summer of 2011.

Enclosures:
As stated

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Workshop #3, SRM to SECY-10-0121: Tabletop on Risk-Informed Surveillance Frequency Program, RITS 5b	
Date	June 29, 2011
Location	NRC, Rockville, TWFN 10A1
Time	8 am to 5 pm
Objective of workshop	To test implementation of Risk-Informed Technical Specifications (RITS) initiative 5b for new reactor designs, and either confirm the adequacy of existing regulatory guidance or identify areas for improvement
Scope of Workshop	Limited to issues of the adequacy of the existing risk-informed guidance to prevent significant decrease in the enhanced margin of safety for new plants. Process issues will not be addressed in this workshop.
Regulatory guidance	RG 1.177, RG 1.174
Supporting document(s)	NEI 04-10, Risk-Informed Technical Specifications Initiative 5b, Risk-Informed Method for Control of Surveillance Frequencies, Revision 1, April 2007
New reactor designs in tabletop	TBD
SPAR models	TBD
Further Commission direction per SRM	"If the staff concludes that the enhanced safety margins for new plants will significantly decrease without regulatory policy changes, the staff should clearly explain how 'significant' (in the context of decreasing safety margins) was defined to support the recommendations."
Pre-workshop activities	1. Industry to review experience with RITS 5b at one or more currently operating reactors and identify specific surveillances to tabletop for new designs 2. Qualitative and quantitative discussions of risk-impacts of RITS 5b for at least two new reactor designs. 3. NRC staff to use SPAR models to augment risk assessment of various scenarios of equipment outages, if necessary
Workshop activities	1. Overview of methodology 2. Discussion of experience with RITS 5b at one or more currently operating reactors 3. Qualitative and quantitative discussions of risk-impacts of RITS 5b 4. Identification of a) regulatory controls, and b) licensee controls to limit the decrease in the enhanced safety margin for new reactors
Preliminary conclusion to draw from tabletop exercise	Determine whether the preponderance of the experience at on RITS 5b for those in the currently operating fleet that have implemented it, qualitative and quantitative results of the tabletop exercises, and the regulatory and licensee controls to limit the decrease in the enhanced safety margin a) provide reasonable assurance of the adequacy of existing risk-informed guidance when applied to RITS 5b for new reactor designs, or b) identify the need for additional analysis or tabletop exercises, and if so, what additional analysis/tabletop, what time frame, and the owner(s) of such action item, or c) whether an area for improvement has been identified, the technical basis for concluding a "significant" decrease in the enhanced safety margin will result, and the specific recommendation to be made to the Commission
Lessons-learned	A list of the major lessons learned from the workshop/tabletop should be carried forward to future workshops/tabletops

U.S. Nuclear Regulatory Commission
Rockville, MD 20852
Public Workshop #2 on SRM to SECY-10-0121
Risk-Informed Technical Specifications Initiative 4b and 50.65(a)(4) for New Reactors
June 1, 2011

List of Attendees

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VESNA DIMITRIJEVIC	AREVA		
BILL GALYEAN	NUSCALE POWER		
STANLEY LEVINSON	AREVA		

ENCLOSURE 2

ENCLOSURE 3

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Net Risk

$$\text{Net Risk Increase} = \left| \sum_{\substack{\text{All Config.} \\ i}} f_i * \Delta CDF_i * \overline{T}_i \right|_{\text{RMTS}} - \left| \sum_{\substack{\text{All Config.} \\ j}} f_j * \Delta CDF_j * \overline{T}_j \right|_{\text{STS}}$$

where: f_i is the frequency of entering maintenance configuration i

ΔCDF_i is the incremental core damage frequency increase from configuration i

$\overline{T}_i$ is the mean duration of remaining in configuration i

If one assumes the same configurations are possible for RMTS and STS, then:

$$\text{Net Risk Increase} = \sum_{\text{All Config.}} \Delta CDF_i * \left[f_{i\,\text{RMTS}} * \overline{T}_{i\,\text{RMTS}} - f_{i\,\text{STS}} * \overline{T}_{i\,\text{STS}} \right]$$