

June 21, 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 MAY 26, 2011

On May 26, 2011, a public meeting was held at the Twinbrook Office, Room 5E1, 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 ground rules are provided as Enclosure 1 and a list of attendees is provided as Enclosure 2. Additional presentation materials prepared by the staff are included in Enclosures 3 through 6. Handouts presented by industry representatives are provided as Enclosures 7 through 9.

The workshop was the second 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."

The NRC staff provided a brief overview of the RITS 4b methodology. Rick Grantom, of the South Texas Project (STP), provided a comprehensive discussion of the implementation of RITS 4b at STP Units 1 and 2. Use of the on-line risk monitoring tools, case studies, best practices, and important lessons learned were highlighted.

The staff presented calculational results using SPAR models for internal events at power for the ABWR and AP1000 reactor designs. The configurations that were tested spanned a wide range, from single equipment outages to multiple equipment outages across divisions. Some configurations with equipment outages spanning 2 or more safety divisions had incremental core damage probabilities (ICDP) in the range of 1E-6 to 1E-5. Staff expressed concern that for a reactor with a baseline core damage frequency of, for example, 5E-7/yr, a one-time use of ICDP equal to 5E-6 would, in effect, represent 10 years' worth of core damage probability.

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The key therefore is to limit the frequency of entering such higher risk maintenance configurations. An important consideration in limiting ICDPs is the requirement in NEI 06-09 that a configuration resulting in a total loss of a specified safety function, for the affected technical specification, not be voluntarily entered.

Some stakeholders questioned certain configurations with multiple equipment outages spanning two or more safety divisions as not being 'realistic.' A suggestion was made that a more appropriate definition of 'realistic,' based on current industry practice of planned maintenance, would be a configuration with major equipment outages within one division, followed by a single *emergent* equipment outage in a second division. When staff calculated the risk of several altered configurations in this regard, ICDPs were in the low 1E-7 to low 1E-6 range. Additionally, some stakeholders believed that the ICDP sensitivity 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.

Industry representatives, including Leo Shanley of Erin Engineering, provided a detailed overview of the 50.65(a)(4) experience, as well as a demonstration of the PARAGON® risk monitoring tool. The 'blended' approach whereby the probabilistic risk assessment was combined with inputs on the degree of defense in depth and plant transient assessment was highlighted. It was noted that factors other than PRA were often more limiting in terms of the risk management action level.

Finally, staff presented the results of 50.65(a)(4) inspection experience over a 10-year time frame. Of 116 violations in this time, all were categorized as GREEN. Staff also provided a more detailed breakdown of the sorts of violations.

Meeting participants identified the regulatory and programmatic controls in RITS 4b that would tend to limit the decrease in enhanced safety margin of the new reactor designs. These include, for example:

- 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.
- A license amendment request to implement RITS 4b is subject to staff review and approval, including the scope of the LCOs to which the program may be applied.

Most participants agreed that the NUMARC 93-01, Section 11 implementation guidance supplemented some aspects of RITS 4b. Of particular interest to the participants in the workshop is the statement in Section 11.3.7.2 that

"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 participants agreed that it would be appropriate to await the results of the June 1, 2011 tabletop exercises before reaching any preliminary conclusions on the adequacy of the existing guidance to preclude a significant decrease in the enhanced safety margins in new reactor designs.

Enclosures:
As stated

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Enclosures:

As stated

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Workshop #2, SRM to SECY-10-0121: Tabletop on Configuration Control, RITS 4b and 50.65(a)(4)	
Dates	May 26, 2011 and June 1, 2011
Location	NRC Rockville offices: Twinbrook 5E1 and TWFN 2B1, respectively
Time	8 am to 5 pm, and 8 am to 3 pm, respectively
Objective of workshop	To test configuration control processes associated with implementation of Risk-Informed Technical Specifications (RITS) initiative 4b and Maintenance Rule 50.65(a)(4) 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, RG 1.182
Supporting document(s)	<ol style="list-style-type: none"> 1. NEI 06-09, Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines 2. NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, draft Rev. 4, Section 11 3. AP1000 Design Control Document (DCD), Section 16.3.1, Investment Protection Short-Term Availability Controls 4. ESBWR DCD, Section 19ACM, Availability Controls Manual and Bases
New reactor designs in tabletop	U.S EPR, US-APWR, AP1000, and ESBWR
SPAR models	AP1000 and ABWR
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	<ol style="list-style-type: none"> 1. Industry to review experience with RITS 4b at STP 1&2 and identify scenarios to tabletop for new designs 2. Industry to assess experience with implementation of 50.65(a)(4) including scenarios to tabletop for new reactor designs 3. Qualitative and quantitative discussions of risk-impacts of RITS 4b and 50.65(a)(4) for at least two new reactor designs. See template to report results. 4. NRC staff to use SPAR models to augment risk assessment of various scenarios of equipment outages 5. NRC staff to review 50.65(a)(4) inspection findings/violations for operating plants
Workshop activities	<ol style="list-style-type: none"> 1. Discussion of experience with RITS 4b at STP 1&2 2. Qualitative and quantitative discussions of risk-impacts of RITS 4b and 50.65(a)(4) for at least two new reactor designs; on-line configuration control demo. 3. Discussion of 50.65(a)(4) inspection findings/violations for operating plants 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	<p>Determine whether the preponderance of the experience at STP Units 1&2 on RITS 4b, the overall industry experience on 50.65(a)(4) for the currently operating fleet, qualitative and quantitative results of the tabletop exercises, and the regulatory and licensee controls to limit the decrease in the enhanced safety margin</p> <ol style="list-style-type: none"> a) provide reasonable assurance of the adequacy of existing risk-informed guidance when applied to configuration control processes such as RITS 4b and 50.65(a)(4) for new reactor designs, <u>or</u> 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, <u>or</u> 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
May 26, 2011

List of Attendees

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