UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

April 18, 2007

MEMORANDUM TO: Maitri Banerjee, Senior Staff Engineer, ACRS

FROM: G. Apostolakis, Chairman, Reliability and PRA Subcommittee

SUBJECT: CERTIFICATION OF THE MINUTES OF THE MEETING OF THE SUBCOMMITTEE ON RELIABILITY AND PROBABILISTIC RISK ASSESSMENT REGARDING RISK MANAGED TECHNICAL SPECIFICATIONS, INITIATIVE 4b, ON MARCH 23, 2007, IN ROCKVILLE, MARYLAND

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting on March 23, 2007, are an accurate record of the proceedings for that meeting.

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George Apostolakis, Date 4/18/07
Reliability and PRA Subcommittee Chairman

Issued 04/18/07

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
MINUTES OF THE MEETING OF THE SUBCOMMITTEE ON RELIABILITY AND PROBABILISTIC RISK ASSESSMENT REGARDING RISK MANAGED TECHNICAL SPECIFICATIONS, INITIATIVE 4b
MARCH 23, 2007
ROCKVILLE, MARYLAND

On March 23, 2007, the Subcommittee on Reliability and Probabilistic Risk Assessment (PRA) held a meeting in Room T-2B3, 11545 Rockville Pike, Rockville, Maryland. The purpose of the meeting was to discuss the NRC staff's review of the industry guidance document NEI 06-09 titled, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines," with representatives of the Office of Nuclear Reactor Regulation (NRR) and the industry. In addition to NRR, representatives from Electric Power Research Institute (EPRI) and the South Texas Project Nuclear Operating Company (STPNOC) made presentations to the Committee.

The meeting was open to the public. No written comments or requests to make oral statements were received from members of the public related to this meeting. A telephone bridge line was made available for NRC staff from Region I and certain members of the press to listen into the meeting. Ms. Maitri Banerjee was the Designated Federal Official for this meeting. The meeting was convened at 8:30 p.m. and adjourned at 12:00 p.m. on March 23, 2006.

ATTENDEES:

ACRS MEMBERS
George Apostolakis, Chairman
Tom Kress, Member
Otto Maynard, Member
William Shack, Member
Said Abdel-Khalik, Member
Mario Bonaca, Member

NRC STAFF/PRESENTERS
R. Tjader, NRR/DRIS/ITSB
A. Howe, NRR/DRA
K. Canavan, EPRI
S. Hess, EPRI
J. Phelps, STPNOC

OTHER ATTENDEES
S. Head, STPNOC
W. Harrison, STPNOC
R. Grantom, STPNOC
B. Bradley, NEI
Z, Edwar, APS/CRMF
M. Banerjee, ACRS Staff
C. Holden, NRR/DRA
D. Terao, NRR/DORL
M. Marshall, NRR/DORL
D. Harrison, NRR/DRA
G. Parry, NRR/DRA
M. Thadani, NRR/DORL
C. Schulten, NRR/DIRS

The presentation slides, handouts used during the meeting, and a complete list of attendees are attached to the Office Copy of the meeting minutes. The presentations to the Subcommittees are summarized below.

Opening Remarks

Dr. Apostolakis, Chairman of the Subcommittee on Reliability and PRA convened the meeting and mentioned the previous ACRS meting with the staff and the industry in his introductory remarks. NEI 06-09 proposes to rely on PRA and risk monitors to extend the technical specification completion times for returning structures, systems, and components to operable

status. A pilot plant application was submitted for NRC approval on August 2, 2004 (later resubmitted on June 6, 2006) by the Nuclear Operating Company for the South Texas project (STP). The last staff briefing was for the joint ACRS Subcommittee on Reliability and PRA and Plant Operations that took place on April 28, 2006. At that time, the staff's safety evaluation (SE) was not developed and the staff was planning to perform an audit of the applicant's implementation of the program at the plant site. The Subcommittee requested another meeting after the staff's planned site visits. Dr. Apostolakis also wanted the benefit of the staff's SE before bringing this to the Full Committee. Dr. Apostolakis called upon Mr. Tjader of the Office of Nuclear Reactor Regulation (NRR) to begin the discussion.

Staff Introduction and Overview of RMTS Initiative 4b

Mr. Bob Tjader and Mr. Andrew Howe with the Technical Specifications Branch and PRA Branch of NRR respectively, made the staff presentation. The staff was seeking a letter from the ACRS supporting the staff's approval of the risk-informed completion time process in NEI 06-09. The staff discussed their review documented in the draft SE. The staff plans to finalize the SE after ACRS review.

The RMTS initiative aligns technical specifications with the Commission Policy Statement on use of PRA. It is consistent with the established NRC guidance and the maintenance rule, particularly rule (a)(4) which requires assessing and managing risk prior to maintenance activities. The staff discussed the benefits of the program in that it effects integrated plant risk considerations based on a broader scope of systems, equipment and components than just those considered in the technical specifications. It also forces a heightened plant operators' awareness of risk contributors and the existing risk profile of the plant, and avoids unnecessary plant transients and shutdowns, while taking TS actions based on risk that is involved in the configuration of the plant at the time.

Risk-informed completion times in Initiative 4b, calculates real time quantitative risk associated with the plant configuration and provides a risk-justified extended completion time for the required actions of the technical specifications. This time will not exceed 30 days which gives the licensee time to restore the system to operable status.

The risk management guidance document program requirements will be included in the plant's technical specifications, under the administrative controls section, after the NRC approves a licensee's amendment request. The program includes: (1) an approved decision-making process and methodology based on risk thresholds for determining TS required action and completion times; (2) requirements for technical adequacy and quality of the supporting PRA; (3) configuration risk management (CRM) tool attributes and fidelity; and (4) implementation guidance. The requirements for quantitative configuration and cumulative risk metrics, and periodic assessment to comply with Regulatory Guide (RG) 1.174, Rev. 1 ("An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," November 2002), in addition to documentation and training requirements are also specified.

In order to apply the program to the TS, the functions addressed by the TS need to be modeled in the plant's PRA, and the PRA needs to be maintained to reflect the as-built and as-operated plant. Although no peer review process is applied for the CRM tool, the staff discussed the attributes the CRM tools must have to meet the program. Application of RG 1.200 ("An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for

Risk Informed Activities," February 2004) for the required technical adequacy of the PRA, the requirements for translation of the PRA into the CRM tool (configuration impact, truncation levels, benchmarking, etc.), conservative treatment of time of the year or operating cycle specific variables, relative ease of user interface, and appropriate administrative controls (software QA, model configuration control, procedures, training and corrective action program) were discussed. Upon member's questions, the staff indicated that an appropriate bounding analysis (e.g., for fire) may be acceptable in leu of specific PRA modeling. EPRI prepared a guidance document on methodology for fire configuration risk management, but staff has not reviewed the document.

The staff discussed the credit allowed for functionality of inoperable components, although the Initiative 4b program can not be used when all trains of a system become inoperable or upon loss of safety function. The methodology will allow the licensee to reflect the actual capability of systems against the required action if it is modeled in the PRA. The staff provided to the Subcommittee two revised pages of their draft SE relating to this discussion (recorded as a part of the presentation slides).

Mr. Bonaca wanted to know if licensing actions to permanently extend the deterministic TS front-stop completion times using PRA has any merit, particularly after the Initiative 4b is implemented at a site. Although the licensees may still want to apply for TS amendments to extend very short front-stop values based on PRA (Initiative 4a), the consensus was that the merit of Initiative 4b was in the enhanced ability to address emerging conditions and not the planned single system outages.

The staff indicated that the program does not require modifying the risk-informed completion time assuming emergent common-cause failures, as the staff considers the existing requirement for operability determination and assessment for extent-of- condition to be adequate for safety. However, the program requires assessment of additional risk management actions while still evaluating the extent-of-condition while in the extended completion time.

The staff indicated that they expect to do an on-site audit for each licensee applying for the TS amendment to implement 4b, like they did at STP. Quality of the PRA, its application in the 4b program, key assumptions and uncertainties, and implementation of the program including the compensatory measures are the prime areas for review.

Discussion on periodic evaluation of cumulative risk, required by the program, resulted in a question from Chairman Apostolakis as to its consistency with the RG 1.174 risk monitoring guidance. The RG guidance addresses cumulative risk (delta CDF or delta LERF) due to plant changes over the baseline PRA risk number, whereas the RMTS program tracks risk accumulated due to each extension of the TS completion time. Dr. Apostolakis asked the staff to address this aspect of risk trending in their briefing of the Full Committee on April 5, 2007, and if the staff's safety evaluation needed any change.

Staff Audit of STP on Readiness to Implement Initiative 4b

The staff stated that the purpose of the audit was to ensure that the applicant's PRA model, CRM program and supporting activities were adequate for implementation of the RMTS. The scope of the audit included a review of the PRA models not addressed by standards (fire, seismic, external events); development, implementation and updating of CRM program;

training; procedures and overall safety culture of the licensee's organization related to PRA. The staff indicated that the result of this review showed an overall adequate implementation of the program at STP, although individual discrepancies, that needed to be resolved, were identified. The audit team identified plant TS applications where the scope of the PRA model was incomplete; and as a result, these TSs could not be added to the program until further enhancement of the plant PRA. The licensee maintains approximately 20,000 pre-solved configurations for program implementation. The staff found that the licensee made conservative assumptions in general, although the licensee needed to enhance the justification for applying the CRM program to some plant TS. At the time of the audit, the results of the licensee's uncertainty analyses were not available, the audit team reviewed the licensee's plan on how to identify the key uncertainties and found some areas of improvements.

Dr. Apostolakis noted that in its SE, the staff made a statement regarding the document titled EPRI 1009652, "Guidelines for the Treatment of Uncertainty in Risk-Informed Applications: Technical Basis Document," December 2004, which provides a method for determining key uncertainties. The SE noted that staff had not reviewed this document, and that the NRC neither endorsed nor disapproved its methods. The staff stated that they were in the process of reviewing the EPRI document, and the EPRI representative at the meeting, Mr. Canavan, agreed to provide a courtesy copy to the ACRS.

Upon Dr. Apostolakis' questions, Mr. Grantom from STP discussed their current process for handling large areas of uncertainties in PRA modeling by assuming conservative approaches through new initiating events.

Industry Presentation

Messrs. Ken Canavan and Stephen Hess of EPRI briefly discussed the human error probability treatment in Initiative 4b (human reliability analysis was the subject of the Subcommittee's meeting the day before), PRA transition into the CRM tool, and consideration of uncertainties. In his presentation, Mr. Canavan pointed out that the treatment of uncertainty in the program is expected to be conservative as in reality the plant operators will have an even better understanding of actual plant configuration and associated risk management actions once the program is implemented. Two EPRI guidance documents on uncertainty are currently available. The staff has been reviewing one, and although the concept is found to be acceptable, the staff has some issues with the details. The Subcommittee would like to review these documents, and EPRI and the staff agreed to make them available. Mr. Canavan mentioned that STP application of uncertainty was consistent with the EPRI guidance, with worst case assumptions for elements of uncertainty that can not be accurately modeled.
In his presentation on the CRM tool, Mr. Hess pointed out that the industry program is mature and is effectively controlling risk while supporting compliance with the maintenance rule. Risk-informed methods used for the (4)(a) requirement of the rule is enhanced with more rigorous methods for Initiative 4b. The plant CRM tools are supporting management decision-making to effectively manage plant configuration risk and any needed compensatory risk management actions. In addition to the tools available for pre-solved risk results for plant configurations (RASCal, Sentinel), on-demand configuration risk solvers (EOOS, Safety Monitor) are also available. Upon Dr. Shack's question, Mr. Hess pointed out that the current program is geared towards completion time extensions while at power, although an industry standards committee is working on a PRA standard for low-power and shutdown conditions.

STP Implementation of Risk-Informed Technical Specifications

Mr. Phelps of NOC discussed implementation of the program at STP, and pointed out that a computer database of 20,000 pre-solved maintenance states and configuration specific completion time calculations is available for the plant operators and maintenance planners in an easy access format. Mr. Phelps also presented an example of the use of the tool to show how initial entry, risk assessment, and subsequent emergent non-quantified conditions are addressed. Upon Dr. Abdel-Khalik's questions, Mr. Phelps stated that at STP they did not find any existing TS completion time (front-stop) to be inadequate (i.e., not restrictive enough), although some very short front-stop completion times are subject to future evaluation for possible permanent extension. The staff pointed out that once Initiative 4b is implemented, such extension may become unnecessary. Also, the staff stated that they had thought about the idea of using a 4b type of process to do away with the TS front-stops. The staff has come to a position against it at this time because of the practical problems it poses. One of the problems may involve finding of a degradation in the tool itself, and determining what process to use to cope with that finding on an immediate online basis.

Dr. Abdel-Khalik wanted to know how changes in plant equipment states that impact the risk-informed completion times, are handled, communicated and documented. Mr. Phelps stated that incase of identification of non-quantified maintenance states, the plant PRA Engineer, available 24 hours on duty or call, would be contacted to calculate the revise completion times; and existing plant procedures will be used to obtain management approval, communication to the plant operators and repair crew, and for documenting the change.

At the end of the presentation, Mr. Tjader pointed out the subject of allowing credit for functionality of inoperable components had received some opposition from the staff and revisions to some parts of the staff's SE (as noted in the two revised pages addressed before). Dr. Apostolakis asked that the staff include this subject in their presentation at the Full Committee meeting on April 5.

Staff/Industry Follow-up Actions

The staff/EPRI agreed to provide the Subcommittee chairman with copies of two EPRI Technical reports related to guidance on treatment of uncertainty (EPRI 1009652, and EPRI 1013491).

Subcommittee Decisions and Follow-up Actions

The Subcommittee acknowledged the benefit of the program and requested the staff to address the following at the Full Committee meeting on April 5, 2007:

- Overview of Initiative 4b
- Incremental risk considerations in configuration risk management
- Operability vs. functionality considerations
- PRA adequacy and uncertainty considerations with examples
- Cumulative risk considerations vs. RG 1.174 guidance
- Benefits to the industry and NRC processes.

Background Materials Provided to the Committee

1. NEI 06-09 Rev. 0, “Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines,” November 2006, (ADAMS Accession No. ML063390639).

2. Letter from D. W. Rencurrel, STP to U.S. Nuclear Regulatory Commission, “South Texas Project Units 1 and 2 Docket Nos. STN 50-498, STN 50-499, Revised Broad Scope Risk-Informed Technical Specification Amendment Request," June 6, 2006, NOC-AE-06002005 (ADAMS Accession No. ML061630315).

3. Memo from L. A. Mrowca, Chief Probabilistic Risk Assessment Licensing Branch B, NRR to D. Terao, Chief Plant Licensing Branch IV, NRR, “Audit Report Regarding South Texas Project, Units 1 and 2, Risk-Managed Technical Specifications Application,” October 5, 2006, (ADAMS Accession No. ML062860170)

4. Memo from Timothy J. Kobetz, Chief Technical Specifications Branch, NRR to Stacey L. Rosenberg, Chief Special Projects Branch, NRR, “Draft Safety Evaluation Relating to NEI 06-09, Risk-Managed Technical Specifications Guidelines, for Risk Management Technical Specifications Initiative 4B, Risk-Informed Completion Times,” undated.

5. Draft Revisions to NRR SE (2 pages) provided at the Subcommittee meeting, untitled, undated.

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NOTE:
Additional details of this meeting can be obtained from a transcript of this meeting available in the NRC Public Document Room, One White Flint North, 11555 Rockville Pike, Rockville, MD, (301) 415-7000, downloading or view on the Internet at http://www.nrc.gov/reading-rm/doc-collections/acrs/ can be purchased from Neal R. Gross and Co., 1323 Rhode Island Avenue, NW, Washington, D.C. 20005, (202) 234-4433 (voice), (202) 387-7330 (fax), nrgross@nealgross.com (e-mail).

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