



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

May 7, 2008

The Honorable Dale E. Klein
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

SUBJECT: SUMMARY REPORT – 551st MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, APRIL 10-12, 2008, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

Dear Chairman Klein:

During its 551st meeting, April 10-12, 2008, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports, letter, and memoranda.

REPORTS

Reports to Dale E. Klein, Chairman, NRC, from William J. Shack, Chairman, ACRS:

- Digital Instrumentation and Control Systems Interim Staff Guidance, dated April 29, 2008.
- Draft NUREG-1902, "Next Generation Nuclear Plant Licensing Strategy Report," dated April 30, 2008. [Official Use Only]
- Hope Creek Generating Station Extended Power Uprate Application, dated May 5, 2008.

LETTER

Letter to Luis A. Reyes, Executive Director for Operations, NRC, from William J. Shack, Chairman, ACRS:

- Response to your April 7, 2008 Letter Regarding State-of-the-Art Reactor Consequences Analyses (SOARCA) Project, dated April 21, 2008.

MEMORANDA

Memoranda to Luis A. Reyes, Executive Director for Operations, NRC, from Frank P. Gillespie, Executive Director, ACRS:

- Proposed Regulatory Guides/Withdrawal of Certain Regulatory Guides, dated April 23, 2008.

- Regulatory Guide 1.210, dated April 23, 2008.
- Proposed Stretch Power Uprate to Millstone Power Station, Unit 3, dated April 23, 2008.
- ACRS Review of Power Uprates, dated April 23, 2008.

HIGHLIGHTS OF KEY ISSUES

1. Extended Power Uprate Application for the Hope Creek Generating Station

The Committee met with representatives of the NRC staff, PSEG Nuclear LLC, “the licensee”, and their respective consultants to discuss the Hope Creek Generating Station (HCGS) extended power uprate (EPU) application and the associated NRC staff’s Safety Evaluation. PSEG has applied for an EPU of approximately 15 percent above the current licensed thermal power of 3,339 megawatts thermal (MWt) to 3,840 MWt. This uprate also represents approximately a 17 percent increase from the original licensed thermal power of 3,293 MWt.

The Committee focused on the steam dryer performance, containment response, and analytical methods review. The steam dryer integrity was the key discussion topic. PSEG does not plan to replace the steam dryer and justified the basis for this decision citing: the merits of its main steam line configuration; the previous performance of the HCGS steam dryer in terms of acoustic vibration history and cracking; the predicted stress ratio, which showed sufficient margin; and the benefits of the deliberate power ascension testing and monitoring.

Committee Action

The Committee issued a report to the NRC Chairman on this matter, dated May 5, 2008, recommending that the (HCGS) (EPU) application be approved.

2. Proposed Licensing Strategy for the Next Generation Nuclear Plant

The Committee met with representatives of the NRC staff, Department of Energy (DOE), and Idaho National Laboratory (INL) to discuss Revision 15 of draft NUREG-1902, “Next Generation Nuclear Plant Licensing Strategy Report.” NUREG-1902 is not publicly available at this time and will be published in conjunction with the submittal of the licensing strategy report to the Congress.

The NRC staff discussed the licensing strategy, prepared jointly by the NRC and DOE, for a full-scale prototype Next Generation Nuclear Plant (NGNP) to be built at the INL facility and operational by 2021. The Energy Policy Act of 2005 (EPAAct) mandated such preparation and submittal of the strategy to Congress by August 7, 2008. The NGNP must be able to provide process heat to an adjacent industrial facility for generation of hydrogen. The EPAAct also requires that the NRC and DOE identify how current light water reactor requirements could be adapted for the NGNP and the needed analytical tools, research and development, and infrastructure development.

The NGNP as currently envisioned by the DOE is a very high temperature, graphite moderated, gas-cooled reactor with TRISO-coated particle fuel. DOE and NRC established several Phenomena Identification and Ranking Table (PIRT) panels, comprised of subject matter experts that identified and ranked significant phenomena in five areas. The panel identified knowledge gaps and a need for data generation, models, analytical tools, and infrastructure for technical basis and licensing review.

The NRC staff discussed the licensing process options that were considered, key technical and program needs, as well as policy issues. Highlights of the PIRT findings were also discussed. The NRC staff described the technical and regulatory challenges and the next steps to be undertaken.

Committee Action

The Committee issued a report to the NRC Chairman on this matter, dated April 30, 2008, recommending that draft NUREG-1902 be issued. The Committee concurred with the NRC/DOE staff recommendation on the prototype NGNP licensing and technical approach. The Committee also provided recommendations on the use of the risk-informed and performance-based technology-neutral licensing framework for any future commercial NGNP.

[Note: Given the predecisional nature of the licensing strategy report before its submittal to Congress, the ACRS report will not be made available to the public.]

3. Digital Instrumentation and Controls (I&C) Interim Staff Guidance (ISG)

The Committee met with representatives of the NRC staff, Nuclear Energy Institute (NEI), and Electric Power Research Institute (EPRI) to discuss three new ISG documents issued by the NRC staff on Cyber Security, Review of New Reactor Digital I&C Probabilistic Risk Assessments (PRAs), and Digital I&C Licensing Process. The staff also discussed progress associated with the assessment of operating experience in the nuclear and other industries to obtain insights regarding potential failure modes to be used for inventory and classification of Digital I&C in nuclear power plants.

The ISG on Cyber Security clarifies the staff's guidance regarding the implementation of cyber security requirements and facilitates the licensing process when NEI 04-04, Revision 2, "Cyber Security Program for Power Reactors," is used in lieu of Regulatory Guide (RG) 1.152 Revision 2, "Criteria for Use of Computers in Safety Systems of Nuclear Power Plants." The staff plans to issue additional guidance on cyber-security to support a new rule 10 CFR 73.54. This will provide guidance for licensees and the applicants pertaining to the development of cyber security programs that meet the requirements of the proposed rule. In addition, it provides guidance to address the design basis threat of cyber attack to prevent radiological sabotage and the theft or diversion of formula quantities of strategic special nuclear material.

The draft ISG on the Review of New Reactor Digital I&C PRAs provides acceptable methods for evaluating risk assessments of Digital I&C systems. This guidance describes how NRC reviewers should evaluate Digital I&C system PRAs, including addressing inclusion of common-cause failures in PRAs and uncertainty analysis associated with new reactor digital systems.

The draft ISG on Digital I&C Licensing Process clarifies the licensing criteria that the staff will use for nuclear plant license amendments in confirming that a proposed design meets applicable requirements.

Representatives of EPRI and NEI addressed key issues of their evaluation research on operating experience to learn more about the failure modes of components and systems.

Committee Action

The Committee issued a report to NRC Chairman on this matter, dated April 29, 2008. The Committee concluded that the ISG on Cyber Security will clarify the staff's guidance regarding the implementation of cyber security requirements and will facilitate the licensing process. The Committee recommended that the draft ISG on the Review of New Reactor Digital I&C PRAs be revised to emphasize the importance of the identification of failure modes, deemphasize sensitivity studies that deal with probabilities, and discuss the current limitations in Digital I&C PRAs.

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

- The Committee considered the EDO's response of April 7, 2008, to comments and recommendations included in the February 25, 2008 ACRS report on the State-of-the-Art Reactor Consequence Analyses Project. The Committee decided that it was not satisfied with the EDO's response, and issued a letter to the EDO on this matter, dated April 21, 2008
- The Committee considered the EDO's response of April 1, 2008, to comments and recommendations included in the February 28, 2008, ACRS letter concerning the Cable Response to Live Fire (CAROLFIRE) and Fire Model Improvements Program. The Committee decided that it was satisfied with the EDO's response.
- The Committee considered the EDO's response of March 27, 2008, to comments and recommendations included in the February 22, 2008, ACRS letter concerning the Draft Final Revision 1 to (RG) 1.45 (DG-1173), "Guidance on Monitoring and Responding to Reactor Coolant System Leakage." The Committee decided that it was satisfied with the EDO's response.

OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from March 8, 2008 through April 9, 2008, the following Subcommittee meetings were held:

- Thermal-Hydraulic Phenomena — March 19, 2008

The Subcommittee reviewed the Pressurized Water Reactor Owners Group (PWROG) Report, WCAP-16793-NP, Revision 0, "Evaluation of Long-Term Cooling Considering Particulate, Fibrous and Chemical Debris in the Recirculating Fluid," and the NRC staff's safety evaluation.

- Digital I&C Systems – March 20, 2008

The Subcommittee reviewed three ISG documents and discussed progress associated with the operational experience review and digital categorization update.

- Power Uprates – March 20-21, 2008

The Subcommittee reviewed the application by PSEG Nuclear LLC, for an extended power uprate for the HCGS and the associated NRC staff's safety evaluation.

- ESBWR – April 9, 2008

The Subcommittee discussed several SER Chapters with open items associated with the ESBWR design certification application.

- Planning and Procedures – April 9, 2008

The Subcommittee discussed proposed ACRS activities, practices, and procedures for conducting Committee business and organizational and personnel matters relating to ACRS and its staff.

LIST OF MATTERS FOR THE ATTENTION OF THE EDO

- The Committee plans to continue its review of the NGNP design and research and development program during future meetings.
- The Committee plans to continue its review of the matters related to Digital Instrumentation and Control (DI&C) during future meetings.
- The Committee would like the opportunity to review the draft final version of the RG listed in the memorandum "Proposed RGs/Withdrawal of Certain RGs," dated April 23, 2008, from Frank P. Gillespie, Executive Director, ACRS, to Luis A. Reyes, Executive Director for Operations.
- The Committee would like the opportunity to review any power uprate amendment, regardless of the level of the individual amendment, which would result in a cumulative power increase greater than 7 percent of the original licensed thermal power.
- The Committee plans to review the Millstone Power Station Unit 3 stretch power uprate application and the associated NRC staff's safety evaluation during its July 2008 meeting.

PROPOSED SCHEDULE FOR THE 552nd ACRS MEETING

The Committee agreed to consider the following topics during the 552nd ACRS meeting, to be held on May 8-10, 2008:

- Selected Chapters of the SER Associated with the ESBWR Design Certification Application
- Insights from PHEBUS – FP Tests
- Draft Brookhaven National Laboratory (BNL) NUREG/CR Report on PRA Methods for Digital Systems
- ACRS Response to the EDO's response, dated January 17, 2008, to the December 20, 2007, ACRS Report on the Susquehanna Extended Power Uprate Application

Sincerely,

/RA/

William J. Shack
Chairman

- Selected Chapters of the SER Associated with the ESBWR Design Certification Application
- Insights from PHEBUS – FP Tests
- Draft Brookhaven National Laboratory (BNL) NUREG/CR Report on PRA Methods for Digital Systems
- ACRS Response to the EDO's response, dated January 17, 2008, to the December 20, 2007, ACRS Report on the Susquehanna Extended Power Uprate Application

Sincerely,
/RA/
William J. Shack
Chairman

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OFFICE	ACRS	SUNSI Review	ACRS	ACRS	ACRS
NAME	GShukla	GShukla	CSantos	FPGillespie	FPG for WJS
DATE	05/07/08	05/07/08	05/7/08	05/ 7 /08	05/ 7 /08

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