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

May 22, 2013

The Honorable Allison M. Macfarlane
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

SUBJECT: SUMMARY REPORT – 604th MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, MAY 9-10, 2013

Dear Chairman Macfarlane:

During its 604th meeting, May 9-10, 2013, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following letter and memoranda:

LETTER

Letter to R. W. Borchardt, Executive Director for Operations, NRC, from J. Sam Armijo, Chairman, ACRS:

- Next Generation Nuclear Plant (NGNP) Key Licensing Issues, dated May 15, 2013

MEMORANDA

Memoranda to R. W. Borchardt, Executive Director for Operations, NRC, from Edwin M. Hackett, Executive Director, ACRS:

- Draft Revisions to Standard Review Plan Sections, dated May 15, 2013

- Final Revision 2 of Regulatory Guide 1.137, dated May 15, 2013

HIGHLIGHTS OF KEY ISSUES

1. Next Generation Nuclear Plant (NGNP) Key Licensing Issues

The Committee met with representatives of the U.S. Department of Energy (DOE), Idaho National Laboratory (INL), and the NRC staff to review the staff's assessment of DOE/INL NGNP key licensing issues. The Energy Policy Act of 2005 directed DOE to establish and manage the NGNP project with INL as the lead laboratory and stipulated that the NRC has

licensing and regulatory authority for any reactor developed by the project. DOE selected a high-temperature gas-cooled reactor for the NGNP project. As required by the Act, DOE and the NRC have been engaged in interactions on technical, licensing, and policy issues that could affect the design and licensing of a NGNP facility. DOE and INL provided an overview of the NGNP safety and design basis approach. The overview included a summary of licensing issues (licensing basis event selection, source terms, functional containment performance, and fuel qualification and radionuclide retention) that have been the subject of interactions between DOE/INL and the NRC staff. The staff presented a summary of its assessment of licensing issue white papers submitted by INL regarding fuel qualification; mechanistic source terms; safety classification of structures, systems, and components; defense-in-depth; and licensing basis event selection. The staff indicated that the DOE/INL proposed approaches to NGNP licensing issues were generally reasonable, with caveats: deterministic elements should be strengthened and technical issues should be resolved through prototype testing in accordance with 10 CFR 50.43(e)(2). The staff emphasized that its assessment feedback is advisory; regulatory decisions would need to be based on actual design detail contained in a NGNP license application.

Committee Action

The Committee issued a letter to the Executive Director for Operations on this matter, dated May 15, 2013, concluding that the staff assessment of the INL white papers on key issues is appropriate given the unavailability of many plant-specific design details. In addition, the Committee recommended that 1) the staff assessment documents be revised to provide clear links to the numerous requests for additional information and responses, 2) the licensing basis event selection assessment should point out the need to clarify the definition of event sequences and event sequence families to ensure consistency in developing licensing basis events and design basis accidents, and 3) the staff's suggestion that the final selection of design basis accidents include postulated deterministic event sequences is inconsistent with the risk-informed framework proposed by the NGNP project and other ongoing NRC activities, so if such sequences are not in the probabilistic risk assessment, they should be revised to include them.

2. Generic Issue (GI)-189, "Susceptibility of Ice Condenser and Mark III Containments to Early Failure from Hydrogen Combustion during a Severe Accident"

The Committee met with representatives of the NRC staff regarding the staff's completion of GI-189, "Susceptibility of Ice Condenser and Mark III Containments to Early Failure from Hydrogen Combustion during a Severe Accident." GI-189 was opened due to concern that hydrogen could accumulate in ice condenser and Mark III containments (14 reactors) following a severe

accident if the installed hydrogen igniter system was without power (e.g., station blackout) – the conditional containment failure probability exceeded the regulatory guideline. 10 CFR 50.44 required ice condenser and Mark III containment to have the capability to control combustible gas; however, there was no requirement to provide backup power to the chosen combustible gas control, AC-powered igniters. The staff presentation described the process used to investigate and successfully resolve the GI-189 issue. The staff's initial evaluation indicated that the most suitable solution to GI-189 was to provide backup power to the hydrogen igniters. Subsequently, the staff interfaced with stakeholders through several public meetings, developed a regulatory analysis regarding the need for rulemaking, obtained licensee commitments to install backup power to the igniters, and verified the installation of backup power using inspection procedure TI 2515/174, "Hydrogen Igniter Backup Power Verification." All licensee modifications were completed and inspected by the end of 2010. GI-189 was also reviewed for impacts following the Fukushima accident. The staff concluded that the agency's mitigating strategies order will enhance containment combustible gas control.

Committee Action

This was an information briefing. No Committee action was necessary.

3. Consequential Steam Generator Tube Rupture (C-SGTR)

The Committee met with representatives of the NRC staff to discuss ongoing efforts on the C-SGTR study. The staff is developing a methodology for a quantitative risk assessment of consequential steam generator tube rupture during (1) a severe accident after the onset of core damage and (2) a Design Basis Accident (DBA) event before the onset of core damage. The focus of the study is on estimating the probability of large early release from steam generator tube rupture and containment bypass. Simplified large early release frequency calculation methods have been developed for two representative PWR plants: a Westinghouse and a Combustion Engineering design. The staff indicated that the study utilized the latest available thermal-hydraulic models, updated steam generator tube flaw distributions, and new models and software for estimating the failure probability/timings of steam generator tubes and reactor coolant system components (i.e. hot leg and surge line). Although the staff has additional work to complete, they are currently reviewing and evaluating preliminary results.

Committee Action

This was an information briefing. No Committee action was necessary.

4. Final Revision 2 to Regulatory Guide 1.137

The Committee considered the draft final revision to Regulatory Guide1.137, “Fuel Oil Systems for Emergency Power Supplies,” and decided not to review it. The Committee has no objection to the staff's proposal to issue this Regulatory Guide as final.

5. Draft Revisions to Standard Review Plan Sections

The Committee considered the draft revisions to the following Standard Review Plan (SRP) Sections and decided not to review them. The Committee would like an opportunity to review the draft final versions of those SRP Sections.

- Section 3.8.1 - Concrete Containment
- Section 3.8.3 - Concrete and Steel Internal Structures of Steel or Concrete Containments
- Section 3.8.4 - Other Seismic Category I Structures
- Section 3.8.5 – Foundations

RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS

- The Committee considered the EDO’s response of April 9, 2013, to comments and recommendations included in the March 20, 2013, ACRS letter on Draft Revision 1 of Regulatory Guide 1.163, “Performance-Based Containment Leak-Test Program.” The Committee decided that it was satisfied with the EDO’s response.

- The Committee considered the EDO’s response of March 25, 2013, to comments and recommendations included in the February 14, 2013, ACRS letter on the safety aspects of the license renewal application for the Limerick Generating Station. The Committee decided that it was satisfied with the EDO’s response.

- The Committee considered the EDO’s response of March 25, 2013, to comments and recommendations included in the February 26, 2013, ACRS letter on the Construction Reactor Oversight Process (cROP) Program and the cROP Pilot Program Results. The Committee decided that it was satisfied with the EDO’s response.

SCHEDULED TOPICS FOR THE 605th ACRS MEETING

The following topics are scheduled for the 605th ACRS meeting, to be held on June 5-7, 2013:

- Station Blackout Mitigating Strategies Rulemaking
- Revisions to Six Regulatory Guides on the Use of Digital Computer Software in the Safety Systems of Nuclear Power Plants
- Assessment of the Quality of Selected NRC Research Programs - FY 2013
- Preparation for Meeting with the Commission

Sincerely,

/RA/

J. Sam Armijo
ACRS Chairman

SCHEDULED TOPICS FOR THE 605th ACRS MEETING

The following topics are scheduled for the 605th ACRS meeting, to be held on June 5-7, 2013:

- Station Blackout Mitigating Strategies Rulemaking
- Revisions to Six Regulatory Guides on the Use of Digital Computer Software in the Safety Systems of Nuclear Power Plants
- Assessment of the Quality of Selected NRC Research Programs - FY 2013
- Preparation for Meeting with the Commission

Sincerely,

/RA/

J. Sam Armijo
ACRS Chairman

Accession No: **ML13141A631** **Publicly Available** **Y** **Sensitive** **N**
Viewing Rights: ☒ NRC Users or ☐ ACRS Only or ☐ See Restricted distribution

OFFICE	ACRS	SUNSI Review	ACRS	ACRS	ACRS
NAME	PWen	PWen	CSantos	EMHackett	EMH for JSA
DATE	05/22/13	05/22/13	05/22/13	05/22/13	05/22/13

OFFICIAL RECORD COPY