

**REGULATORY AUDIT PLAN FOR THE REVIEW OF
CALCULATIONS ON HYDROGEN GAS GENERATION
IN THE RADWASTE BUILDING BUNKERS
RELATED TO LICENSING AMENDMENT REQUEST (LAR) 13-09
DOCKET NOS. 52-027 AND 52-028**

BACKGROUND

By letter dated February 27, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML14065A022) South Carolina Electric & Gas Company (the licensee) requested an amendment to Combined License Numbers NPF-93 and NPF-94, for Virgil C. Summer Nuclear Station Units 2 and 3. The proposed amendment has been modified numerous times since the original submittal, including Revision 1, submitted December 17, 2015 (ADAMS Accession No. ML15351A428) and Revision 1, Supplement 1, submitted June 1, 2016 (ADAMS Accession No. ML16154A048) with a planned Revision 1, Supplement 2, to be submitted in the coming months. The proposed amendment would revise the Updated Final Safety Analysis Report (UFSAR), both for Tier 1 and 2, including changes to the Radwaste Building design and configuration details. These changes include, but are not limited to, combining the waste accumulation room and the packaged waste storage room into one room, which is being called the waste accumulation room, adding bunkers to the accumulation room, and correcting the radiation zoning figures. The bunkers are assumed to be air tight and are not ventilated.

The staff reviewed the proposed changes and requested the licensee to provide information regarding the potential for flammable/explosive gases being generated inside the bunkers, including information on the hydrogen concentrations within the bunkers.

In its response letter dated June 1, 2016 (Revision 1, Supplement 1 of LAR 13-09) (ADAMS Accession Number ML16154A048), the licensee provided information on the types and quantities of resins that could be stored in the bunkers and indicated that hydrogen gas would be limited to 5 percent volume within each bunker. In a draft response provided in October 2016, the licensee revised the response, including changing the limit of hydrogen to 4 percent volume within each bunker. The licensee indicated that 4 percent hydrogen concentration would be maintained with the specified quantities of steam generator blowdown and condensate polishing resin being stored in a bunker for one year. The licensee also provided an equation for calculating the required bunker free volume for maintaining the bunker below the limit of 4 percent volume of hydrogen in air, but does not explain how the equation was derived or adequately explain the parameters and values used in the equation. The licensee further stated that the supporting calculations can be made available for U.S. Nuclear Regulatory Commission (NRC) review.

The NRC staff plans to conduct a regulatory audit to verify the licensee's methodology and calculations are appropriate for determining the maximum hydrogen concentration with one year of storage of the stated quantities of steam generator blowdown and condensate polishing resin.

Enclosure

REGULATORY AUDIT BASES

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix A, General Design Criteria (GDC) 3 requires that structures, systems, and components (SSCs) important to safety shall be designed and located to minimize the probability and effects of fires and explosions.

10 CFR Part 50, Appendix A, GDC 61, requires, in part, that systems that may contain radioactivity be designed to assure adequate safety under normal and postulated accident conditions and shall be designed with appropriate containment, confinement, and filtering systems.

Regulatory Guide (RG) 1.189, "Fire Protection for Nuclear Power Plants," indicates that the design should minimize fires and explosions, including those that could be associated with the release of radioactive material and exposure to workers. RG 1.189 also indicates that the fire hazard analysis should include explosion-prevention measures in areas subject to potentially explosive environments from flammable gases or other potentially energetic sources, include ion exchange columns.

REGULATORY AUDIT SCOPE

This audit will assist the staff in verifying the methodology and calculations for determining the hydrogen concentrations in the bunkers are appropriate for calculating the maximum hydrogen concentrations that would be expected for the specified quantities and types of material and storage time.

REQUESTED MATERIAL (FROM THE LICENSEE)

The NRC staff requests the following documents to be made available for the audit team:

- Calculations for determining the hydrogen concentrations within the bunkers with the specified quantities of material and storage times.
- Information on how the equation for determining the required bunker free volume was derived and information on the parameters/values used in that equation.
- Other supporting documents that the licensee deems necessary to explain the methodology, the calculations, or the results of the calculations.

TEAM ASSIGNMENTS

Paul Kallan, Senior Project Manager (NRO) – Team Lead
Edward Stutzcage, Health Physicist (NRO) – Technical Reviewer
Jimmy Chang, Engineer (NMSS) – Supporting Technical Reviewer

LOGISTICS AND DELIVERABLES

The regulatory audit will be tentatively scheduled in November 2016 in Rockville, Maryland. Audit findings will be discussed with the licensee at the audit exit. Additional questions, if necessary, will be issued after the audit to close the audit findings.

A publically available regulatory audit summary will be provided within 90 days of the completion of the audit.

REFERENCES

Regulatory Guide 1.189, "Fire Protection for Nuclear Power Plants"