

PLUS7 FUEL TESTING AND NUMERICAL MODELING AUDIT PLAN

June 14 – 17, 2016

APR1400 DESIGN CERTIFICATION

**Korea Hydro and Nuclear Power Co., Ltd. and Korea Electric Power Corporation
Docket No.: 52-046**

Location: Westinghouse Electric Company
5801 Bluff Road
Hopkins, SC 29061

US NRC Headquarters Office
11545 Rockville Pike
Rockville, MD 20852-2738

Purpose:

The purpose of this audit is to allow the NRC technical staff to understand the testing and the data garnered, how the testing feeds into the models used for analysis, and obtain clarification on technical and licensing impacts on the application for the Advanced Power Reactor 1400 (APR1400). The NRC staff will audit the test procedures, methods, and results. The staff will observe part of the testing in real time. The staff will also examine how the data is used for purposes of analysis.

Background:

On March 4, 2015, the U.S. Nuclear Regulatory Commission (NRC) accepted the design certification application for docketing for the APR1400 submitted by Korea Hydro and Nuclear Power Co. (KHNP) (Reference 1).

The NRC staff held a public meeting with KHNP on February 3, 2016, to discuss Section 4.2 of the APR1400 design control document (DCD) (Reference 2), and the associated RAI 275-8294 and draft RAI 8405. The meeting summary is available in the NRC Agencywide Documents Access and Management System (ADAMS) under Accession Number ML16068A101. During this meeting, KHNP outlined a testing plan to gather the necessary information for modeling the PLUS7 fuel performance for seismic conditions. At the meeting, KHNP stated that the NRC staff would be able to witness the testing performed.

The NRC staff has determined that efficiency gains would be realized by auditing the documents related to the fuel testing and subsequent analysis. The purpose of this audit is to allow the NRC technical staff to understand the testing and the data garnered, how the testing feeds into the models used for analysis, and obtain clarification on technical and licensing impacts on the application for the APR1400. During the audit and interactions with the applicant, there may be detailed NRC requests for information developed, which would be part of future formal correspondence.

Regulatory Audit Basis:

The audit basis is Title 10 of the *Code of Federal Regulations* Part 50, Appendix A, General Design Criteria 2, "Design Bases for Protection against Natural Phenomena." This regulatory audit is needed to evaluate the safety conclusions that need to be made regarding Chapter 4, "Reactor," of the APR1400 DCD, and to identify detailed information related to the PLUS7 fuel seismic performance under seismic conditions. The audited information will provide an additional level of detail that will support the acceptability of the APR1400 design certification application.

Regulatory Audit Scope:

The primary scope of this audit is to observe the KHNP PLUS7 [

.] The staff will review the test procedures, observe the conduct of the tests, and review the test results. The staff may also review the use of the obtained data in analyses for seismic conditions.

The staff will conduct this audit in accordance with the guidance provided in NRO-REG-108, "Regulatory Audits" (Reference 3).

Documents/Information Necessary for the Audit:

The NRC staff requests KHNP to provide access to test procedures, test reports, and documentation that demonstrates how the grid test data is implemented in the numerical models. The NRC staff also requests KHNP to provide access to its staff that can answer technical questions related to grid testing and grid modeling. Ultimately, the staff aims to gain and understanding of how the testing feeds into the models, and obtain clarification on what the new grid impact models will be.

Appropriate handling and protection of proprietary information shall be acknowledged and observed throughout the audit.

Audit Team:

Matt Thomas, NRO, Technical Reviewer
Daniel Beacon, NRR, Technical Reviewer
Pravin Patel, NRO, Technical Reviewer
Nick Klymyshyn, Technical Reviewer (NRC contractor)
John Vera, NRO, Project Manager

Special Requests:

None.

Audit Activities:

The NRC audit team's review will cover the technical areas identified in this audit plan. The audit will commence June 14, 2016, during ongoing testing in Columbia, South Carolina. The NRC Project Manager will coordinate with KHNP to verify specific documents and identify any changes to the audit schedule and requested documents. The NRC Project Manager will also coordinate communications with the applicant regarding the audit activities and discussions.

The NRC staff acknowledges the proprietary nature of the information requested. It will be handled appropriately throughout the audit. While the NRC staff will take notes, the NRC staff will not remove hard copies or electronic files from the audit sites.

At the completion of the audit, the audit team will issue an audit summary within 90 days that will be declared and entered as an official agency record in the NRC's Agencywide Documents Access and Management System (ADAMS) records management system. The audit outcome may be used to identify any additional information to be submitted for making regulatory decisions, and it will assist the NRC staff in the issuance of RAIs (if necessary) for the licensing review of APR1400 DCD Chapter 4 and any related information provided in other chapters, in preparation of the NRC staff's Safety Evaluation Report.

If necessary, any circumstances related to the conductance of the audit will be communicated to John Vera (NRC) at 301-415-5790 or John.Vera@nrc.gov.

References:

1. "Letter to Korea Hydro and Nuclear Power Co., Ltd., and Korea Electric Power Corporation – Acceptance of the Application for Standard Design Certification of the Advanced Power Reactor 1400," ADAMS Accession Number ML15041A455, issued March 4, 2015.
2. APR Design Control Document, Revision 0, issued December 2014.
3. NRO-REG-108, "Regulatory Audits," ADAMS Accession Number ML081910260, issued April 2, 2009.