Document Date: September 3, 2009

NRC AUDIT PLAN

U.S. EPR FSAR Chapter 8 Electrical Engineering Program Audit

Date: Thursday April 02, 2009

Location: AREVA NP, Inc., Rockville Document Center
1700 Rockville Pike, Suite 400
Rockville, MD 20852

Purpose

Perform a Regulatory Audit to examine and evaluate technical, procedural and process information to understand or verify information to support the basis of licensing and regulatory design certification decisions related to specific areas of Chapter 8, Section 8.3.1 of the AREVA NP, Inc., U.S. EPR Final Safety Analysis Report (FSAR). The staff will review the documentation provided to determine if AREVA's methodologies can be supported, and to determine the impact this material has on the staff's conclusions for this Chapter on the U.S. EPR FSAR.

Background

Under C.I.8.3.1.3 of RG 1.206, AREVA NP, Inc. performed electrical power system calculations and distribution system studies for onsite ac power systems. These studies and calculations are mentioned in three of the responses to NRC requests for additional information (RAIs). The electrical power system calculations and distribution system studies utilized electrical transient analyzer program (ETAP), Nuclear Version 5.5.6N, to analyze the alternating current (ac) distribution system for load flow and voltage regulation, short-circuit studies and motor starting studies. ETAP has been qualified to Title 10 of *the Code of Federal Regulations* (10 CFR) Part 50 Appendix B, and also complies with 10 CFR 21, American Society of Mechanical Engineers (ASME) NQA-1, International Organization for Standardization (ISO) 9001, and Institute of Electrical and Electronic Engineers (IEEE) Standard 730.1-1989. The following is a list of specific calculations performed by AREVA in these studies:

1. Load Flow/Voltage Regulation Studies and Under/Overvoltage Protection
2. Stability studies
3. Short-Circuit Studies
4. Equipment Sizing Studies
5. Equipment Protection and Coordination Studies
6. Insulation Coordination (Surge and Lightning Protection)
7. Power Quality Limits
8. Monitoring and Testing
9. Grounding

This audit is intended to learn how those calculations were performed and examine some sample calculations that were described in AREVA's FSAR and RAI responses.

Regulatory Audit Basis

10 CFR 52.47(a)(2) requires the design certification FSAR description to be "sufficient to permit understanding of the system designs and their relationship to the safety evaluations" for [10CFR Part 52.47(c)(1)] "…an essentially complete design except for site-specific elements…."

This audit will address safety concerns specifically related in responses to the requests by the NRC staff for additional information (RAI) contained in the mailing transmitted June 16, 2008, as U.S. EPR RAI 224, Letter 11, Questions 08.03.01-8, 08.03.01-9 and 08.03.01-10 (ADAMS[1] ML081680649), and AREVA NP, Inc.'s corresponding response to these questions, documented in the responses of September 25, 2008 (ADAMS ML082790010). The RAI and Question numbers are summarized in the following table:

	RAI & Letter Number	RAI Question Number	RAI Transmittal Date	AREVA Response Date
1	224 / 11	08.03.01-8	06/16/2008	09/25/2008
2	224 / 11	08.03.01-9	06/16/2008	09/25/2008
3	224 / 11	08.03.01-10	06/16/2008	09/25/2008

The information to be reviewed is intended to provide direct support for the safety conclusions that apply to AREVA's Design Certification application for the U.S. EPR under 10 CFR, Part 52.

The information to be assessed is intended to augment the staff's understanding, and inform or be specifically referenced by the staff's FSER on the U.S. EPR design certification.

Regulatory Audit Scope

NRC seeks greater understanding of AREVA's approach to assuring consistency in the transfer to COL applicants the analyses, calculations and assumptions made for the following:

1. Maintaining adequate voltage regulation at safety-related equipment terminals, as identified in RAI 224 / Letter 11, Question 08.03.01-8

2. The analysis and assumptions, identified in RAI 224 / Letter 11, Question 08.03.01-9, used to evaluate:

    a. Worse case bolted three phase short-circuit fault currents in the onsite ac distribution system
    b. Acceptable ratings for equipment such as circuit breakers for switchgear bus and containment penetration assembly

3. The studies, acceptance criteria, and assumptions identified in RAI 224 / Letter 11, Question 08.03.01-10 used to determine equipment sizing

AREVA will provide:

1. A sample summary (output) of the documentation (assumptions and calculations) for the aforementioned studies

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2. Discussion of how the studies were performed by using available tools and input data to perform the aforementioned studies and discussions of its validity

3. Discussion of the documentation for the studies, acceptance criteria, and assumptions and how it will be used for ITAAC by the COLA

The staff will review the documentation provided to determine if AREVA's methodologies can be supported, and to determine the impact this material may have on the staff's conclusions for this Chapter of the U.S. EPR FSAR.

NRC staff:

1. Staff will provide any relevant or non-relevant source documents to the Lead Auditor for inclusion in the Audit Summary. Any specific documents deemed necessary for submittal on Docket to support safety conclusions will be identified for request under a future RAI.

2. Any materials deemed to be suitable for submittal or citation will be identified to the Lead Auditor for future quality assurance program audit activities.

3. Staff is to determine if the detailed analysis and calculations described in the RAI 11 responses to Questions 08.03.01-8, 08.03.01-9 and 08.03.01-10 exist (or will exist) in a form suitable for docketing.

4. Staff will review sample case of studies performed (e.g., load flow, protection coordination studies).

Information and Other Material Necessary for the Regulatory Audit

No additional information or materials apart from those mentioned in the Audit Scope portion of this plan are identified by the staff for use during this audit.

Team Assignments

The following individuals will review the above documents and any other documents that are related to the above and are available at the time of the audit:

- Peter Kang, Electrical Engineering Branch, Office of New Reactors, Lead Reviewer
- Ronaldo Jenkins, Electrical Engineering Branch Chief
- James Steckel, EPR Projects Branch, Auditor
- Three additional staff from Electrical Engineering Branch.

No quality assurance support from the NRC Division of Construction Inspection & Operational Programs (DCIP) is required for this audit. Any materials deemed to be suitable for submittal or citation will be identified for future quality assurance program audit activities.

Logistics

Location was identified above. PM will meet at Headquarters at 8:00 a.m. Thursday,

April 02, 2009, and travel as a group to the AREVA Twinbrook location via Metrorail or NRC shuttle.

Deliverables

A technical staff audit summary shall be submitted to the project branch addressing the areas of concern and any follow-on information requests or QA program confirmations necessary to ensure the accuracy of staff conclusions. Information contained in the audit summary is intended to be referenced in Chapter 8 of the Draft SER.