June 24, 2009

MEMORANDUM TO: Joseph Colaccino, Branch Chief
EPR Projects Branch 1 (NARP)
Division of New Reactor Licensing
Office of New Reactors

FROM: Hossein Hamzehee, Chief /**RA**/
PRA Licensing, Operations, Support &
Maintenance Branch 2 (SPLB)
Division of Safety Systems and Risk Assessment
Office of New Reactors

SUBJECT: AUDIT PLAN TO REVIEW SUPPORTING TECHNICAL INFORMATION RELATED TO SELECTED AREAS OF U.S. EPR FSAR CHAPTER 19

AREVA NP, Inc. submitted to the U.S. Nuclear Regulatory Commission (NRC) a U.S. Evolutionary Power Reactor (EPR) design certification (DC) application in December, 2007. Enclosed is the audit plan to review areas related to Chapter 19 of the Final Safety Analysis Report (FSAR) of the U.S. EPR DC application. The purpose of this audit is to compare results of calculations obtained by AREVA NP using modular accident analysis program (MAAP) with those obtained by the NRC Office of Research (RES) using the MELCOR code, of representative severe accident scenarios for the U.S. EPR. The scenarios include depressurized station blackout (SBO) with and without containment isolation failure, high pressure SBO with MCCI, and main steam line break (MSLB) inside containment.

Contact: Edward Fuller, NRO/DSRA/SPLB
301-415-1975

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Docket No. 52-020

Enclosure: Audit Plan

DISTRIBUTION:

Non Public ARP R/F	HHamzehee, NRO	JColaccino, NRO	GTesfaye, NRO
	RidsNroDnrlNar1	PChowdhury, NRO	EFuller, NRO

ADAMS Accession Number: M;091750957

OFFICE	TR: DSRA / SPLB	BC: DSRA/SPLB
NAME	EFuller /AMA	HHamzehee
DATE	06/24/2009	06/24/2009

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AUDIT PLAN TO REVIEW SUPPORTING TECHNICAL INFORMATION RELATED TO SELECTED AREAS OF U.S. EPR FSAR CHAPTER 19

APPLICANT:	AREVA NP, Inc.
APPLICANT CONTACT:	Ronda Pederson
TIME:	9:00 am to 4:00 pm on 6/25/2009
LOCATION:	AREVA NP, Inc., Twinbrook Office, Room 438 Rockville, MD
REVIEWERS:	Edward L. Fuller, NRO Hanh Phan, NRO Suzanne Schroer, NRO Imtiaz Madni, RES Hossein Esmaili, RES Mohsen Khatib-Rahbar, ERI Michael Zavisca, ERI James Fulford, ERI Prosanta Chowdhury, NRO

BACKGROUND

AREVA NP, Inc. submitted to the U.S. Nuclear Regulatory Commission (NRC) a Final Safety Analysis Report (FSAR) for its application of the U.S. Evolutionary Power Reactor (EPR) in December, 2007. The NRC Office of Research (RES) has conducted a confirmatory assessment of several severe accident scenarios in the U.S. EPR, using the MELCOR 1.8.6 code. As a consequence, some significant differences from the AREVA MAAP 4.0.7 results were obtained.

In order to cover important review areas handled by the NRO PRA Licensing, Operations, Support & Maintenance Branch, the staff is proposing an audit that will be carried out at the AREVA office in Rockville, MD. The audit is needed to help resolve existing questions in accomplishing the U.S. EPR review schedule in an efficient manner.

PURPOSE AND APPROACH

The purpose of this audit is to compare MAAP and MELCOR calculations, pertaining to the safety evaluation of Chapter 19 of the U.S. EPR FSAR, of representative severe accident scenarios for the U.S. EPR to determine the causes of the significant differences in the results.

ENCLOSURE

The topics covered in the audit will include MAAP and MELCOR calculations of several scenarios, including depressurized station blackout (SBO) with and without containment isolation failure, high pressure SBO with MCCI, and main steam line break (MSLB) inside containment.

To achieve the review goals in an efficient manner, the staff has assembled an interdisciplinary audit team. The audit team will include experts from NRC and its consulting organizations. To facilitate and expedite the work, it is foreseen that the audit will be attended by representatives from AREVA NP who will provide insights either on its own MAAP calculations or those performed by the NRC; these insights might explain the differences. AREVA NP representatives will also provide supporting documents and technical evidence to the reviewers. The staff will document the audit findings in an audit report.

AUDIT ACTIVITIES AND SCHEDULE

The NRC staff will conduct the review over a period of one business day. NRC may request an ad-hoc extension of the audit at the same location if findings during the ongoing audit reveal the need for additional time. Such an extension will be requested before the meeting is adjourned on June 25, 2009 by the NRC staff responsible for the audit.

Following the audit, each technical reviewer will provide input to Edward Fuller by July 8, 2009. The NRC staff responsible for the audit will assemble and prepare a final audit report. The final report will be made available to all contributors for their concurrence by July 31, 2009, and will be issued by August 31, 2009.

A detailed agenda for the audit is presented in Attachment A. A list of requested documentation to be made available for audit is in Attachment B. Any questions related to the conductance of the audit should be communicated to Edward Fuller (NRC) at 301-415-1975 or at Edward.Fuller@nrc.gov.

Attachment A

Agenda
NRC Chapter 19 U.S. EPR Design Certification Safety Evaluation
Confirmatory Assessment Comparison Audit
Thursday, June 25, 2009
AREVA NP, Inc., Twinbrook Office, Rockville, MD

AUDIT - proprietary

9:00a-9:15	Introduction.....[NRC/AREVA NP]
9:15-10:00	MELCOR Model and Nodalization ..... [NRC]
10:00-10:50	MELCOR and MAAP Results for Selected Severe Accident Scenarios .....[NRC/ AREVA NP]
10:50-11:05	Break
11:05-12:05p	Discussion of Calculation Differences/ Documentation Review and Audit .....[NRC/AREVA NP]
12:05-1:05	Lunch
1:05-2:40	Discussion of Calculation Differences/ Documentation Review and Audit (cont.) .....[NRC/AREVA NP]
2:40-2:55	Break
2:55-4:00	Summary and Exit Meeting.....[NRC/AREVA NP]
4:00	Adjourn

Attachment B

List of Required Documentation for Audit:
Confirmatory Assessment Comparison Audit

- U.S. EPR PRA - Severe Accident Heat Removal System (SAHRS) PRA System Analysis
- MAAP [Modular Accident Analysis Program] 4.0.7 Justification for Level 1 PRA Analysis
- U.S. EPR Design Certification-Level 2 PRA Supporting Severe Accident Analysis
- Phenomenological Evaluation No. 1 - Induced Rupture of the Reactor System Pressure Boundary
- U.S. EPR PRA - Phenomenological Evaluation No. 4 - Phenomena at Vessel Failure
- Phenomenological Evaluation No. 2 - Fuel Coolant Interactions
- Phenomenological Evaluation No. 6 - Long Term Containment Challenges
- Human Action Modeling in the Level 2 PRA
- Phenomenological Evaluation No. 3 In-Vessel Core Recovery
- Phenomenological Evaluation No. 7 - Level 2 Equipment Survivability
- Phenomenlogical Evaluation No. 5 - Hydrogen Deflagration, Flame Acceleration, and Deflagration-to-Detonation Transition
- U.S. EPR PRA - Containment Event Tree Structure Quantification and Sensitivity/Uncertainty Analysis
- U.S. EPR PRA - Source Term Methodology and Identification of Key Uncertainties
- Level 2 PRA - Introduction, Scope And Methodology
- Combustible Gas Control System [CGCS] Analytical Input Requirements Specification
- Combustible Gas Control System Description
- Core Melt Stabilization System Analytical Input Requirements Specification
- Core Melt Stabilization System Description
- Severe Accident Heat Removal System Analytical Input Requirements Specification
- Severe Accident Heat Removal System Design Description
- U.S. EPR Severe Accident Containment Performance Evaluation
- Development of MAAP4 Models for EPR-Specific Plant Design Features
- Qualification of MAAP Version 4.0.7 FAI [Fauske & Associates, LLC]
- U.S. EPR MAAP 4.07 Model Development
- Relevant Scenario Selection and Uncertainty Analysis Methodology for Severe Accident Safety Issue Resolution
- Analysis of Relevant Severe Accident Scenarios for U.S. EPR Ex-vessel Safety Issues
- Uncertainty Analysis of Severe Accident Scenarios for U.S. EPR Ex-vessel Safety Issues
- Representative Analysis of Transient Melt Spreading Using MELTSPREAD Version 1.4
- Description, Verification and Application of the Computer Code WALTER
- CGCS Performance Analysis
- U.S. EPR Hydrogen Mitigation Strategy
- U.S. EPR Core Melt Stabilization System Assessment
- High Pressure Melt Ejection
- Evaluation of Steam Explosion in the U.S. EPR
- Equipment Survivability Evaluation
- OL3 [Olkiluoto 3] Severe Accidents Thermal-Mechanical Study of SG [Steam Generator] Tubes for Relevant Core Melt Accidents
- U.S. EPR MAAP 4.07 Severe Accident Source Term Analysis
- Justification of the Type of Refractory Layer Used in the Reactor Pit of OL3