

**U.S. NUCLEAR REGULATORY COMMISSION REGULATORY AUDIT OF
PROBABILISTIC RISK ASSESSMENT IMPACT AS PART OF
THE ADVANCED BOILING-WATER REACTOR DESIGN CERTIFICATION RENEWAL
APPLICATION
(Docket No. 52-045)**

AUDIT PLAN

APPLICANT: GE Hitachi Nuclear Energy (GEH)

APPLICANT CONTACTS: Patricia Campbell; Timothy Enfinger
GE Hitachi Nuclear Energy
Washington Regulatory Affairs
202-637-4239

DURATION: July 27, 2017 through September 27, 2017
(Via GEH's Electronic Reading Room (eRR))

Various times during the audit, the staff will examine the probabilistic risk assessment (PRA) related documents remotely

LOCATION: NRC Headquarters
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852-2738

A. Background

On December 7, 2010, General Electric Hitachi (GEH) applied to the U.S. Nuclear Regulatory Commission (NRC) for the renewal of the U.S. Advanced Boiling-Water Reactor (ABWR) standard plant design certification (DC), which the NRC had issued on June 11, 1997.

By letter dated July 20, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12125A385), the NRC provided a compilation of design changes that the staff requested GEH to consider in the renewal of the ABWR DC.

By letter dated September 25, 2015 (ADAMS Accession No. ML15271A171), regarding the design changes based on the staff review of the application, GEH stated the following:

“GEH has established a process that requires evaluation of the design changes that are included in the renewal application. The process specifies evaluation of the changes for impact on the PRA. If a design change results in a significant impact on PRA, risk evaluation will be performed at an appropriate level.”

The purpose of this audit is for the staff to (1) understand the process used to determine the potential impact of design changes or departures on ABWR design-specific PRA, (2) review related documentation and non-docketed information to evaluate conformance with the SRP and staff guidance, and (3) ensure the quality of the process/procedures used by GEH for PRA update meet appropriate regulatory requirements.

B. Regulatory Audit Basis

Title 10 of the *Code of Federal Regulations* (10 CFR) 52.47(a)(27) states that a DC application must contain a final safety analysis report that includes a description of the design-specific PRA and its results. Title 10 CFR Part 50, Appendix B, requires, in part, that design control measures shall be provided for verifying or checking the adequacy of design, such as by the performance of design reviews.

In support of the safety conclusions that need to be made regarding ABWR DCD, Revision 6, Chapter 19, an audit is needed to ensure that the applicant has established and conformed to an acceptable process to evaluate the impacts on the PRA due to design changes.

C. Regulatory Audit Scope

The specific scope of this audit will include reviewing the process/guidance and all related documentation used to evaluate impact on PRA of the changes resulting from the design modifications or departures.

D. Documents/Information Necessary for the Regulatory Audit

The following documents are to be made available to the NRC staff:

ECA Number	ECA Subject
CP1-1-ECA-0001	Design Changes due to Aircraft Impact Assessment
CP1-ECA-0002	ABWR CST Leakage
CP1-ECA-0004	ABWR DCD R5 Aircraft Impact Assessment RAI
CP1-ECA-0006	ABWR DCD Revised Containment Analysis
CP1-ECA-0007	ABWR DCD Rev 4 Aircraft Impact Assessment
CP1-ECA-0009	ABWR DCD Gas Accumulation Locations - Addition of Vent Lines to RPV Head Spray Nozzle
CP1-ECA-0010	Deletion of New Fuel Vault
CP1-ECA-0012	ABWR DCD Fukushima Recommendation 4.2 - Mitigation Strategies
CP1-ECA-0013	ABWR DCD COPS Size Correction
CP1-ECA-0014	ABWR DCD Fukushima Recommendation 4.2 - Mitigation Strategies - FLEX
CP1-ECA-0015	ABWR DCD Fukushima Recommendations 4.2 - Electrical Strategies
CP1-ECA-0016	ABWR DCD Spent Fuel Pool Wide Range Level Instrumentation
CP1-ECA-0017	ABWR DCD Aircraft Impact Assessment - Civil

CP1-ECA-0018	ABWR DCD Aircraft Impact Assessment - Mechanical
CP1-ECA-0019	ECCS ΔPCT DCD Update
CP1-ECA-0020	ABWR Tornado and Hurricane Missile Speeds
CP1-ECA-0021	ABWR Mitigation of Open Phase Condition (OPC)
CP1-ECA-0022	RAI 09.05.01-1 concerning Multiple spurious operations (MSOs)
CP1-ECA-0023	ABWR ECCS Suction Strainer Design Change- GE Optimized Stacked Disk
Procedure #	Title
CP-03-113	Engineering Change Control
WI-03-113-01	NPE Design Change Control
WI-03-113-04	Product Design Change Control Evaluation of Changes Affecting NRC Design Certification Documents
WI-03-113-05	GEH Product Design Change Control – PRA Model Maintenance and Update

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

E. Special Requests

The NRC staff requests that GEH provide access to the audit documents. GEH can upload the requested documents to the GEH's eRR for staff review. During the audit, the NRC project manager might request verbal communication with GEH subject matter experts to obtain additional clarification to resolve staff's concerns.

F. Audit Team

The audit team will include:

- James Shea, Lead Project Manager (NRC)
- Michelle Hayes (NRO/DSRA/SPRA, Acting Branch Chief)
- Hanh Phan (NRO/DSRA/SPRA, Lead PRA Analyst, Audit Lead)
- Malcolm Patterson (NRO/DSRA/SPRA, PRA Analyst)
- Marie Pohida (NRO/DSRA/SPRA, Senior PRA Analyst)

G. Logistics

The regulatory audit will be conducted at the Rockville NRC Headquarters via GEH's eRR. Verbal discussion between the staff and GEH subject experts might be arranged during the audit as necessary.

An entrance teleconference will be organized to go over the audit activities and for GEH personnel to provide an overview of the PRA-related documents available in the eRR.

An exit teleconference will be held during the last day to discuss the staff findings and any open issues that could result in a written request for additional information.

NRC staff will not electronically copy/print and remove proprietary files from the audit site.

H. Deliverables

Within 90 days of completion of the audit, the audit team will generate an audit results summary report (ARSR). The ARSR will provide a list of documents audited by the audit team, summary of progress toward resolution of technical issues, and a description of any new outstanding issues that may emerge during the audit.