

June 23, 2010

APPLICANT: GE Hitachi Nuclear Energy

PROJECT: Economic Simplified Boiling Water Reactor (ESBWR) Design Certification

SUBJECT: SUMMARY OF THE FEBRUARY 11 TO 12, 2009, AND SEPTEMBER 29-30, 2009, REGULATORY AUDITS OF SUPPORTING INFORMATION FOR FUEL STORAGE RACKS TOPICAL REPORTS AT GENERAL ELECTRIC HITACHI OFFICE IN WASHINGTON, D.C.

On February 11-12 and September 29-30, 2009, the U.S. Nuclear Regulatory Commission (NRC) staff conducted audits of the supporting information for the fuel storage topical reports which supports Chapter 9 of the ESBWR Design Certification Application. The audit was conducted at the GE-Hitachi Nuclear Energy (GEH) offices in Washington, D.C. A summary of the audits, including participants and audit activities is provided in Enclosure 1.

Pursuant to 10 CFR 2.390, we have determined that the enclosed audit report contains proprietary information. We have prepared a non-proprietary version of the audit report (Enclosure 1) that does not contain proprietary information. The proprietary information is indicated in brackets and underlined in Enclosure 2. We will delay placing this document in the public document room for a period of ten (10) working days from the date of this letter to provide you with the opportunity to comment on the proprietary aspects only. If you believe that any additional information in the enclosure is proprietary, please identify such information line by line and define the basis pursuant to the criteria of 10 CFR 2.390 before the public release date.

*/RA/*

Dennis Galvin, Project Manager  
ESBWR/ABWR Projects Branch 1  
Division of New Reactor Licensing  
Office of New Reactors

Docket No. 52-010

Enclosure:

1. Audit Summary

cc: See next page

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ADAMS ACCESSION NO. ML101450301

NRO-002

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**Summary of the February 11-12, 2009, Regulatory Audit  
Of Fuel Storage Racks Supporting Documentation  
Economic Simplified Boiling Water Reactor (ESBWR)  
Design Certification**

On February 11-12 and September 29-30, 2009, the U.S. Nuclear Regulatory Commission (NRC) staff conducted audits of the supporting information for the fuel storage topical reports which supports Chapter 9 of the Economic Simplified Boiling Water Reactor (ESBWR) Design Certification Application. These audits were conducted at the GE-Hitachi Nuclear Energy (GEH) offices in Washington, D.C. The applicable fuel rack topical reports are NEDO-33373, entitled "Dynamic, Load-Drop and Thermal-Hydraulic Analyses for ESBWR Fuel Racks," and NEDC-33374P, entitled "Safety Analysis Report for Fuel Storage Racks Criticality Analysis for ESBWR Plants." The purpose of the audits was to review supporting documentation for NEDC-33374P Revisions 1 and 2, and NEDO-33373 Revision 1 in support of developing requests for additional information.

Regulatory Audit on February 11-12, 2009, Review of NEDC-33374P, Revision 1, supporting Documentation

The purpose of the audit was to discuss the staff review of NEDC-33374P, Revision 1, and the responses to the associated RAIs 9.1-77 to 9.1-95. These involve the criticality analysis of the fuel storage racks. The staff also reviewed supporting documentation for NEDC-33374P, Revision 1. The audit participants are listed in Table 1. The documentation reviewed is listed in Table 2. As a result of the audit, the staff issued the following supplemental RAIs: 9.1-77 S01, 9.1-78 S01, 9.1-79 S01, 9.1-80 S01, 9.1-81 S01, 9.1-83 S01, 9.1-84 S01, 9.1-85 S01, 9.1-87 S01, 9.1-88 S01, 9.1-89 S01, 9.1-90 S01, and 9.1-95 S01. These RAIs may be found in the Agency-wide Documents Access & Management System (ADAMS) at Accession Number ML090330429.

Regulatory Audit on February 12, 2009, Review of NEDO-33373, Revision 1, Section 5, supporting Documentation

The purpose of the audit was to discuss the staff review of NEDO-33373, Revision 1, Section 5, and the responses to the associated RAIs 9.1-51, 9.1-74, 9.1-75, and 9.1-76. These involve the thermal-hydraulic analysis of the fuel storage racks. The staff also reviewed supporting documentation for NEDO-33373, Revision 1, Section 5. The audit participants are listed in Table 3. The documentation reviewed is listed in Table 4. As a result of the audit, the staff issued RAIs 9.1-119 to 9.1-127. These RAIs may be found in ADAMS at Accession Number ML091280154.

Regulatory Audit on September 29-30, 2009, Review of NEDC-33374P, Revision 2, supporting Documentation

The purpose of the audit was to discuss staff review of NEDC-33374P, Revision 2 and the responses to associated RAIs 9.1-77 S01, 9.1-78 S01, 9.1-79 S01, 9.1-80 S01, 9.1-81 S01, 9.1-83 S01, 9.1-84 S01, 9.1-85 S01, 9.1-87 S01, 9.1-88 S01, 9.1-89 S01, 9.1-90 S01, and 9.1-95 S01. These involve the criticality analysis of the fuel storage racks. The staff also reviewed supporting documentation for NEDC-33374P, Revision 2. The audit participants are listed in Table 5. The documentation reviewed is listed in Table 6. As a result of the audit, the staff issued the following RAIs: 9.1-77 S02, 9.1-78 S02, 9.1-81 S02, 9.1-89 S02, 9.1-90 S02,

9.1-91 S02, 9.1-129 and 14.3-457. These RAIs may be found in the Agency-wide Documents Access & Management System (ADAMS) at Accession Number ML092960405.

Table 1: Regulatory Audit on February 11-12, 2009, Review of NEDC-33374P, Revision 1  
Supporting Documentation: Participants

Participants	Organization
Art Alford	GEH
Fletcher Williams	GEH
John Zino	GEH
Dennis Galvin	NRC
James Gilmer	NRC
Jackie Dorn	NRC
Don Mueller	ORNL
Davis Reed	ORNL

Table 2: Regulatory Audit on February 11-12, 2009, Review of NEDC-33374P, Revision 1  
Supporting Documentation: Documentation Reviewed

NEDC-33374P Reference #	Reference
2	TGBLA006V, UM-0010, Revision 2, August 2006
3	Nuclear Design Bases - Fuel Bundles (GE14E), DB-0003.27, Rev. 0, December 2006
4	Design Specification, "Fuel Storage Rack Design Specification", 26A7032, Rev. 1
5	- ITEC-1040 "Validation of the SCALE4.4/CSAS25 sequence for Criticality Analyses", ENUSA, Rev. 0, September 2002
-	GE procedure TDP-0140, "New and Spent Fuel Storage Rack Calculations," Rev. 1, January 2008

Table 3: Regulatory Audit on February 12, 2009, Review of NEDO-33373, Revision 1  
Supporting Documentation: Participants

Participants	Organization
Art Alford	GEH
Fletcher Wilkins	GEH
Dennis Galvin	NRC
James Gilmer	NRC
Christopher Boyd	NRC

Table 4: Regulatory Audit on February 12, 2009, Review of NEDO-33373, Revision 1  
Supporting Documentation: Documentation Reviewed

NEDO-33373 Reference #	Reference
1	Fuel Storage Rack Design Specification” Document No 26A7032 Rev 02 GE Nuclear Energy
3	ESBWR Spent Fuel Pool Decay Heat Part II GE-NE-0000-0040-6730- R0-DRAFT Rev 0. GE Proprietary Information
4	ESBWR Spent Fuel Pool Boil-off. NeDRF 0000-0038- 9391/neDRFSection 0000-0038-9392 Rev 02
5	Rack Layout at Spent Fuel Building” ENSA 5926.D100 Rev 01
6	Design Study Summary GE14E, ESBWR Fuel Assembly, DRF Section 41- 8790, Global Nuclear Fuel (GNF)
8	Fuel Storage Requirements” Doc. No 22A5866 Rev 08, GE Nuclear Energy
9	Rack Layout at Spent Fuel Building” ENSA 5926.D100 Rev 02
10	ESBWR Buffer Pool Boil-Off and Makeup Capacity, eDRF Section 0000- 0076-3483

Table 5: Regulatory Audit on September 29-30, 2009, Review of NEDC-33374P, Revision 2  
Supporting Documentation: Participants

Participants	Organization
Tim Enfinger	GEH
Erik Kirstein	GEH
John Hannah	GEH
Dennis Galvin	NRC
James Gilmer	NRC
Don Mueller	ORNL
Davis Reed	ORNL

Table 6: Table 5: Regulatory Audit on September 29-30, 2009, Review of NEDC-33374P,  
Revision 2 Supporting Documentation: Documentation Reviewed

#	Reference
1	MFN 09-561: NEDC-33374P, Rev. 2
2	Normal Configuration Analysis Calculation Sheet
3	Abnormal and Tolerance Analysis Calculation Sheet
4	MFN 09-499, Rev. 1: Revised Responses to Portion of NRC Request for Additional Information Letter No. 304 to Design Control Document Revision 5 – Spent Fuel Storage Racks – RAI Number 9.1-81 S01
5	MFN 09-545, Rev. 1: Revised Responses to Portion of NRC Request for Additional Information Letter No. 304 to Design Control Document Revision 5 – Spent Fuel Storage Racks – RAI Number 9.1-84 S01, 9.1-85 S01, 9.1-87 S01, 9.1-95 S01
6	MFN 09-550, Rev. 1: Revised Responses to Portion of NRC Request for Additional Information Letter No. 304 to Design Control Document Revision 5 – Spent Fuel Storage Racks – RAI Number 9.1-77 S01, 9.1-78 S01, 9.1-80 S01, 9.1-83 S01, 9.1-88 S01, 9.1-89 S01, 9.1-90 S01

7	Spent Fuel Pool Rack Drawings <ul style="list-style-type: none"> <li>a. ENSA Drawing 5926.D200 Rev 02, "Assembly Drawing Rack (Type-15x12)"</li> <li>b. ENSA Drawing 5926.D210 Rev 02, "Base Plate Rack (Type-15x12)"</li> <li>c. ENSA Drawing 5926.D220 Rev 00, "Cutting Drawing Sheet Rack (Type-15x12)"</li> </ul>
8	Buffer Pool Rack Drawings <ul style="list-style-type: none"> <li>a. ENSA Drawing 5926.D400 Rev 01, "Assembly Drawing Rack (Type-11x7)"</li> <li>b. ENSA Drawing 5926.D410 Rev 02, "Base Plate Rack (Type-11x7)"</li> <li>c. ENSA Drawing 5926.D420 Rev 00, "Cutting Drawing Sheet Rack (Type-11x7)"</li> </ul>
9	New Fuel Rack Drawings <ul style="list-style-type: none"> <li>a. ENSA Drawing 5926.D500 Rev 01, "Fresh Fuel Rack Assembly Drawing"</li> <li>b. ENSA Drawing 5926.D510 Rev 01, "Fresh Fuel Rack Base Plate"</li> <li>c. ENSA Drawing 5926.D520 Rev 01, "Fresh Fuel Rack Miscellaneous Detail"</li> </ul>
10	Draft Spent Fuel Layout Drawing
11	GEH Drawing 105E3908 Rev 02, "ESBWR Nuclear Island"
12	26A7032, Rev 3, Fuel Storage Rack Specification
13	DB-0003.27, GE14E Design Basis Document
14	Bundle Uncertainty Documentation <ul style="list-style-type: none"> <li>a. A50YP12 Rev 51, "Uranium Dioxide Fuel Pellets"</li> <li>b. A50YP11 Rev 46, "Gadolinium Oxide-Uranium Dioxide Fuel Pellets"</li> <li>c. GNF Drawing 234C6625 Rev 0, "GE14 Tube"</li> </ul>
15	Material Specifications <ul style="list-style-type: none"> <li>a. ASTM A887-89, "Standard Specification for Borated Stainless Steel Plate, Sheet, and Strip for Nuclear Application", Reapproved 2004</li> <li>b. Carpenter Power Products UNS Number S30460-67, "Micro-Melt NuetroSorb PLUS Alloys"</li> <li>c. ASTM A240/A240M-09a, "Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications", May 2008</li> <li>d. AKSteel UNS S30400/UNS S30403, "Product Data Sheet – 304/304L Stainless Steel"</li> </ul>
16	DRF Section 0000-0086-5233, MCNP-05P Light Water Reactor Critical Benchmark Evaluations Using ENDF/B-VII Nuclear Cross-Section Data, June 2008
17	Summary of Critical Experiments in the Step-2 and Step-3 Fuels in NCA
18	NEDC 32609P, "Benchmarking of Toshiba's NCA Critical Facility", January 1995
19	SCO-01-2047, "2001 Critical Examination of PLR/Corner Gd" December 2001

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(Revised 05/12/2010)

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