



**SAFETY INSPECTION REPORT AND COMPLIANCE INSPECTION**

<b>1. CERTIFICATE/QUALITY ASSURANCE PROGRAM (QAP) HOLDER:</b> GE Hitachi Nuclear Energy (GEH) 3901 Castle Hayne Road Wilmington, NC 28402		<b>2. NRC/REGIONAL OFFICE</b>  Headquarters U. S. Nuclear Regulatory Commission Mail Stop TWFN-4B34 Washington, DC 20555-0001	
<b>REPORT NUMBER(S)</b> 71-09228/2017-202			
<b>3. CERTIFICATE/QAP DOCKET NUMBER(S)</b> 07100254	<b>4. INSPECTION LOCATION</b> Wilmington, NC	<b>5. DATE(S) OF INSPECTION</b> November 06-07, 2017	

**CERTIFICATE/QUALITY ASSURANCE PROGRAM HOLDER:**

The inspection was an examination of the activities conducted under your QAP as they relate to compliance with the Nuclear Regulatory Commission (NRC) rules and regulations and the conditions of your QAP Approval and/or Certificate(s) of Compliance. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector. The inspection findings are as follows:

- ☐ 1. Based on the inspection findings, no violations were identified.
- ☒ 2. Previous violation(s) closed.
- ☐ 3. The violation(s), specifically described to you by the inspector as non-cited violations, are not being cited because they were self-identified, non-repetitive, and corrective action was or is being taken, and the remaining criteria in the NRC Enforcement Policy, to exercise discretion, were satisfied.

\_\_\_\_\_ Non-cited violation(s) was/were discussed involving the following requirement(s) and Corrective Action(s):

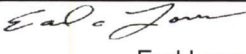
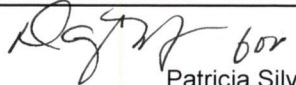
- ☐ 4. During this inspection, certain of your activities, as described below and/or attached, were in violation of NRC requirements and are being cited in accordance with NRC Enforcement Policy. This form is a NOTICE OF VIOLATION, which may be subject to posting in accordance with 10 CFR 19.11.  
(Violations and Corrective Actions)

**Statement of Corrective Actions**

I hereby state that, within 30 days, the actions described by me to the Inspector will be taken to correct the violations identified. This statement of corrective actions is made in accordance with the requirements of 10 CFR 2.201 (corrective steps already taken, corrective steps which will be taken, date when full compliance will be achieved). I understand that no further written response to NRC will be required, unless specifically requested.

TITLE	PRINTED NAME	SIGNATURE	DATE
CERTIFICATE/QAP REPRESENTATIVE	Mark Elliott, GEH Services Quality Leader	<i>Mark Elliott</i>	12/5/17
NRC INSPECTOR	Earl C. Love	<i>Earl C. Love</i>	12/5/17
BRANCH CHIEF	Patricia Silva	<i>Patricia Silva for P. Silva</i>	12/6/17

### INSPECTOR NOTES COVER SHEET

Licensee/Certificate Holder (name and address)	GE Hitachi Nuclear Energy (GEH) 3901 Castle Hayne Road Wilmington, NC 28402
Licensee/Certificate Holder contact and phone number	Mark Elliott, GEH Services Quality Leader 910-819-5546
Docket No.	071-09228
Inspection Report No.	7109228/2017-202
Inspection Dates(s)	November 06-07, 2017
Inspection Location(s)	Wilmington, NC
Inspector	Earl Love, Senior Transportation and Storage Safety Inspector
Summary of Findings and Actions	<p>On May 09 - 17, 2017 the U.S. Nuclear Regulatory Commission (NRC) performed inspections at GEH, Wilmington, NC and VNC, Vallejos, California. The purpose of the inspections was to assess GEH's design activities associated with an Amendment request to add a High Performance Insert and other miscellaneous design changes, as well as, GEH's corrective actions taken concerning the root cause and actions taken to correct deficiencies in the use of an optional high performance insert as reported in GEH's letter dated October 28, 2016, "10 CFR 71.95 – 60 Day Report – Model 2000 Certificate Condition Not Followed."</p> <p>The purpose of this inspection was to assess the adequacy of corrective actions taken by GEH, at the Wilmington, NC facility, to a Non-cited Violation identified during May 09-17, 2017 inspections documented in NRC Inspection Report 71-09228/2017-201 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML17277A069).</p> <p>Overall, GEH's corrective actions were assessed to be complete and no concerns were identified.</p>
Lead Inspector Signature/Date	 12/05/2017 Earl Love
Inspector Notes Approval Section Chief Signature/Date	 12/06/2017 Patricia Silva



## **Background**

The Model No. 2000 transportation packaging assembly of interest consists of an overpack and a cask using a High Performance Insert (HPI) and Material Basket (MB) to carry Co-60 source rods. Since the HPI and MB are not an authorized content in Certificate of Compliance (CoC) No. 9228, revision 26, GE Hitachi Nuclear Energy (GEH) requested and received a onetime authorization to ship Co-60 source rods using the Model 2000 containing the HPI and MB.

On May 09-17, 2017, the U.S. Nuclear Regulatory Commission (NRC) inspected GEH's Wilmington, NC and Vallecitos, CA facilities. The purpose of the inspections was to assess GEH's design activities associated with an Amendment request to add a HPI and other miscellaneous design changes, as well as, GEH's corrective actions taken concerning the root cause and actions taken to correct deficiencies in the use of an optional HPI as reported in GEH's letter dated October 28, 2016, "10 CFR 71.95 – 60 Day Report – Model 2000 Certificate Condition Not Followed" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16302A348). The team conducted an inspection exit meeting on September 08, 2017. The team did not identify any violations of significance related to NRC requirements, however, one Severity Level IV Non-cited violation of NRC requirements was identified in that GEH did not adequately execute the control of purchased material to assure that purchased material conformed to procurement documents before a Licensee's use of the packaging.

## **Findings**

The inspector noted that HPI repairs were complete and the majority of deviation and condition reports were closed. The inspector evaluated GEH's corrective actions and determined that actions taken to address deficiencies in the use of an optional HPI were adequate.

### High Performance Inserts

During the May 2017 inspection, the team noted that GEH's supplier DAHER-Transport Logistics International, Inc. (TLI) failed to: a) adequately fabricate component assemblies for use in the GE Model 2000 Transportation Package in accordance with its 10 CFR 71 quality assurance program that had been reviewed and approved by GEH, (b) maintain adequate control of non-conforming items and design documents, and (c) failed to report deficiencies to GEH for dispositioning prior to delivery. GEH initiated design deviation report (DDR) Nos. 437098797-008 and 009 to address HPI-001 and 002 weld non-conformances and DDR No. 437098797-006 to address HPI-001 manufacturing dimensions found not to be in compliance with fabrication tolerances. In addition, GEH initiated condition report (CR) Nos. 20208 and 26052 for corrective actions and to track resolution of the DDRs. At that time, the team determined a violation of 10 CFR 71.115, "Control of Purchased Material, Equipment, and Services," occurred in that GEH did not adequately execute the control of purchased material.

During this inspection, the inspector assessed GEH's DDRs and CRs, as noted. The inspector noted that most weld non-conformances that ranged from minor issues such as weld spatter to significant concerns such as lack of fusion, cracking, and undersized welds were reworked to conform to the originally specified design. The inspector noted certain areas where the location and geometry hindered reworking. Instead, GEH repaired the welds to the extent that the welds met the specified weld size even though internal defects could not be removed. The inspector noted that GEH structurally discredited these welds by performing a technical analysis as

described in design base record (DBR) No. 0027087, revision 1, "Disposition Responses for GE 2000 HPI Body Assembly, DDR-437098797-008 / 009." The team noted that HPI Body Licensing Drawing, 001N8425, revision 1 was updated to reflect discredited welds.

The inspector noted that GEH performed a technical evaluation to address HPI-001 manufacturing dimensions found not to be in compliance with fabrication tolerances (DDR No. 437098797-006). The results of the evaluation were summarized in DBR-0028229, revision 0, "GE 2000 High Performance Insert (HPI)." Based on a review of the DBR, the evaluation ensured no detrimental effect on the form, fit, or function and ensured the safety level and design basis was maintained. The inspector noted that licensing drawings were reviewed and compared with portions of the GE-2000 Safety Analysis Report (SAR) to establish the evaluation conclusion. Overall, GEH concluded that in all cases, the out of tolerance dimensions did not have a significant negative effect on the radiation shielding or streaming and that the basic design features such as material type, thickness, and configuration that provide adequate shielding and prevent streaming were not significantly altered. The inspector noted that DBR-0028229, contained sufficient technical detail that outlined recommended changes to licensing drawings. The inspector noted that all licensing drawings associated with the HPI and MB have been updated and NRC approved (ADAMS Accession Numbers ML17214A027 and ML17214A023) to address non-conformances and that justification for those changes were documented by GEH within DBR-0029957, revision 0, "HPI and HPI/MB assembly licensing drawings."

#### Shielding Test

During the May 2017 inspection, the team noted Condition 8 of the Letter of Authorization (ADAMS Accession Number ML17023A105) requires the HPI to be acceptance tested using a confirmatory gamma scan as described in the Safety Analysis Report (SAR), Section 8.1.6, "Shielding Tests." The team noted that GEH's procurement and fabrication specification issued to TLI required shielding to meet requirements as defined in NUREG/CR-3854, "Fabrication Criteria for Shipping Containers." Specifically, Sections 3.1.2 and 3.2.1 of NUREG/CR-3854 to meet the requirements of 10 CFR 71.85(a) prior to the initial use of the package. Contrary to this, the team noted GEH identified that TLI failed to conduct an adequate confirmatory gamma scan to validate shielding effectiveness. Upon discovery, GEH initiated DDR No. 437098797-003 to address this issue. The team noted that the HPI-001 body and bottom plug test results were acceptable, however, gamma scan results of the top plug revealed that the exposure measurement location in a particular predetermined quadrant had a high exposure reading that was not consistent with other locations within a symmetrical measurement group. The team noted that GEH attributed the high readings to the possibility of a flaw within the HPI-01 top plug and/or an erroneous measurement due to detector placement or equipment malfunction. The team noted GEH's disposition of the top plug as unacceptable. As such, the gamma scan examination was reevaluated and a second examination was performed.

GEH has since performed a gamma scan test of HPI-001 and HPI-002 depleted uranium assemblies, the results of which have been evaluated and summarized according to GEH DBRs. During this inspection, the inspector reviewed engineering enhancements to test specification procedure (No. 003N9030-TSP-01-R1, "Model 2000 High Performance Insert (HPI) Gamma Scan Acceptance Testing") and reviewed GEH's DBR acceptance test report (No. DBR-0025767-ATR-01-R2, "Model 2000 (GE2000) Cask – High Performance Insert (HPI) – Gamma Scan – HPI-01 Acceptance Test Report"). The inspector noted that the examination overlay for the HPI top plug was updated since the previous test and that a new overlay was developed to improve resolution of data measurements and reduce human performance error

during the data measurement process in order to allow for a better comparison against maximum calculated dose rates. The inspector noted consistent exposure measurements, with no major fluctuations and that all measurements were bounded by the maximum dose rate as calculated by GEH. In addition, the inspector reviewed HPI-2's design base acceptance test report (No. DBR-0030657-ATR-02-R0). Overall, it was determined that in DBR-0025767-ATR-01-R1 and -ATR-02-R0, both HPI-01 and -02, body, top plug, and bottom plug were acceptable and that both HPI's are in compliance with 10 CFR 71.85(a). No concerns were identified.