



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

**SAFETY EVALUATION REPORT**

**DOCKET NO. 71-9228**

**Model No. 2000**

**Letter Authorization Amending Certificate of Compliance No. 9228**

**SUMMARY**

By letter dated July 6, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17187A076), General Electric-Hitachi (GEH) requested a revision to the letter authorization issued on January 23, 2017 (ADAMS Accession No. ML17023A105), to add revised drawings and extend the expiration date to March 31, 2018, or until Certificate of Compliance No. 9228 is renewed, whichever occurs first. In addition to being required on the drawings, GEH requested Condition No. 8 of the letter authorization be revised to require that the high performance insert (HPI) be acceptance tested via a confirmatory gamma scan. GEH submitted revised drawings to update Condition No. 9. Based on the statements and representations in the application, the staff concludes that revised conditions as evaluated below provide reasonable assurance that the package will meet the requirements in Title 10 of the *Code of Federal Regulations* Part 71.

**EVALUATION**

In Attachment 2 of the application, GEH requested a revision to Condition No. 8 to add that the HPI shall be acceptance tested using a confirmatory gamma scan. In Note 10 on Drawing No. 001N8425G001, Rev. 2, "GE 2000 HPI Body Licensing Drawing;" Note 10 on Drawing No. 001N8427G001, Rev. 2, "GE 2000 Top Plug Assembly Licensing Drawing;" and Note 9 on Drawing No. 001N8428G001, Rev. 2, "GE 2000 HPI Bottom Plug Assembly Licensing Drawing," the notes state that the HPI shield body, and top and bottom plug shielding shall be confirmed by gamma scan testing of the HPI assembly. This requirement provides assurance that confirmatory gamma scan of the HPI is used to demonstrate the HPI shielding effectiveness.

GEH also requested revision to Condition No. 9, to provide updated drawing showing the as-fabricated configuration. GEH requested that Conditions No. 9 state: "The HPI and HPI Material Basket shall be constructed and assembled in accordance with Drawing No. 001N8422G001, Rev. 3, "GE 2000 HPI and Material Basket Licensing Drawing," Drawing No. 001N8423G001, Rev. 2, "GE 2000 HPI Licensing Drawing," Drawing No. 001N8424G001, Rev. 2, "GE 2000 HPI Material Basket Assembly Licensing Drawing," Drawing No. 001N8425G001, Rev. 2, "GE 2000 HPI Body Licensing Drawing," Drawing No. 001N8427G001, Rev. 2, "GE 2000 Top Plug Assembly Licensing Drawing," and Drawing No. 001N8428G001, Rev. 2, "GE 2000 HPI Bottom Plug Assembly Licensing Drawing."

In Attachment 3 of the application, in addition to adding notes requiring confirmatory gamma scan of the HPI as discussed above, GEH provides summary descriptions of other changes indicated on drawings. These include primarily: dimensions and tolerances change to reflect as-fabricated components, drawing notes update to reflect as-fabricated condition/process, and

American Society of Mechanical Engineers, Boiler and Pressure Vessel Code compliance language changes on weld design and weld fabrication.

The staff reviewed the drawing revisions for the as-fabricated HPI and its dedicated material basket, including dimension and tolerance deviations, and updates of drawing notes for fabrication of the HPI system components. The staff found that the addition of the gamma scan of the HPI provides assurance of the effectiveness of the shielding protection because gamma rays is the primary radiation source of concern. The staff also found that the revisions clarify drawing details and have minimal effects on the safety performance of the design. On the American Society of Mechanical Engineers, Boiler and Pressure Vessel Code compliance language change on weld design and weld fabrication, the staff reviewed design details of the impacted welds. The staff determined that the welds are either not relied on for structural support or the substituted code requirement has equal or higher structural load carrying capabilities. On this basis, the staff has reasonable assurance to conclude that the welds, as revised on these drawings, will not negatively affect the safety performance of the HPI and its dedicated material basket.

## **CONDITIONS**

1. The package shall be shipped in "Configuration 1" with a decay heat between 0 – 1,500 watts.
2. The maximum Co-60 activity is 96,750 Curies.
3. The Co-60 rods shall be shipped in the HPI using the HPI Material Basket.
4. The separators, basket filler, material basket, barrel rack, and basket support, described in sections 5(a)(3)(ix), 5(a)(3)(vi), 5(a)(3)(v), and 5(a)(3)(x) of the certificate of compliance, shall not be used.
5. Co-60 is the primary radionuclide allowed to be shipped in the HPI. Co-60 encapsulated in zircalloy and other Co-60 rod activation products (such as zirconium) are the radionuclides allowed to be shipped in the HPI.
6. The package will be prepared for shipment and operated in accordance with the operating procedures prescribed in Certificate of Compliance No. 9228, Rev. 26, and supplemented by Chapter 7 of the application dated January 15, 2016.
7. The package shall be shipped in the upright position and will be an exclusive-use shipment.
8. The acceptance tests and maintenance program of the package shall follow the certificate of compliance as supplemented by Chapter 8 of the application dated January 15, 2016, except that the HPI shall be acceptance tested using a confirmatory gamma scan as described in the safety analysis report, Section 8.1.6, "Shielding Tests."
9. The HPI and HPI Material Basket shall be constructed and assembled in accordance with GE Drawing No. 001N8422G001, Rev. 3, "GE 2000 HPI and Material Basket Licensing Drawing," Drawing No. 001N8423G001, Rev. 2, "GE 2000 HPI Licensing Drawing," Drawing No. 001N8424G001, Rev. 2, "GE 2000 HPI Material Basket Assembly Licensing Drawing," Drawing No. 001N8425G001, Rev. 2, "GE 2000 HPI Body Licensing Drawing," Drawing No. 001N8427G001, Rev. 2, "GE 2000 Top Plug Assembly Licensing Drawing," and Drawing No. 001N8428G001, Rev. 2, "GE 2000 HPI Bottom Plug Assembly Licensing Drawing."
10. Modifications to the cask shall be constructed and assembled in accordance with GE Drawing No. 101E8718, Sheet 1, Rev. 16, and Sheet 2, Rev. 15, "Model 2000 Shipping Cask S/N 2001," and Drawing No. 105E9520, Sheet 1, Rev. 8, and Sheet 2, Rev. 7, "Model 2000 Shipping Cask all S/N's Except S/N 2001."
11. The containment boundary of Model No. 2000 package (Configuration 1) includes the steel-clad lead cylinder with a stainless steel forging at each end, the closure lid with O ring

combination, the pipe plugs at vent port and drain port, the containment welds, and the base metals. The O-rings at the vent port and drain port are not part of the containment boundary.

## **CONCLUSIONS**

Based on the statements and representations in the GEH application dated July 6, 2017, the staff concludes with reasonable assurance that the shipment of Co-60 rods in Model No. 2000 packages with the HPI and its dedicated materials basket meets the requirements in Title 10 of the *Code of Federal Regulations* Part 71.

Issued with letter to S. Murray  
dated 8/1/17.