

August 5, 2009

EA-09-190

Ms. Tammy Morin
Licensing Manager
Holtec International
555 Lincoln Drive West
Marlton, NJ 08053

SUBJECT: EXERCISE OF ENFORCEMENT DISCRETION – HOLTEC INTERNATIONAL

Dear Ms. Morin:

This refers to a U.S. Nuclear Regulatory Commission (NRC) in-office review conducted from March 2, 2009 to June 26, 2009, concerning a change to the Final Safety Analysis Report (FSAR) for Certificate of Compliance (CoC) No. 72-1014 that eliminated a helium leak rate test of the Multi-Purpose Canister (MPC) confinement boundary weldment at fabrication.

Based on the results of a review of records, a telephone conversation on March 2, 2009, as well as your letters dated March 13, 2009, "Helium Intrusion Test on the Enclosure Vessel Weld Joints in the MPC" (ADAMS Accession No. ML090820298), May 1, 2009, "Helium Leakage Testing of Multi-Purpose Canister" (ADAMS Accession No. ML091330617), and June 5, 2009, "10 CFR 72.48 Evaluation No. 762, Revision 1" (ADAMS Accession No. ML091600091 and ML091600092 – Proprietary), the NRC has determined that a violation of NRC requirements occurred. Specifically, 10 CFR 72.48(c)(2) requires, in part, that a certificate holder obtain a CoC amendment prior to implementing a proposed change if the change would result in a: (1) design basis limit for a fission product barrier as described in the FSAR (as updated) being altered; or (2) is a departure from a method of evaluation described in the FSAR (as updated) used in establishing the design bases or in the safety analyses. Contrary to this, Holtec failed to obtain a CoC amendment prior to implementing a change that eliminated a helium leak rate test of the welded confinement boundary after fabrication. Additional technical detail regarding the violation is provided in the Enclosure to this letter.

The violation is of concern because the MPC confinement boundary is relied upon to prevent the release of radioactive material during normal, off-normal, and accident conditions. It is also relied upon to maintain an inert environment and sufficient helium pressure to keep cladding temperatures below the acceptable limit.

As described in the Enclosure, the NRC considers the significance of this violation to be low; however, the design basis for the HI-STORM 100 Cask System assumes no credible leakage. The NRC acknowledges your commitment to reinstate the helium leak rate test after June 30, 2009. Additionally, based on the information provided, NRC does not concur with your determination that the helium leak rate test can be removed.

The violation was evaluated in accordance with the NRC Enforcement Policy and has been characterized at Severity Level IV. However, I have been authorized, after consultation with the

Director, Office of Enforcement, to exercise enforcement discretion in this case in accordance with Section VII.B.6 of the Enforcement Policy and not cite the violation because of: (1) the lack of clarity of the requirement to perform helium leak rate testing; (2) the low safety significance of the violation; and (3) your overall good performance, in that, your facility has not been the subject of any enforcement action within the last two inspections. The current Enforcement Policy is included on the NRC's Web site <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>.

Holtec International is hereby requested to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to David W. Pstrak, Chief, Rules, Inspections, and Operations Branch, Division of Spent Fuel Storage and Transportation, Office of Nuclear Material Safety and Safeguards, within 30 days of the date of this letter. This reply should be clearly marked as a "Reply to EA-09-190" and should include: (1) the corrective actions taken in response to the violation discussed in the Enclosure, and (2) the corrective steps to reinstate helium leak rate testing. Your reply should also address: (1) the length of time the violation lasted; (2) the apparent root cause of the violation; (3) whether reporting requirements are warranted; and (4) your justification for continued use of these MPCs. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. The NRC will use your response, in part, to determine whether enforcement action is necessary to ensure compliance with regulatory requirements.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> to the extent possible, it should not include any personal privacy, proprietary or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

Sincerely,

/RA/

David W. Pstrak, Chief
Rules, Inspections, and Operations Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Docket No.: 72-1014
Enclosure: Technical Detail Regarding
Review of Holtec International's
10 CFR 72.48 Evaluation No. 762

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Sincerely,
/RA/
 David W. Pstrak, Chief
 Rules, Inspections, and Operations Branch
 Division of Spent Fuel Storage and Transportation
 Office of Nuclear Material Safety
 and Safeguards

Docket No.: 72-1014
 Enclosure: Technical Detail Regarding Review of Holtec International's 10 CFR 72.48
 Evaluation No. 762

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Technical Detail Regarding Review of Holtec International's 10 CFR 72.48 Evaluation No. 762

Review Scope

The NRC conducted an in-office review of Holtec International (Holtec) Evaluation No. 762 Revision 0, dated January 25, 2006, and Revision 1, dated June 5, 2009, and the HI-STORM 100 System Final Safety Analysis Report (FSAR), Revision 3, to determine whether Holtec's decision to eliminate helium leak rate testing during the fabrication of HI-STORM 100 multi-purpose canisters (MPCs) was permitted under 10 CFR 72.48. Additionally, the NRC reviewed letters transmitted by Holtec on March 13, 2009, May 1, 2009, and June 5, 2009, which provided additional information regarding the bases for Holtec's decision.

Observations and Findings

Description: Holtec's Evaluation No. 762 determined that shop helium leak rate testing as described in the HI-STORM 100 System FSAR, Revision 3, was redundant and not required. As a result, Holtec modified the FSAR to eliminate the shop helium leak rate test during the fabrication of the MPCs. The leak rate test was designed to demonstrate that the MPC shell and baseplate welds were leaktight (i.e. defined as a helium leak rate of less than or equal to 5×10^{-6} atmospheres-cubic centimeter/second in the FSAR). The bases for Holtec's decision were documented in Evaluation No. 762, Revision 1. The evaluation included a general statement that elimination of the leak rate test would not adversely impact the leaktightness of the MPC. The evaluation provided a number of primary technical reasons for this statement including: (1) fabrication and inspection of the MPCs were consistent with selected portions of the ASME Code; (2) Holtec's expanded interpretation of NRC Interim Staff Guidance (ISG) 18, "The Design and Testing of Lid Welds on Austenitic Stainless Steel Canisters as the Confinement Boundary for Spent Fuel Storage," to include additional welds not permitted within the scope of the ISG; (3) successful completion of helium leak rate testing on a prototype MPC and during the fabrication of 194 MPCs; and, (4) the results from a theoretical model which demonstrated that the helium leakage through postulated micro-capillary flaws in the weld material would be an order of magnitude less than the assumed threshold for establishing a leaktight boundary.

The NRC determined that none of the reasons provided by Holtec in the evaluation were adequate to demonstrate the leaktightness of the MPC. These new evaluation methods have not been previously approved by NRC, as a basis for demonstrating confinement integrity. Specifically, the non-destructive examinations (i.e., a radiographic examination and a surface liquid penetrant examination) performed during the fabrication of the MPC are designed to detect the presence of weld flaws above a threshold size to demonstrate that structural integrity can be maintained. However, these examinations are not intended to demonstrate that the MPC welds can prevent helium leakage to the small values necessary to demonstrate leaktightness. The NRC guidance in ISG-18 was only intended to apply to redundant MPC lid welds that met all of the narrowly defined criteria in the ISG. The MPC shell and baseplate welds did not meet these criteria. The prior successful testing of the 194 MPCs and the prototype testing confirmed that the welding process and techniques were sound, but do not relieve the applicant from the requirement to perform appropriate testing to demonstrate the leaktightness of each production weld. Finally, Holtec's theoretical model was not considered bounding since it predicted the helium leakage through micro-capillary sized flaws that are orders of magnitude smaller than the flaw detection limits achievable by the non-destructive examination methods used during the fabrication of MPCs.

Part 72.48(c)(2)(vii) and (viii) of 10 CFR, requires, in part, that the certificate holder request an amendment prior to implementing a change that would alter a design basis limit for a fission product barrier or result in a departure from a method of evaluation as described in the FSAR. The method for evaluating the integrity and performance of the confinement boundary after fabrication was the explicit specification of a set of tests and examinations to confirm MPC design criteria, including the helium leak rate test in Revision 3 of the FSAR. In the HI-STORM 100 System FSAR, Revision 3, Holtec specified that helium leak rate testing of the MPC shell seams and shell-to-baseplate welds was a MPC design criteria and also added that leakage of the MPC was not credible based on the materials, and methods of fabrication and inspection. In Chapter 9 of the FSAR, Holtec identified helium leak rate testing as one of the tests performed to demonstrate integrity of the MPC confinement boundary. The NRC accepted this approach and the original safety evaluation report acknowledged the leak rate testing requirement; performance of this testing formed part of the basis for the staff's determination that confinement and thermal safety limits could be met for the HI-STORM 100 MPCs. This level of assurance was considered necessary for the maximum heat load and source term limits permitted in the HI-STORM 100 certificate of compliance. Based on the above, NRC determined that Holtec was not permitted to eliminate (or alter) the method for demonstrating leaktightness of the MPC confinement boundary without NRC approval.

Analysis: The performance deficiency associated with this violation involved Holtec's failure to properly implement their 10 CFR 72.48 change process. This issue is considered to be of greater than minor significance since approximately 120 MPCs were loaded without being adequately tested to demonstrate their leaktightness. Leaktightness is required for the HI-STORM 100 System to ensure radiological confinement and also to ensure that adequate helium overpressure is retained to ensure adequate cooling of fuel stored in the MPC. The significance of this issue is considered to be low based on prior NRC inspection results of Holtec's manufacturing controls, the report that 194 MPCs had been previously fabricated and demonstrated to be leaktight, general licensee radiological monitoring programs, and the information provided that none of the MPCs had been loaded beyond about 70% of the design thermal limit. Notwithstanding the above, the NRC expects that Holtec will provide a formal evaluation to assess this condition as described in the cover letter to this enclosure.

Summary

A Severity Level IV violation of 10 CFR 72.48 was identified for the implementation of a change to the HI-STORM 100 FSAR that was not permitted without prior NRC approval.