

April 24, 2006

Mr. Donald W. Olson
President
Columbiana Hi Tech, LLC
1802 Fairfax Road
Greensboro, N.C. 27407

SUBJECT: CERTIFICATE OF COMPLIANCE NO. 9288 FOR THE MODEL NO.
CHT-OP-TU PACKAGE

Dear Mr. Olson:

As requested by your application dated August 5, 2005, as supplemented October 25, 2005, February 27, and April 10, 2006, enclosed is Certificate of Compliance No. 9288, Revision No. 7, for the Model No. CHT-OP-TU package. Changes made to the enclosed certificate are indicated by vertical lines in the margin. The staff's Safety Evaluation Report is also enclosed.

The approval constitutes authority to use the package for shipment of radioactive material and for the package to be shipped in accordance with the provisions of 49 CFR 173.471. Those on the attached list have been registered as users of the package under the general license provisions of 10 CFR 71.17 or 49 CFR 173.471. Registered Users may request by letter to remove their names from the Registered Users List.

If you have any questions regarding this certificate, please contact me or Shawn Williams of my staff at (301) 415-8500.

Sincerely,

/RA/ Joseph M Sebrosky for

Robert A. Nelson, Chief
Licensing Section
Spent Fuel Project Office
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-9288
TAC No. L23884

Enclosures: 1. Certificate of Compliance
No. 9288, Rev. No. 7
2. Safety Evaluation Report
3. Registered Users List

cc w/encls 1 & 2: R. Boyle, Department of Transportation
J. Shuler, Department of Energy
RAMCERTS
Registered Users

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SAFETY EVALUATION REPORT

Docket No. 71-9288
Model No. CHT-OP-TU
Certificate of Compliance No. 9288
Revision No. 7

SUMMARY

By letter dated August 5, 2005, as supplemented October 25, 2005, February 27, and April 10, 2006, Columbiana Hi Tech, LLC (CHT) requested approval of minor design changes and a "-96" designation to Certificate of Compliance (CoC) No. 9288 for the Model No. CHT-OP-TU package. Staff requested additional information (RAI) on December 22, 2005. CHT submitted a response to the RAI on February 27, 2006, that included a consolidated application. Based on the statements and representations in the application, as supplemented, the staff agrees that these changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

EVALUATION

Staff reviewed the minor design changes and the associated justification in the SAR. In addition, staff reviewed the documents submitted in the consolidated application and concluded that the application incorporated the changes to the SAR that were previously referenced in the CoC.

2.0 STRUCTURAL

For completeness, the applicant evaluated the dynamic crush drop and determined, in Section 2.7.1.5 of the application, that the test is not applicable to this package. This is to show compliance with the provisions of 10 CFR 71.73(c)(2) because the package gross weight of 1,700 kg (3,760 lb) exceeds the maximum package mass of 500 kg (1,100 lb) for which the test is required.

2.1 Materials

The staff requested additional information, RAI No. 1-4, to justify the use of any carbon steel welding material with a minimum of 70 ksi as indicated on Drawing No. OP-TU-SAR and Drawing No. OP-TU-A3. The applicant revised these drawings to include the grades of weld material that are acceptable under the ASME code for use with the 0.15% carbon steel sheet.

The staff requested additional information, RAI No. 1-5, to clarify the torque and lubrication requirements on the outer lid bolts. Bolt materials to be used for the outer lid closure include both lubricated and unlubricated bolts with the lubricated bolts having lower required torque values than the unlubricated bolts. Polishing of the bolts, which occurs with use, and lubrication are two factors that reduce the torque requirements for proper pre-loading of these bolts. The applicant added drawing notes to define the acceptable levels of torque for these surface-polishing and lubrication conditions.

The staff requested additional information, RAI No. 1-6, to justify the selection of A53 Grade B as a suitable alternative to the A569 material, which was withdrawn by ASTM, in the year 2000, and was replaced by A1011 CS Type B as an equivalent to A569. The applicant showed that A53 Grade B steel and A1011 CS Type B are equivalent for this application and both materials should perform as well as the ASTM A569 material that was used in the original performance tests.

The staff requested additional information, RAI No. 1-7, to justify the applicants conclusion that hydrogen generated from a payload with less than 0.068 W/m^3 generates less hydrogen than required to form a flammable mixture. The applicant discussed the potential chemical reactions and concluded that the only potentially significant reaction would be the radiolytically generated hydrogen gas in the Oxide Vessels. This hydrogen comes from pre-packaging materials of plastic in the packaging; materials of this type are only permitted when the contents has a decay heat that is essentially zero. For other contents, non-hydrogen-bearing plastics such as Teflon™ or metallic containers are used. The allowable decay heat is 0.068 W/m^3 , an amount that gives rise to about 0.001 liters of hydrogen gas per year. The staff agrees with the approach taken by the applicant and agrees that no significant impact on the Oxide Vessel would result from chemical reactions.

The applicant conducted tests in humid environments to determine the extent of chemical reactions that might occur in the carbon steel and stainless steels of interest. An aggressive ferric chloride solution was used in corrosion tests conducted under ASTM specification G48 for a variety of materials of interest. These short-term, accelerated laboratory tests adequately simulate and predict the long-term behavior under corrosive conditions that might be encountered in service. Staff agrees that the tests aid in leading to the conclusion that there are no significant concerns on the expected behavior under service conditions for the foam, structural components and the primer applied to these components.

Thus, staff concludes that there will be no adverse chemical, galvanic, or other reactions among materials used in this transportation package. These findings show compliance with 10 CFR 71.43 (d).

The staff requested additional information, RAI No. 1-8, to justify the durability of the O-rings specified on Drawing No. OP TU-V-AB1, sheet 1 of 2. The applicant's response demonstrated that the O-rings will maintain their durability under the radiation imposed over a lifetime of service.

Based on the review of the statements and representations in the application, the staff concludes that the materials of construction have been adequately described and evaluated and that the package meet the requirements of 10 CFR Part 71.

3.0 THERMAL

Due to revised A_2 values in the regulations that became effective on October 1, 2004, (69 FR 3698), the applicant reevaluated the heat generation threshold. The new value of 0.068 W/m^3 is still essentially zero, amounting to less than 5 mWatts for the whole package. The possibility of hydrogen generation (through radiolysis) is therefore not a concern. Section 7 of the application also specifies that the contents must be unloaded within one year of loading.

4.0 CONTAINMENT

CHT submitted Revision 7 to the SAR to show compliance with the new Part 71 rule that became effective on October 1, 2004 (69 FR 3698). The containment changes from Revision 6 of the SAR included updating the A_2 values and eliminating the maintenance leak rate test of 1×10^{-5} ref cc/sec.

The staff reviewed the methodology for determining the content mixture A_2 and associated maximum allowable leakage rates for the normal conditions of transport (NCT) and the hypothetical accident conditions (HAC) for the various payloads. The staff found the methodology to be identical to what had been approved in the existing SAR, Revision 6, and consequently was acceptable for applying it to the updated A_2 values. The results from applying the existing methodology to the updated A_2 values, justified larger allowable leakage rates because all the updated A_2 values had increased. As expected, the NCT leakage rates were more restrictive (i.e., lower allowable leakage rates compared to the HAC) and resulted in maximum allowable leakage rates between 0.123 ref-cc/sec and 0.386 ref-cc/sec, depending on payload. Based on this relatively high allowable leakage rate the staff agreed that deletion of the maintenance leak rate test 1×10^{-5} ref cc/sec was adequately justified. This justification was based on the applicant continuing the performance of pre-shipment and periodic leak rate tests to demonstrate that the allowable leakage rates are being met for the approved contents. Also, the applicant indicated in a response to a request for additional information, RAI No. 1-3, that the leak rate tests for pre-shipment and periodic are to meet a reference air leakage rate of 10^{-1} ref-cc/sec in accordance with ANSI N14.5 - 1997, "American National Standard for Radioactive Materials - Leakage Tests on Packages for Shipment."

Based on the review of the statements and representations in the application, the staff concludes that the changes made to the containment section have been adequately described and evaluated and that the package design meets the containment requirements of 10 CFR Part 71.

6.0 CRITICALITY

The applicant requested several changes to the contents, including revising the description of the contents for both homogenous (powders or crystalline form) and heterogenous (pellets or previously pelletized material) uranium-bearing materials (Condition Nos. 5.(b)(1)(E) and (F)) to delete the prohibition of graphite as a non-fissile material and to clarify that materials with a hydrogen density larger than water are excluded, with the exception of the materials specifically included in Condition No. 5.(b)(1). The applicant evaluated the contents for addition of graphite as shown in Figure 6-9 of the SAR. The applicant concluded that moderation by graphite, for both heterogenous and homogenous contents, is less reactive than optimum hydrogenous moderation.

The applicant also requested an editorial change to Condition No. 5.(b)(2) of the certificate to specify the maximum contents of 402 pounds of uranium compounds per oxide vessel and 1608 pounds of uranium compounds per package, instead of UO_2 , which is consistent with the description of the contents in Condition No. 5(b)(1). The applicant had previously evaluated UO_2 and uranium compounds that have a lower uranium content than UO_2 . Therefore, uranium compounds, except for those already excluded as authorized contents, are bounded by the applicant's evaluation of UO_2 .

Based on the review of the statements and representations in the application, the staff concludes that the requested revisions to the authorized contents in the CoC have been adequately described and evaluated and that the package design meets the criticality requirements of 10 CFR Part 71.

EVALUATION FOR “-96” DESIGNATION

The amendment also requested a “-96” designation in the package identification number, as specified in 10 CFR 71.19(e). CHT submitted information supporting the request for a “-96” designation. CHT addressed the 19 issues considered in the rulemaking process that resulted in the revised rule (69 FR 3698). The applicant discussed the impacts and effects that each issue of the revised regulations would have on the transportation package and related impacts on the Certificate of Compliance. Based on the statements and representations in the application, the staff concluded that the design has been adequately described and meets the requirements of 10 CFR Part 71 for a “-96” approval.

The following changes were made to the CoC:

Condition No. 1.d. was revised to reflect the updated package identification number with a “-96.”

Condition No. 3.b. was revised to reflect the consolidated application submittal.

Minor editorial changes were made in Condition No. 5(a)(2). The word “diameter” was added to clarify that the sleeves are closed with twelve 1/2-inch-diameter bolts. Also, “Maximum transport unit weight” was replaced with “Maximum empty transport weight” and “Maximum package weight” was replaced with “Maximum loaded package weight” for clarity.

Condition No.5.(a)(3) was revised to reflect the new revision numbers of the drawings. Drawing No. OPTU-V-AB1, Rev. 8, Sheet 2 of 2, showing views of the two additional options of tamper-indicating bolts was added to the CoC.

Condition No. 5.(b)(1) the decay heat was revised from 0.011 W/m³ to 0.068 W/m³ consistent with the application. Also, the words “contain hydrogen bearing substances, was replaced with “be packaged using hydrogen bearing plastics” for clarification.

Condition No. 5.(b)(1)(A), (B), (C), (D), (E), and (F) was revised to remove the maximum load restrictions per Oxide Vessel and per package. These load restrictions were incorporated in Condition No. 5.(b)(2).

Condition No. 5.(b)(1)(E) and (F) was revised to remove graphite from the sentence, “Compounds may be mixed with other non-fissile materials with the exception of beryllium, graphite, or hydrogenous material enriched in deuterium,” as discussed in Section 6 of this Safety Evaluation Report (SER). These conditions were also revised to include the wording, “except for the allowance provided by Condition No. 5.(b)(1),” for clarification.

Condition No. 5.(b)(2) was revised by clarifying the maximum load restrictions for each content per Oxide Vessel and per package. In addition, the UO₂ wording was replaced with “uranium compounds” as explained in Section 6 of this SER.

Condition No. 5(c) was revised to delete the wording “Minimum transport index to be shown on the label for nuclear criticality control.”

Condition No. 8 of the certificate allows a package to be marked with the previous package identification number, USA/9288/B(U)-85, until April 30, 2007. This is to allow time to replace the packaging nameplate showing the revised package identification number, USA/9288/B(U)-96.

The applicant indicated in the February 17, 2006, response to RAI No. 1-2, that 10 CFR 71.55(f), which addresses packaging design requirements for packages transporting fissile material by air, are not applicable to this package. Therefore, for clarity, Condition No. 9 of the CoC was added to specify that transport by air of fissile material is not authorized.

Condition No. 10. was added to authorize use of the previous revision of the certificate for a period of approximately one year.

As a consequence of the inclusion of the new Condition Nos. 8, 9, and 10, the previous Condition No. 8 was renumbered to Condition No. 11.

The Reference Section has been revised to include the consolidated application.

CONCLUSION

For the reasons stated in this Safety Evaluation Report, the staff concludes that the proposed changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9288, Revision No. 7 on April 24, 2006.