

November 26, 2008

Mr. T. E. Sellmer
Manager
Packaging Integration
Washington TRU Solutions LLC
P.O. Box 2078
Carlsbad, NM 88221-2078

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR REVIEW OF THE
CERTIFICATES OF COMPLIANCE NO. 9218 AND 9279, REVISION FOR THE
MODEL NOS. TRUPACT-II AND HALFPACT PACKAGES

Dear Mr. Sellmer:

By letter dated July 18, 2007, as supplemented April 14, 2008, Washington TRU Solutions, LLC, submitted an amendment request to the U.S. Nuclear Regulatory Commission for Certificates of Compliance No. 9218 and 9279. The request includes a consolidation of responses to a request for additional information (RAI) dated February 14, 2008, and a revision request to add a new authorized payload container (Shielded Container). NUREG 1609, "Standard Review Plan for Transportation Packages for Radioactive Material," was used by the staff in its review of the application.

In connection with our review, we need the information identified in the enclosure to this letter. Additional information requested by this letter should be submitted in the form of revised Safety Analysis Report pages. To assist us in scheduling staff review of your response, we request that you provide this information by December 12, 2008. If you are unable to provide a response by that date, our review may be delayed.

Please reference Docket Nos. 71-9218 and 71-9279 and TAC Nos. L24217 and L24218 in future correspondence related to this request. The staff is available to meet to discuss your proposed responses. If you have any questions regarding this matter, I may be contacted at (301) 492-3339.

Sincerely,

/RA/

Kimberly J. Hardin, Senior Project Manager
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Docket Nos. 71-9218 and 71-9279
TAC Nos. L24217 and L24218

Enclosure: Request for Additional Information

Mr. T. E. Sellmer
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By letter dated July 18, 2007, as supplemented April 14, 2008, Washington TRU Solutions, LLC, submitted an amendment request to the U.S. Nuclear Regulatory Commission for Certificates of Compliance No. 9218 and 9279. The request includes a consolidation of responses to a request for additional information (RAI) dated February 14, 2008, and a revision request to add a new authorized payload container (Shielded Container). NUREG 1609, "Standard Review Plan for Transportation Packages for Radioactive Material," was used by the staff in its review of the application.

In connection with our review, we need the information identified in the enclosure to this letter. Additional information requested by this letter should be submitted in the form of revised Safety Analysis Report pages. To assist us in scheduling staff review of your response, we request that you provide this information by December 5, 2008. If you are unable to provide a response by that date, our review may be delayed.

Please reference Docket Nos. 71-9218 and 71-9279 and TAC Nos. L24217 and L24218 in future correspondence related to this request. The staff is available to meet to discuss your proposed responses. If you have any questions regarding this matter, I may be contacted at (301) 492-3339.

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Docket Nos. 71-9218 and 71-9279

TAC Nos. L24217 and L24218

Enclosure: Request for Additional Information

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**Request for Additional Information
Washington TRU Solutions
Docket Nos. 71-9218 and 71-9279
Certificates of Compliance No. 9218 and 9279
Model Nos. TRUPACT-II and HalfPACT Packages**

Washington TRU Solutions LLC, on behalf of the U.S. Department of Energy, submitted amendment requests, by letter dated July 18, 2007, as supplemented April 14, 2008, to Revision 22 of the Certificate of Compliance (CoC) for the TRUPACT-II Package, Docket No. 71-9218, and to Revision 5 of the CoC for the HalfPACT Package, Docket No. 71-9279.

This request for additional information (RAI) identifies additional information needed by the U.S. Nuclear Regulatory Commission (NRC) staff in connection with its review of the amendments. The requested information is listed by chapter number and title in the applicant's Safety Analysis Report (SAR). NUREG-1506, "Standard Review Plan for Transportation Packages for Radioactive Material," was used by the staff in its review of the amendment application.

The amendment request is contained in the response to a Request for Additional Information (RAI) dated February 14, 2008. In addition to revisions necessitated by the response to the RAI, the request includes the addition of a new authorized payload container (Shielded Container) that incorporates gamma shielding for shipment in the HalfPACT packaging.

Each individual RAI section describes information needed by the staff to complete its review of the application and to determine whether the applicant has demonstrated compliance with the regulatory requirements of 10 CFR Part 71.

TRUPACT-II SAR

Chapter 3 Thermal Review

- 3-1 Original 3-1: Provide an uncertainty analysis for the TRUPACT-II maximum normal operating pressure (MNOP) analysis. Justify the pressure calculation conservatively accounts for uncertainty of decay heat, temperature, void volume, etc.

Original: In the payload assembly decay heat limits analysis, Table 3.4-6 shows pressure increase of 49.74 psig for Type III.1. The pressure increase is very close to the specification of 50 psig. Same issue applies to Table 3.4-7 to 3.4-11.

This information is needed to ensure compliance with 10 CFR 71.4 and 71.33(a)(5).

New: Provide measurement data to validate the calculated flammable gas generation rate. Clarify whether the $G_{\text{theoretical}}/G_{\text{actual}}$ ratio estimated in CH-TRAMPAC Section 5.2.5.3.3 holds for all types of waste and configuration. Provide experiment measurements of MNOP to validate the MNOP analysis for both TRUPACT-II and HalfPACT.

In the RAI 3-1 response, the applicant states "An analysis of the relationship between flammable gas generation and total gas generation is provided in CH-TRAMPAC Section 5.2.5.3.3. The payload container flammable gas generation limits correspond to low total gas generation, which means that the 50-psig design pressure specification will be met

by a large margin for payloads comprised of payload containers that meet flammable gas generation limits. Therefore, compliance with the payload container flammable gas generation limits will ensure compliance with the MNOP.” In CH-TRAMPAC Section 5.2.5.3.3, an example was presented to show the relation between actual G value and theoretical G value and the conclusion was the actual G value is 18 times lower than the theoretical value. However, the “actual” value is obtained from the hydrogen gas generation rate formula derived by the gas generation methodology, not a measurement value. In light of a small margin for the payload container flammable gas generation limits, staff needs experimental validation to support the methodology.

This information is needed to ensure compliance with 10 CFR 71.31(a)(2) and 71.43(d).

Contact Handled-Transuranic Waste Authorized Methods for Payload Control (CH-TRAMPAC)

CH-1 Original CH-2 : Provide validation of the analytical shipping category for waste Type I, II and III based on existing shipment data.

Original: The staff needs to verify the consistency between gas generation compliance methods and the gas generation methodology based on the measurement of flammable gas concentration or flammable gas generation rate (FGGR) from shipments, particularly validation of analytical category for Type I, II, and III. For analytical category, the headspace sampling data should prove the flammable gas concentration meets the limit predicted by the methodology based on waste type, package configuration, decay heat, and shipping period.

New: Characterize the analytical category shipments that show unqualified FGGR limits in the validated set and provide a methodology to exclude them from the analytical category. Alternatively, the applicant should justify why the current configuration of the analytical category drums and methodology ensure that hydrogen concentrations will not exceed 5% even without headspace sampling. Specify the phenomena and waste configurations of the analytical category shipments that result in hydrogen concentrations that are not as conservative as initially expected.

The applicant stated in the CH-2 RAI response that an analysis of the estimated FGGR for individual drums shows that approximately 96% of the 9,665 drums have measured headspace sampling hydrogen concentration values that comply with the assigned payload shipping category FGGR limits. The applicant indicates the drums in the remaining 4% of the data set comply with the 5% hydrogen concentration limit based on the reported headspace hydrogen concentration data and other mitigating factors.

The applicant indicated these FGGR unqualified drums were shipped based on compliance of reported headspace hydrogen concentration data in consideration with other factors such as venting, overly estimated hydrogen concentration, drum opening, and overly conservative confinement assumptions. The analytical category containers basically require confirmation with only decay heat requirements. However, the historical shipping data indicates that a significant number of package configurations (i.e., 4%) may need to undergo a remediation process or some other type of evaluation. The licensee should characterize these exceptional configurations and determine if they require a special category. A methodology should be developed to identify these packages and exclude them out of the analytical shipping category (similar to the approach for 100-gallon drums containing 55-gallon puck drums). The applicant should clarify the extent that headspace sampling is relied upon to identify analytical

configurations that may not comply with FGGR. The staff notes that headspace sampling is not required in the current CoC for analytical configurations

This information is needed to ensure compliance with 10 CFR 71.31(a)(2) and 71.43(d).

- CH-2 Clarify if waste type IV materials are proposed authorized contents for the shielded container.

The applicant stated in Section 5.2.5.4.1 "Compliance with flammable (gas/VOC) limits for shielded containers may not be evaluated by testing." For Type IV waste, the shipment is subject to full container testing according to Figure 5.2-1. The applicant should clarify whether Type IV waste is an authorized content for the shielded container.

This information is required by the staff to assess compliance with 10 CFR 71.31(a)(2) and 71.43(d).

- CH-3 Original CH-6: Explain the procedure to handle the scenario when a 9-day transport and unloading time limit is not met.

Original: In Procedure 6.2.3.3, a procedure is specified if the 24-hr limit is not met. For procedure 6.2.3.7, there is no procedure specified if the 9-day transport and unloading time limit is not met. Provide the procedure for this scenario.

New: Provide the procedure to handle the scenario when a 9-day transport and unloading time limit is not met.

Revised Procedure 6.2.3.7 in response to RAI CH-6 does not provide a procedure for the scenario that the 9-day transport and unloading time limit is not met. A procedure similar to 6.2.3.3 should be provided. (i.e., if total loading time is less than or equal to 24 hours, proceed to Step 6.2.3.4. If total loading time exceeds 24 hours, the package must be vented for a period at least as long as the period the TRUPACT-II or HalfPACT ICV was sealed and the closure process must be repeated.)

This information is needed to ensure compliance with 10 CFR 71.35(c) and 71.43(d).

Contact Handled-Transuranic (CH-TRU) Payload Appendices

- AP-1 Provide materials of construction for the 30-gallon payload drum. Refer to CH-TRU Payload Appendices, Appendix 4.5, page 4.5-1.

This information is necessary to accurately provide a sufficient basis for evaluation of the SAR.

This information is needed to ensure compliance with 10 CFR 71.33.

- AP-2 Original AP-2: Include the proposed controls for the 100-gallon drums loaded with compacted 55-gallon drums in CH-TRAMPAC (Section 3.10.1) with the additional information on adjusted hydrogen concentration based on the decay curve.

Original: Per January 21, 2008 letter, WTS proposed to include specific controls for 100-gallon drums loaded with compacted 55-gallon drums in the CH-TRAMPAC. Staff agrees with the addition of the proposed control. However, more explanation is needed on the use of the decay curve for determining an adjusted hydrogen concentration.

New: Revise Figure 6.14-2 in CH-TRU Payload Appendices and provide a measurement time for hydrogen concentration.

The decay curve provided (Figure 6.14-2) in the RAI response (AP-2) does not include the original data points and has no numerical values on the axes. It is merely a statistical trend with no indication of measurement time. No definitive time in days is specified in the curve or in the method to perform the proposed hydrogen concentration measurement. A conservative measurement time is needed to ensure the acceptable hydrogen concentration limit is met.

The information is required by the staff to assess compliance with 10CFR 71.31(a)(2) and 71.43(d).

AP-3 Justify the load resistance for the shielded container. Explain the difference between the values and other drums.

Table 2.2-4 shows load type resistance for the shielded container. The resistance factor for the shielded container is relatively smaller than 55, 85, or 100 Gallon drums for different shipping periods.

This information is needed to ensure compliance with 10 CFR 71.31(a)(2) and 71.43(d).

HalfPACT Review Contact Handled-Transuranic (CH-TRU) Payload Appendices

HP-1 Provide the shielded container thermal analysis model input and output files.

The licensee provided HalfPACT Shielded Container Thermal Analysis Report (P04F.M2.02-03) with computer run records. A complete thermal model input deck and run results should be provided to facilitate the review. Refer to ISG-21 for guidance on the use of computational modeling software and the kinds of information to be provided to support a licensing action.

This information is needed to ensure compliance with 10 CFR 71.35, 71.71(b)(c).

HP-2 Justify the direct application of insolation load to the components on the inside of polyurethane foam.

In SAR Section 3.4, the applicant states "Accordingly, a 100°F ambient temperature with the following insolation values are used for heat input to the exterior package surfaces." While in Section 4.5.4.1 of CH-TRU Payload Appendices, the 24-hour averaged insolation load is applied to the components on the inside of polyurethane foam including payload and internal package. The licensee should reconcile this difference. The solar load is usually applied on the package exterior boundary and then the heat diffuses to the internal package through heat transfer mechanisms (conduction, convection, and radiation). The applicant should provide the reasons for applying direct heat source on the internal components.

The information is required by the staff to assess compliance with 10 CFR 71.35 and 71.71(c).

HP-3 Provide the following clarifications to the thermal models for HalfPACT/Shielded Container configuration.

- a. The thermal model of HalfPACT is a three-dimensional 180 degree symmetry model. According to the model description, six segments of the two-dimensional lumped parameter HalfPACT SAR model, each encompassing a 30 degree wide segment of the packaging circumference, are combined to form a 180 degree symmetry model. The applicant needs to clarify how these 2-D segments can simulate 3-D effects.
- b. In Section 6.2.2 of Calculation Package P04F.M2.02-03, the applicant states "Figure 6-6 repeats the model layout shown in Figure 6-5 but with the addition of the ICV shell and honeycomb spacer surfaces. These surfaces represent the boundary with the HalfPACT modeling obtained from the HalfPACT SAR." The applicant should clarify whether the final solution is obtained from simultaneous solution of both HalfPACT and Shielded Container models. If not, the applicant should clarify the details of integrated solution method, which include the interface between two models and the sequence of calculation.
- c. Provide thermal properties of the material inside shielded container.

The applicant stated "The payload within the shielded containers is conservatively assumed to be **paper** and to exhibit the thermal conductivity of air in order to bound the potential temperature rise and temperature limit within the payload." The thermal properties of the materials (paper) are not included in either SAR or the calculation package (P04F.M2.02-03). The applicant needs to provide these properties and the actual material thermal properties to verify the adequacy of conservatism in this assumption.

This information is needed to ensure compliance with 10 CFR 71.35 and 71.71(b)(c).

HP-4 Justify the reason for no HAC thermal evaluations of the shielded container, and that the evaluations of the approved containers are bounding, given the following differences and discrepancies between the shielding container and approved containers.

- a. The third justification in CH-TRU Payload Appendices 4.5.4.2 assumes greater thermal mass for a single shielded container than a single 55-gallon drum. The 4-th justification in the calculation package (Section 5.0 in P04F.M2.02-03) assumes the maximum payload mass of the shielded container payload is identical to the maximum base payload mass. The applicant should clarify the difference in these statements.
- b. In Calculation Package P04F.M2.02-03, a statement of less heat transfer rate to the shielded containers is used to support no safety evaluation for HAC. The justification of this statement is not provided in the CH-TRU Payload Appendices. The applicant should revise the CH-TRU Payload Appendices 4.5.4.2 to reconcile the differences.
- c. The applicant predicts the shielded container configuration will be bounded by the base load configuration (seven 55-gallon drums) in HAC. Based on the NCT calculation results, Table 4.5-1, the shielded container is more limiting than the base load configuration. It appears to staff that the shielded containers would expect to be less limiting under both NCT and HAC. The applicant should explain this discrepancy.

This information is needed to ensure compliance with 10 CFR 71.35 and 71.73(4).