

NRC FORM 618 (8-2000) 10 CFR 71		U.S. NUCLEAR REGULATORY COMMISSION			
CERTIFICATE OF COMPLIANCE FOR RADIOACTIVE MATERIAL PACKAGES					
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2. PREAMBLE

- a. This certificate is issued to certify that the package (packaging and contents) described in Item 5 below meets the applicable safety standards set forth in Title 10, *Code of Federal Regulations*, Part 71, "Packaging and Transportation of Radioactive Material."
- b. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF A SAFETY ANALYSIS REPORT OF THE PACKAGE DESIGN OR APPLICATION

- | | |
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| a. ISSUED TO (Name and Address) | b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION |
| Department of Energy
Washington, DC 20585 | Nuclear Waste Partnership, LLC application dated
<u>August 3, 2022</u> , as supplemented. |

4. CONDITIONS

This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below.

5. (a) Packaging

(1) Model No.: TRUPACT-II

(2) Description

A stainless steel and polyurethane foam insulated shipping container designed to provide single containment for shipment of contact-handled transuranic waste. The packaging consists of an unvented, 1/4-inch thick stainless steel inner containment vessel (ICV), positioned within an outer confinement assembly (OCA) consisting of an unvented 1/4-inch thick stainless steel outer confinement vessel (OCV), a 10-inch thick layer of polyurethane foam and a 1/4 to 3/8-inch thick outer stainless steel shell. The package is a right circular cylinder with outside dimensions of approximately 94 inches diameter and 122 inches height. The package weighs not more than 19,250 pounds when loaded with the maximum allowable contents of 7,265 pounds.

The OCA has a domed lid which is secured to the OCA body with a locking ring. Although not part of the containment boundary, the OCV confinement seal is provided by an optional butyl rubber O-ring (bore seal). The OCV is equipped with a seal test port and a vent port.

The ICV is a right circular cylinder with domed ends. The outside dimensions of the ICV are approximately 73 inches diameter and 98 inches height. The ICV lid is secured to the ICV body with a locking ring. The ICV containment seal is provided by a butyl rubber O-ring (bore seal). The ICV is equipped with a seal test port and vent port. Aluminum spacers are placed in the top and bottom domed ends of the ICV during shipping. The cavity available for the contents is a cylinder of approximately 73 inches diameter and 75 inches height.

Summary of Comments on Microsoft Word - TRUPACT_26

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and assembled

This verbiage is already in the HalfPACT CoC. Adding this text to the TRUPACT-II CoC provides consistency with the HalfPACT CoC.

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This is not needed in the list as it is captured in the first sentence of 5(a)(3).

5. (a) (3) Drawings

The packaging is constructed in accordance with Nuclear Waste Partnership, Drawing No. 2077-500 SNP, "TRUPACT-II Packaging SAR Drawing," sheets 1-11, Rev. ~~2~~^{AA}. The contents are positioned within the packaging in accordance with the Contact-Handled Transuranic Waste Authorized Methods for Payload Control (CH-TRAMPAC), ~~Rev. 5~~^{Rev. 6}, Section 2.9, "Payload Container/Assembly Configuration Specifications." In addition, the following packaging components are constructed and assembled in accordance with the following Nuclear Waste Partnership drawings:

- (i) ~~Drawing No. 2077-500 SNP, "TRUPACT-II Packaging SAR Drawing," sheets 1-11, Rev. AA.~~
- (ii) Drawing No. 163-001, "Standard Pipe Overpack SAR Drawing," sheets 1-3, Rev. ~~98~~⁹⁸;
- (iii) Drawing No. 163-002, "S100 Pipe Overpack SAR Drawing," sheets 1 and 2, Rev. 6;
- (iv) Drawing No. 163-003, "S200 Pipe Overpack SAR Drawing," sheets 1 and 2, Rev. 5;
- (v) Drawing No. 163-004, "S300 Pipe Overpack SAR Drawing," Rev. 3;
- (vi) Drawing No. 163-006, "Compacted Puck Drum Spacers SAR Drawing," Rev. 2 (spacers needed for the purpose of maintaining subcriticality in 55-, 85-, and 100-gallon drums); and
- (vii) Drawing No. 163-009, "Criticality Control Overpack SAR Drawing," sheets 1 and 2, Rev. ~~21~~²¹.

(b) Contents

(1) Type and form of material

Dewatered, solid or solidified transuranic and tritium-contaminated materials and wastes. Materials must be packaged in one of the following payload containers:

- (i) 55-gallon drum,
- (ii) 85-gallon drum,
- (iii) 100-gallon drum,
- (iv) standard waste box (SWB),
- (v) standard pipe overpack,
- (vi) S100 pipe overpack,
- (vii) S200 pipe overpack,
- (viii) S300 pipe overpack,
- (ix) ten-drum overpack (TDOP), or
- (x) criticality control overpack (CCO).

The payload containers are described in CH-TRAMPAC, ~~Rev. 5~~^{Rev. 6}, Section 2.9, "Payload Container/Assembly Configuration Specifications." Materials must be restricted to prohibit explosives, corrosives, nonradioactive pyrophorics and compressed gases. Within a payload container, radioactive pyrophorics must not exceed 1 percent by weight, and residual liquids must not exceed 1 percent by

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Add preceding sentence:

"Table 2 (below) includes the maximum number of payload containers per package and authorized packaging configurations."

5. (b) (1) Type and form of material (continue)

volume. Flammable organics and methane are limited along with hydrogen to ensure the absence of flammable gas mixtures in TRU waste payloads as described in Chapter 5.0 of CH-TRAMPAC, ~~Rev. 5~~Rev. 6. For payloads of content code LA 154 and SQ 164, the absence of flammable gas mixtures is ensured as described in Appendix 6.12 of the CH-TRU Payload Appendices, ~~Rev. 4~~Rev. 5. For payload configurations with unvented heat-sealed bag layers, the absence of flammable gas mixtures is ensured as described in Appendix 6.13 of the CH-TRU Payload Appendices, ~~Rev. 4~~Rev. 5. For Analytical Category payload containers containing puck drums, the absence of flammable gas mixtures is ensured as described in Appendix 6.14 of the CH-TRU Payload Appendices, ~~Rev. 4~~Rev. 5.

(2) Maximum quantity of material per package

Contents not to exceed 7,265 pounds including skoring and secondary containers. Table 1 (below) includes the maximum gross weight for a payload container.

Table 1. Maximum gross weight for a payload container

Type of Payload Container	Maximum Gross Weight
55-gallon drum	1,000 pounds
6-inch standard pipe overpack	328 pounds
12-inch standard pipe overpack	547 pounds
S100 pipe overpack	550 pounds
S200 pipe overpack	547 pounds
S300 pipe overpack	547 pounds
85-gallon drum	1,000 pounds
100-gallon drum	1,000 pounds
SWB	4,000 pounds
TDOP	6,700 pounds
CCO	350 pounds



Table 2. Maximum number of payload containers per package and authorized packaging configurations are as follows:

Type of Payload Container	Maximum Number of Payload Containers per Package
standard pipe overpack	14
S100 pipe overpack	14
S200 pipe overpack	14
S300 pipe overpack	14
100-gallon drum	6
55-gallon drum	14
85-gallon drum	8
SWB	2
TDOP	1
CCO	14

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- (i) 14 55-gallon drums,
- (ii) 14 standard pipe overpacks,
- (iii) 14 S100 pipe overpacks,
- (iv) 14 S200 pipe overpacks,
- (v) 14 S300 pipe overpacks,
- (vi) 8 85-gallon drums,
- (vii) 6 100-gallon drums,
- (viii) 2 SWBs,
- (ix) 1 TDOP, or
- (xi) 14 CCOs

5. (b) (2) Maximum quantity of material per package (continue)

Fissile material not to exceed the limits specified in CH-TRAMPAC, Rev. 5 Rev. 6, Section 3.1, "Nuclear Criticality." Table 2 (below) includes limits related to CCOs and pipe overpacks.

Table 2. Maximum Fissile gram equivalent in CCOs and pipe overpacks and associated additional controls/limits

Parameters				
Payload Containers	Non-machine compacted material		Machine compacted material	
	Maximum FGE of ²³⁹ Pu	Additional limits/controls	Maximum FGE of ²³⁹ Pu	Additional limits/controls
CCO	380	≤ 1% by weight Be/BeO	380	≤ 1% by weight Be/BeO and ≤ 2,000 grams plastic
Pipe Overpack	200	for Be/BeO > 1 wt%, Be/BeO must be chemically or mechanically bound to the fissile material	200	≤ 1% by weight Be/BeO

Parameter	Payload-Container	
	CCOs	Pipe Overpacks
Maximum Fissile gram equivalent of Pu-239 for non-machine compacted material	380	200
Additional limits/controls for non-machine compacted material	≤ 1% by weight Be/BeO	for Be/BeO > 1 wt%, Be/BeO must be chemically or mechanically bound to the fissile material
Maximum Fissile gram equivalent of Pu-239 for machine compacted material	380	200

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*Additional limits/controls
for machine-compacted
material*

$\leq 1\%$ by weight Be/BeO
and $\leq 2,000$ grams plastic

$\leq 1\%$ by weight
Be/BeO

* Be means beryllium and BeO means beryllium oxide.

All payloads shall meet the activity limits specified in CH-TRAMPAC, [Rev-5Rev. 6](#), Section 3.3, "Activity Limits." The payload is limited to 10^5 A₂ quantities.

Maximum decay heat per package not to exceed 40 watts. Decay heat per payload container not to exceed the values given in CH-TRAMPAC, [Rev-5Rev. 6](#), Table 5.2-1, "List of Approved Alpha-numeric Shipping Categories, Maximum Allowable Hydrogen Gas Generation Rates, and Maximum Allowable Wattages," or calculated for approved shipping categories in accordance with the methodology specified in Section 5.2.3 of CH-TRAMPAC, [Rev-5Rev. 6](#). For content code LA 154 and SQ 154 payloads, decay heat per payload container not to exceed the values specified in Appendix 6.12 of CH-TRU Payload Appendices, [Rev-4Rev. 5](#).

(c) Criticality Safety Index: 0.0

6. Physical form, chemical properties, chemical compatibility, configuration of waste containers and contents, isotopic inventory, fissile content, decay heat, weight, center of gravity, and radiation dose rate must be determined and limited in accordance with CH-TRAMPAC, [Rev-5Rev. 6](#).
7. Each payload container must be assigned to a shipping category in accordance with CH-TRAMPAC, [Rev-5Rev. 6](#), Section 5.1, "Payload Shipping Category." For a payload assembly made up of payload containers with the same shipping categories, each payload container and payload assembly must not exceed the allowable wattage in accordance with CH-TRAMPAC, [Rev-5Rev. 6](#), Section 5.2.3, "Hydrogen Gas Generation Rate and Decay Heat Limits for analytical category," or must be tested for gas generation in accordance with CH-TRAMPAC, [Rev-5Rev. 6](#), Section 5.2.5, "Unified Flammable Gas Test Procedure." For a payload made up of payload containers with different (nonequivalent) shipping categories, the flammability index of each payload container must not exceed 50,000 in accordance with CH-TRAMPAC, [Rev-5Rev. 6](#), Section 6.2.4, "Mixing of Shipping Categories," and Appendix 2.4 of the CH-TRU Payload Appendices, [Rev-4Rev. 5](#), "Mixing of Shipping Categories and Determination of the Flammability Index." For Analytical Category payload containers containing puck drums, the absence of flammable gas mixtures is ensured as described in Appendix 6.14 of the CH-TRU Payload Appendices, [Rev-4Rev. 5](#). Each content code LA 154 and SQ 154 payload container must be assigned to a shipping category in accordance with Appendix 6.12 of CH-TRU Payload Appendices, [Rev-4Rev. 5](#). Content code LA 154 and SQ 154 payload containers may only be assembled with other payload containers belonging to content code LA 154 and SQ 154, respectively, or dunnage in accordance with Appendix 6.12 of CH-TRU Payload Appendices, [Rev-4Rev. 5](#). For a payload of content code LA 154 or SQ 154 containers with different shipping categories, the flammability index of each payload container must not exceed 50,000 in accordance with Appendix 6.12 of CH-TRU Payload Appendices, [Rev-4Rev. 5](#).
8. Payload containers within a package shall be selected in accordance with CH-TRAMPAC, [Rev-5Rev. 6](#), Section 6.0, "Payload Assembly Requirements." Payload containers of content code LA 154 and SQ 154 shall be assembled in accordance with Appendix 6.12 of CH-TRU Payload Appendices, [Rev-4Rev. 5](#).
9. Each payload container must be vented in accordance with Section 2.5, "Filter Vents," of the CH-TRAMPAC, [Rev-5Rev. 6](#). Payload containers which were not equipped with filtered vents during storage must be aspirated in accordance with CH-TRAMPAC, [Rev-5Rev. 6](#), Section 5.3, "Venting and Aspiration."

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10. For close-proximity and controlled shipments meeting the conditions specified in Appendices 3.5 and 3.6, respectively, of CH-TRU Payload Appendices, ~~Rev-4~~Rev. 5, shipping periods of 20 days and 10 days may be applicable. The shipping period for any mode of transport is not to exceed 60 days. For content code LA 154 and SQ 154 shipments, the shipping period as defined in Appendix 6.12 of the CH-TRU Payload Appendices, ~~Rev-4~~Rev. 5 is not to exceed 5 and 10 days, respectively.
11. In addition to the requirements of Subpart G of 10 CFR Part 71:
 - (a) Each package must be prepared for shipment and operated in accordance with the procedures described in Chapter 7.0, "Operating Procedures," of the application, as supplemented. For content code LA 154 and SQ 154 payloads, each package must be prepared for shipment and operated in accordance with the procedures described in Chapter 7.0 of the application as modified by Appendix 6.12 of CH-TRU Payload Appendices, **Rev. 5**.
 - (b) Each package must be tested and maintained in accordance with the procedures described in Chapter 8.0, "Acceptance Tests and Maintenance Program," of the application, as supplemented.
 - (c) All free-standing water must be removed from the inner containment vessel cavity and the outer confinement vessel cavity before shipment.
12. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR 71.17.



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Revision No. 25 of this certificate may be used until TBD 2023.		
To help facilitate implementation.		
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As supplemented on: June 24, 2021; October 6, 2021; November 18, 2021; and February 24, 2022.		

13. Transport by air of fissile material is not authorized.

14. ~~Revision No. 24 of this certificate may be used until November 30, 2021.~~

14.5. Expiration date: September 30, 2024.

REFERENCES

Nuclear Waste Partnership, LLC, application dated ~~August 3, 2020~~ ~~February 24, 2022~~.

~~As supplemented on: September 28, 2020.~~

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Yaira K. Diaz Sanabria, Chief
Storage and Transportation Licensing Branch
Division of Fuel Management
Office of Nuclear Material Safety
and Safeguards

Date:

