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February 9, 2012

ATTN: Document Control Desk
Director, Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: TRUPACT-III Amendment Request, Docket No. 71-9305, SAR Revision 8

AREVA Federal Services LLC (AFS) hereby submits Revision 8 of the Safety Analysis Report for the TRUPACT-III packaging, Docket No. 71-9305. This revision to the application is to respond to comments provided by NRC staff in telephone conversations over the last week. The change consists of a revision to SAR drawing note 48, clarifying the meaning of the note in regards to the use of ultrasonic inspection of containment boundary welds. Included with this letter is one paper copy of the revised pages and SAR drawings and one CD containing the entire SAR, Revision 8, in PDF file format. The CD is contained within an envelope labeled, "TRUPACT-III Docket 71-9305 Electronic Copy of Documents".

AFS and the U. S. Department of Energy (DOE) appreciate the NRC's timely response to this matter. To support the waste transportation needs of the DOE, AFS requests that this revision be approved and the revised TRUPACT-III Certificate of Conformance be issued by February 17, 2012. The urgency is to support the DOE agreements with the State of South Carolina for shipping of the large box TRU waste at the Savannah River Site (SRS).

Should you have any questions regarding this submittal, please contact me at (253) 552-1321 or via E-mail (phil.noss@areva.com).

Very Truly Yours,
AREVA Federal Services LLC

A handwritten signature in black ink that reads "Phil Noss".

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NIM 5501



Contents of Electronic Media

This submission is composed of both paper copies and an electronic copy. The electronic copy is contained within an envelope labeled, "TRUPACT-III Docket 71-9305 Electronic Copy of Documents". The envelope contains one disc as follows:

Title	Media Type:	Contents
TRUPACT-III SAR	CD-R	One file of the complete text of the submittal: TRUPACT-III SAR, Complete, Rev. 8.pdf (19,197 kb) (578 pages)

**Delete and Insert Instructions
for
Updating TRUPACT-III Safety Analysis Report
Docket Number 71-9305**

SAR Section	Delete Rev. 7	Insert Rev. 8
Cover and Spline	Cover Page and Spine	Cover Page and Spine
Table of Contents	Pages i to ix	Pages i to ix
1.3.1	Pages 1.3.1-1 – 1.3.1-2	Pages 1.3.1-1 – 1.3.1-2
2.3	Pages 2.3-1 – 2.3-2	Pages 2.3-1 – 2.3-2
General Arrangement Drawings	51199-SAR, Rev. 7	51199-SAR, Rev. 8
8.1	Pages 8.1-1 – 8.1-2	Pages 8.1-1 – 8.1-2

Docket 71-9305



TRUPACT-III



Safety Analysis Report

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TRUPACT-III



Safety Analysis Report

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AREVA Federal Services LLC

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1.3.1 Packaging General Arrangement Drawings

This section presents the TRUPACT-III packaging general arrangement drawing¹, consisting of 21 sheets entitled, *TRUPACT-III Packaging SAR Drawing*, Drawing Number 51199-SAR, Rev. 8.

Within the packaging general arrangement drawing, dimensions important to the packaging's safety are dimensioned and toleranced (e.g., sealing regions on the seal flanges). All other dimensions are provided as a reference dimension, and are toleranced in accordance with the general tolerance block.

¹ The TRUPACT-III packaging general arrangement drawing utilizes the uniform standard practices of ASME Y14.5M-1994, *Dimensioning and Tolerancing*, American National Standards Institute, Inc. (ANSI).

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2.3 Fabrication and Examination

2.3.1 Fabrication

The TRUPACT-III packaging is fabricated using conventional metal forming and joining techniques. All welding procedures and welding personnel must be qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code.¹ Where possible, containment boundary weld joints are made in flat sections and are full penetration butt joints. Where a corner joint is necessary, such as at the closed end of the containment boundary or at the body flange inner corner joints, the joint is a full penetration corner joint. Threaded parts are fabricated according to ASME B1.13M.² All non-containment joints, such as those connecting the CSA outer sheets, are fabricated in accordance with the requirements delineated on the drawings in Appendix 1.3.1, *Packaging General Arrangement Drawings*.

The polyurethane foam, calcium silicate insulation, balsa wood, and butyl rubber O-rings are procured using written procedures. See Section 8.1.5, *Component Tests*, for details of the fabrication and performance requirements of these components.

2.3.2 Examination

Each of the materials performing a significant safety function must meet the ASTM specifications delineated on the drawings in Appendix 1.3.1, *Packaging General Arrangement Drawings*. Safety-significant materials not having an ASTM designation are controlled by means of written procedures whose requirements are summarized in Section 8.1.5, *Component Tests*.

All welds are subject to visual examination per AWS D1.6.³ Welds of the containment boundary plates and flanges are examined additionally by radiographic inspection in accordance with the ASME Boiler and Pressure Vessel Code, Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 2,⁴ and by liquid penetrant inspection on the final pass in accordance with the ASME Boiler and Pressure Vessel Code, Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 6.⁵ Fillet welds attaching the V-stiffeners to the containment sheets, and all other welds of the CSA outboard of that location, are inspected in the same way, omitting the radiographic inspection. Welds between components of the overpack structures (including welds to the outside of the CSA) are inspected visually as noted above, and additionally using liquid

¹ American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section IX, *Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators*, 2004 Edition, 2005 and 2006 Addenda.

² American Society of Mechanical Engineers (ASME) B1.13M, *Metric Screw Threads – M Profile*.

³ ANSI/AWS D1.6:1999, *Structural Welding Code--Stainless Steel*, American Welding Society (AWS).

⁴ American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, *Rules for Construction of Nuclear Facility Components*, Division 1 - Subsection NB, *Class 1 Components*, and Section V, *Nondestructive Examination*, Article 2, *Radiographic Examination*, 2004 Edition, 2005 and 2006 Addenda.

⁵ American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section V, *Nondestructive Examination*, Article 6, *Liquid Penetrant Examination*, 2004 Edition, 2005 and 2006 Addenda.

penetrant inspection on the final pass in accordance with the ASME Boiler and Pressure Vessel Code, Section III, Division 1, Subsection NF, Article NF-5000, and Section V, Article 6.⁶

In cases where radiographic examination cannot be performed, containment boundary welds are inspected by ultrasonic examination in accordance with the ASME Boiler and Pressure Vessel Code, Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 4⁸. The use of multi-pass liquid penetrant examination for repair of containment boundary welds is identified in General Note 48 on the drawings in Appendix 1.3.1, *Packaging General Arrangement Drawings*. Subsequent to repairs of containment boundary welds, the CSA containment boundary will be subjected to the pressure and leakage rate tests described below.

Each TRUPACT-III packaging will also be subjected to the following three tests:

- CSA internal pressure test, in which the containment boundary is pressurized to at least 150% of the MNOP. The pressure test requirements are described in Section 8.1.3.2, *Containment Vessel Pressure Testing*.
- Containment boundary leakage rate test, which includes helium leakage rate tests of the structural containment boundary, the containment O-ring seal, and the vent port containment O-ring seal. The requirements are described in Section 8.1.4, *Fabrication Leakage Rate Tests*.
- Load test of the upper ISO lift fittings, in which each fitting is tested to 150% of its maximum working load. The load test requirements are described in Section 8.1.3.1, *Lifting Device Load Testing*.

⁶ American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, *Rules for Construction of Nuclear Facility Components*, Division 1 - Subsection NF, *Supports*, 2004 Edition, 2005 and 2006 Addenda.

⁸ American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, *Rules for Construction of Nuclear Facility Components*, Division 1 - Subsection NB, *Class 1 Components*, and Section V, *Nondestructive Examination*, Article 4, *Ultrasonic Examination*, 2004 Edition, 2005 and 2006 Addenda.

¹ Title 10, Code of Federal Regulations, Part 71 (10 CFR 71), *Packaging and Transportation of Radioactive Material*, 01-01-09 Edition.

Figure Withheld Under 10 CFR 2.390

	AREVA Federal Services LLC Packaging Projects Tacoma, WA 98402	
	TRUPACT-III PACKAGING SAR DRAWING	
SCALE: NONE	WT. N/A	
REV. B	SHEET 1 OF 21	
DWG NO.	51199-SAR	
SIZE	D	
	CADFILE: 51199SAR018.DWG	

Figure Withheld Under 10 CFR 2.390

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Figure Withheld Under 10 CFR 2.390

Figure Withheld Under 10 CFR 2.390

8	02	51199-SAR
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REV. 8	SHEET 20 OF 21
DWG NO.	51199-SAR
SIZE	D
CADFILE:	51199SAR20R.DWG

Figure Withheld Under 10 CFR 2.390

8.0 ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

8.1 Acceptance Tests

Per the requirements of 10 CFR §71.85¹, this section discusses the inspections and tests to be performed prior to first use of the TRUPACT-III packaging. Acceptance criteria for all inspections and tests are found either on the drawings in Appendix 1.3.1, *Packaging General Arrangement Drawings*, or in the sections that follow. Deviations from requirements will be recorded and dispositioned in accordance with the cognizant quality assurance program.

8.1.1 Visual Inspections and Measurements

Each TRUPACT-III will be visually inspected and measured to ensure that all of the requirements delineated on the drawings in Appendix 1.3.1, *Packaging General Arrangement Drawings*, including but not limited to such items as materials, physical arrangement of components, quantities, dimensions, welds, and measurements, are satisfied.

8.1.2 Weld Examinations

The locations, types, and sizes of all welds will be identified and recorded to ensure compliance with the drawings in Appendix 1.3.1, *Packaging General Arrangement Drawings*. All welds in each TRUPACT-III packaging will be visually examined. With the exception of seal and specific non-structural welds, all welds will be liquid penetrant examined. In addition, all welds in the containment boundary will be examined by radiography. Alternatives to radiographic examination of containment boundary welds are delineated in General Note 48 on the drawings provided in Appendix 1.3.1, *Packaging General Arrangement Drawings*. Visual examination is performed according to AWS Specification D1.6². Liquid penetrant, ultrasonic, and radiograph examinations are performed according to the relevant sections of the ASME code, as specified for each weld on the drawings.

8.1.3 Structural and Pressure Tests

8.1.3.1 Lifting Device Load Testing

From Section 2.1.3, *Weights and Center of Gravity*, the maximum weight of the TRUPACT-III is 25,000 kilograms (55,116 pounds). Each upper ISO corner fitting is designed to carry approximately 59% of the maximum lifted load, or 14,650 kg (32,298 lb). Each ISO corner fitting shall be load tested to 150% of the maximum working load, or at least 21,975 kg (48,447 lb), per ANSI N14.6³.

¹ Title 10, Code of Federal Regulations, Part 71 (10 CFR 71), *Packaging and Transportation of Radioactive Material*, 01-01-09 Edition.

² ANSI/AWS D1.6:1999, *Structural Welding Code – Stainless Steel*, American Welding Society (AWS).

³ ANSI N14.6-1993, *American National Standard for Radioactive Materials – Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4,500 kg) or More*, American National Standard Institute, Inc. (ANSI).

Following load testing of the ISO corner fittings, all welds and adjacent base metal (minimum 13 mm [0.5 in.] on each side of the weld) directly related to the load testing of the fitting shall be visually inspected for plastic deformation or cracking in accordance with AWS D1.6, and liquid penetrant inspected per ASME B & PV Code, Section III⁴, Division 1, Subsection NF, Article NF-5000, and Section V⁵, Article 6, as delineated on the drawings in Appendix 1.3.1, *Packaging General Arrangement Drawings*. Indications of cracking or distortion shall be recorded and evaluated in accordance with the cognizant quality assurance program.

8.1.3.2 Containment Vessel Pressure Testing

Per the requirements of 10 CFR §71.85(b), the containment structural assembly (CSA) shall be pressure tested to 150% of the maximum normal operating pressure (MNOP) to verify structural integrity. The MNOP of the TRUPACT-III package is equal to 172 kPa (25 psig). Thus, the CSA shall be pressure tested to at least $172 \times 1.5 = 258$ kPa (37.5 psig).

Following pressure testing of the CSA, accessible base material and welds directly related to the pressure testing of the containment boundary sheets of the CSA shall be visually inspected for plastic deformation or cracking in accordance with AWS D.1.6, and liquid penetrant inspected per ASME B & PV Code, Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 6, as delineated on the drawings in Appendix 1.3.1, *Packaging General Arrangement Drawings*. Indications of cracking or distortion shall be recorded and evaluated in accordance with the cognizant quality assurance program.

Leakage rate testing per Section 8.1.4, *Fabrication Leakage Rate Tests*, shall be performed after completion of pressure testing to verify package configuration and performance to design criteria.

8.1.4 Fabrication Leakage Rate Tests

This section provides the generalized procedure for fabrication leakage rate testing of the containment vessel boundaries and penetrations following the completion of fabrication. Fabrication leakage rate testing shall follow the guidelines of Section 7.3, *Fabrication Leakage Rate Test*, of ANSI N14.5⁶.

Prior to leakage rate testing, internal components that are not permanently affixed to the containment plate, such as the payload, roller floor, and payload pallet, shall be removed. For ease of leakage rate testing, the interior surfaces of the CSA should be thoroughly cleaned. As an option, the debris shield insert may be omitted from the assembly for fabrication leakage rate tests.

Fabrication leakage rate testing shall be performed on the CSA. Three separate tests comprise the series. Each test shall meet the acceptance criteria delineated in Section 8.1.4.1, *Fabrication Leakage Rate Test Acceptance Criteria*.

⁴ American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, *Rules for Construction of Nuclear Power Plant Components*, 2004 Edition, 2005 and 2006 Addenda.

⁵ American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section V, *Nondestructive Examination*, 2004 Edition, 2005 and 2006 Addenda.

⁶ ANSI N14.5-1997 (or later), *American National Standard for Radioactive Materials – Leakage Tests on Packages for Shipment*, American National Standards Institute, Inc. (ANSI).