Department of Energy
Washington, DC 20585

April 20, 2020

Aleksandr Gelfond
Cask Division Engineering/Licensing Manager
Energy*Solutions*
740 Osborn Road
Barnwell, SC 29812

Dear Mr. Gelfond,

In response to your letter dated February 24, 2020 to Dr. James Shuler of my staff, enclosed is Department of Energy (DOE) Certificate of Compliance (CoC) Number 9204, Revision 12, for the Model 10-160B package and its DOE Safety Evaluation Report (SER). The CoC is renewed for five years.

This CoC is issued by DOE under the authority of 49 CFR Part 173.7(d) and is conditional upon the user fulfilling the applicable Operational and Quality requirements of 49 CFR Parts 100-199 and 10 CFR Part 71, and the conditions specified in Item 5 of the CoC.

The expiration date of Revision 12 is November 31, 2025.

If you have any questions, please contact me or Dr. Shuler at (301) 903-5513.

Sincerely,

Julia C. Shenk

Digitally signed by Julia C. Shenk
Date: 2020.04.20 13:54:32 -04'00'

Julia C. Shenk
Headquarters Certifying Official
Director
Office of Packaging and Transportation

Enclosures

cc: Gerard van Noordennen, Energy*Solutions*
James Shuler, EM-4.24
Docket File 20-27-9204

U.S. DEPARTMENT OF ENERGY

DOE Packaging Certification Program

CERTIFICATE OF COMPLIANCE
For Radioactive Materials Package

DOE F 5822.1
(5-85 Formerly EV-618)

1a. Certificate Number	1b. Revision No.	1c. Package Identification No.	1d. Page No.	1e. Total No. Pages
9204	12	USA/9204/B(U)F-96 (DOE)	1	8

2. PREAMBLE

2a. This certificate is issued under the authority of 49 CFR Part 173.7(d).

2b. The packaging and contents described in Item 5 below meet the safety standards set forth in subpart E, "Package Approval Standards" and subpart F, "Package, Special Form and LSA-III Tests" Title 10, Code of Federal Regulations, Part 71.

2c. 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 —

(1) Prepared by (*Name and Address*):	(2) Title and identification of report or application:	(3) Date:
Energy*Solutions* 740 Osborn Road Barnwell, SC 29812	Consolidated Safety Analysis Report for Model 10-160B Type B RADWASTE Shipping Cask, Energy Solutions Revision 3, as supplemented [See 5(e)]	January 2011

4. CONDITIONS
This certificate is conditional upon fulfilling of the applicable Operational and Quality Assurance requirements of 49CFR parts 100 – 199 and 10CFR Part 71, and the conditions specified in Item 5 below.

5. Description of Packaging and Authorized Contents, Model Number, Transport Index, other Conditions, and References:

(a) Packaging

(1) Model Number: 10-160B

(2) Description:

A cylindrical carbon steel and lead shielded shipping cask, designed to transport radioactive waste material. The cask is transported in the upright position and is equipped with steel encased, rigid polyurethane foam impact limiters on the top and bottom. The package has approximate dimensions, shielding, and weight as follows:

Cask height	88 inches
Cask outer diameter	78-1/2 inches
Cask cavity height	77 inches
Cask cavity diameter	68 inches
Overall package height, with impact limiters	130 inches
Overall package diameter, with impact limiters	102 inches
Lead shielding thickness	1-7/8 inches
Gross weight (packaging and contents)	72,000 lbs
Maximum total weight of contents, shoring, secondary containers, and optional shield insert	14,250 lb.

6a. Date of Issuance: April 20, 2020	6b. Expiration Date: December 31, 2025

FOR THE U.S. DEPARTMENT OF ENERGY

7a. Address *(of DOE Issuing Office)*	7b. Signature, Name, and Title *(of DOE Approving Official)*
U.S. Department of Energy Office of Packaging and Transportation (EM-4.24) 1000 Independence Avenue, SW Washington, DC 20585	Julia C. Shenk Digitally signed by Julia C. Shenk Date: 2020.04.20 13:48:51 -04'00' Julia C. Shenk Headquarters Certifying Official Director Office of Packaging and Transportation

The cask body consists of a 1-⅛-inch thick carbon steel (ASME SA516 or SA537) inner shell, a 1-⅞-inch thick lead gamma shield, and a 2-inch thick carbon steel outer shell (ASME SA516). The inner and outer shells are welded to a 5-½-inch thick carbon steel bottom plate. The cask cavity has an optional 11-gage stainless steel liner. A 12-gage stainless steel thermal shield surrounds the cask outer shell in the region between the impact limiters. The impact limiters are secured to each other around the cask by eight ratchet binders.

The cask lid is a 5-½ inch thick carbon steel plate, and has a 31-inch diameter opening equipped with a secondary lid. The primary lid is sealed with a double elastomer O-ring and 24 equally spaced 1-¾ inch diameter bolts. The secondary lid is 46 inches in diameter, is centered within the primary lid, and is sealed to the primary lid by a double elastomer O-ring and 12 equally spaced 1-¾ inch diameter bolts. The space between the double O-ring seals is provided with a test port for leak testing the primary and secondary lid seals.

The secondary lid is protected by a thermal shield which consists of two polished stainless steel plates separated by a thin air gap. The thermal shield is attached to the secondary lid lifting lugs with hitch-pins. The optional cask drain and vent ports are sealed with a plug and an O-ring seal.

The package is equipped with four tie-down lugs welded to the cask outer shell. Two lifting lugs and two redundant lifting lugs are removed during transport. The lid is equipped with three lifting lugs which are covered by the top impact limiter and rain cover during transport.

An optional carbon steel shield insert may be used within the cask cavity for contents as specified in 5(b)(1)(i) through (v) for contents specified in 5(b)(1)(vii), a source insert (Drawing C-038-145083-004) shall be used. The source insert design weight is 8,000 lbs; it has side walls consisting of 6.0-inch thick lead, sandwiched between an inner 8 inches nominal SCH 60 steel pipe and an outer 24.0-inch SCH steel pipe. The bottom of the source insert also consists of lead supported by a 0.75-inch thick steel base plate. The lid includes a steel encased lead plug, steel bolting plate and flat silicone rubber gasket. Steel or wooden cribbing (Drawings C-038-145083-005 and DWG-4132-ST-0005 respectively) may be used to support the source insert within the 10-160B.

The Argonne National Laboratory (ANL) Source Container Assembly is a two-part, vented, shielded source container specified in Drawing C-038-349097-001 and provides both photon (gamma) and neutron shielding in the forms of lead and steel for photon shielding and a casted neutron shield material, SWX-237. The photon shield has side walls consisting of lead with a total thickness of 6.0 inches, located between an inner 8.0-inch (nominal) SCH 60 steel pipe and an outer 24.0-inch (nominal) SCH 60 steel pipe. The bottom consists of 5.0 inches of lead supported by a 0.75-inch thick steel base plate. The lid includes a steel encased lead plug (nominal lead thickness 8 ⅞ inches), steel bolting plate, and flat silicon rubber gasket. The neutron shield has side walls consisting of SWX-237 with a thickness of 3.0 inches between an inner 26 inch nominal SCH 20 steel pipe and an outer 33 inch OD rolled ½ inch steel plate. There are four vents from the gamma shield cavity through the shield wall. These are aligned with four vents through the neutron shield, which terminate with a HEPA filter. The vents provide a diffusion path to the cask void for hydrogen generated in the gamma shield cavity. The bottom has 3 inches of SWX-237 supported by a ½ inch steel plate. The lid is a 3 inch SWX-237 layer enclosed in steel with a steel bolting plate and flat silicon rubber gasket. The ANL Source Container was designed as a one-time use disposal container for the contents specified in 5(b)(1)(vi) of this Certificate.

The Los Alamos National Laboratory (LANL) Corrugated Metal Box (CMB) is a filter-vented, Department of Transportation (DOT) Spec 7A, Type A container with overall dimensions (in inches) approximately 38-½ (height) x 54 (width) x 68 (length) and authorized gross weight of

6,000 lb. The CMB is of a welded construction, fabricated from 14 gage mild steel. The CMB closure is by welding the lid to the container body. The CMB shipping configuration includes three NUCFIL filter-vents installed on the container body to aid hydrogen diffusion to the 10-160B containment system. The CMB requires cribbing to prevent movement of the CMB within the 10-160B cask during NCT and HAC. The estimated weight of the cribbing design is 4,800 lb. The cribbing is a two-piece design, consisting of Lower and Upper Guide Assemblies. The Lower Guide Assembly sits below the CMB and the Upper Guide Assembly is installed after the CMB is loaded in the 10-160B. The Upper Guide Assembly has an adjustable height plate to eliminate axial gaps between the cribbing and the 10-160B cavity. Both the Upper and Lower Guide Assemblies have eight cantilevered guide arms that center the CMB and bear upon the 10-160B containment shell walls through ultra-high molecular weight polyethylene contact guides. The CMB and cribbing design are required to transport the contents specified in 5(b)(1)(viii) of this Certificate.

The Gammacell (GC) configuration consists of previously certified Type B packagings modified to use as source inserts and one-time-use disposal containers. The containers are the GC 200 Irradiator, GC 200 Irradiator with extra shielding band, and the GC 220 Irradiator. Each GC consists of a lead-shielded, cylindrical, steel-encased body welded to a support frame/skid. The skids are 32 inches square by 4 inches tall. The overall height of a GC (with skid) is approximately 34 inches. The GC 200 is 25 ¾ inches in diameter with approximately 9 inches of shielding thickness. The GC 200 with extra shielding band is 28 inches in diameter and has an additional 1-inch-thick band of lead added to the side of the packaging. The GC 220 is 30 inches in diameter with approximately 14 inches of shielding thickness. The components of the modified GCs are as follows: a) shielded body with integral skid, b) top shield plug/lid, c) lower shield plug, and d) source containers (i.e., bucket and spacers/plate configurations). The usable cavity in the GC 200 and 200 with extra shielding band is 6.2 inches tall by 7 inches in diameter; the usable cavity in the GC 220 is 8.5 inches tall by 8.75 inches in diameter. Source containers are designed to fit these respective cavities; there are two source container configurations for the GC 200 and 200 with extra shielding band and two for the GC 220. The GC 200 lids are secured with eight (8) ¾ inch -10 NC bolts; the GC 220 lid is secured using four (4) ¾ inch-10 NC bolts. Only a single GC at a time may be transported in 10-160B. The GCs and wooden cribbing design are required to transport the contents specified in 5(b)(1)(ix) of this Certificate.

The 20WC-5 Shield Insert configuration consists of a previously certified (expired) 20WC-5, Type B(U) packaging, a convenience canister assembly or basket assembly, and a cask cribbing assembly. The 20WC-5 complete packaging consists of an overpack drum and assembly, 2R transport container assembly, and tungsten shield assembly. The drum lid is secured to the drum body by sixteen (16), ½ inch–13 UNC-2B hex nuts. The 20WC-5 drum outer dimensions are 39 ½ inches in diameter and 51 $^{5}/_{16}$ inches tall. The 2R transport container assembly and tungsten shield assembly are nested in a drum cradle assembly inside the cavity of the drum. The tungsten shield assembly is 11 $^{7}/_{8}$ inches in diameter and 30 ¼ inches tall, weighs approximately 1,800 pounds, and provides approximately 5 $^{3}/_{8}$ inches of shielding. The usable internal cavity of the shield assembly is approximately 2 inches in diameter and 17 ¾ inches tall, or 1 inch in diameter if tungsten sleeves are used for additional shielding. The Co-60 targets (nickel coated metal, normal form) and returning Co-60 doubly encapsulated special form contents are loaded in a single convenience canister assembly or basket assembly for loading in the shield assembly. Only a single 20WC-5 may be transported in 10-160B. The 20WC-5 and wooden cribbing design (DWG-4182-ST-0001-01) are required to transport the contents specified in 5(b)(1)(x) of this Certificate.

The IBL-437C Irradiator configuration consists of a single self-shielded Model IBL-437C blood irradiator and wood cribbing assembly (with nylon slings). The overall dimensions of the Irradiator

are approximately (length, width, & height) 23.6 in. x 23.3 in x 42.1 in. and it weighs 4,519 lb. The overall dimensions of the cribbing assembly, with Irradiator, are 66 in. diameter x 78 in. in height and estimated weight, without Irradiator, is 1,615 lb. The estimated weights of the lower assembly and top assembly are 1,427 and 188 lb. respectively. The Irradiator shield and wooden cribbing design (DWG-5164319-ST-0001) are required to transport the contents specified in 5(b)(1)(xi) of this Certificate, for disposal. The configuration weighs approximately 6,191 lb., with an addition 58 lb. of nylon slings rigged to the Irradiator and cribbing for ease of removal.

(3) Drawings:

The packaging is constructed and assembled in accordance with Energy*Solutions* Drawing No. C-110-D-29003-010, sheets 1 through 5, Rev. 16.

The Secondary Lid Thermal Shield is constructed in accordance with Energy*Solutions* Drawing No. DWG-CSK-12CV01-EG-0002-01, Rev. 3.

An optional shield insert is constructed in accordance with Chem-Nuclear Systems Drawing No. C-119-B-0018, Rev. 2.

Source Insert and Cribbing (i.e., shoring): Drawings C-038-145083-004, Rev. 0 (source insert); C-038-145083-005, Rev. 0 (steel cribbing); and DWG-4132-ST-0005-01 through -07, Rev. 1 (wooden cribbing).

An optional ANL Source Container and Shoring are constructed in accordance with Energy*Solutions* Drawings No. C-038-349097-005, Rev 0 and No. C-038-349097-001, sheets 1-3, Rev 1.

DWG-5063-ME-0100-01, Transport of LANL Corrugated Metal Boxes in the 10-160B Cask, Cribbing General Arrangement, Sheet 1 of 1

DWG-4132-ST-0001-01, -02, and -03, Summary of Field Measurements Modifications and weld Details for Gammacell 200 & 220 Sheet 1 - 3, Rev 1

DWG-4132-ST-0002-01, -02, -03 and -04, Transport of SWRI Gammacells 200, 200 (Extra Shielding Band) & 220 in 10-160B Cask Cribbing Assembly & Details Sheets 1 - 4, Rev 1

DWG-4132-ST-0003-01 and -02, Transport of SWRI Gammacells 200, 200 (Extra Shielding Band) & 220 in 10-160B 220 Dtls of Inner Buckets/Spacers Sheets 1 and 2, Rev 1

DWG-4132-ST-0004-01, Transport of SWRI Gammacells 200, 200 (Extra Shielding Band) & 220 in 10-160B Cask 200 Dtls of Inner Buckets/Spacers Sheet 1 of 1, Rev 1

INIS-DWG-0051, INIS-2/20WC-5 Overpack Drum and Assembly and Details OD 39.5 x51 H, Rev A

INIS-DWG-0007, INIS-2 Tungsten Shield Assembly and Details, Rev C

INIS-DWG-0019, INIS-2R-1 Transport Container Assembly and Details, Rev A

DMP-CICC-100, Cobalt Irradiation Capsule Canister Assembly, Rev 0

INIS-DWG-0049, INIS-SF01.6-13-I Cobalt 60 Calibration Capsule Assembly, Rev B

DWG-4182-ST-0001-01, Transport of 20WC-5 Shield Insert in 10 160B Cask Cribbing Assembly and Details, Rev 2

DWG-5164319-ST-0001, Transport of IBL-437C Irradiator in 10-160B Cask Cribbing Assembly & Details, Sheets 1 through 8, Rev 0

(b) Contents:

(1) Type and form of material

(i) Byproduct, source, and special nuclear material, non-fissile or fissile-excepted, as special form, or non-special form in the form of solids, dewatered resins or process solids, or solidified waste, in secondary containers; or

(ii) Dewatered, solid or solidified transuranic-containing wastes (TRU), fissile or non fissile or fissile-excepted, in secondary containers; or

(iii) Plutonium 239 (Pu-239) as PuBe neutron sources meeting the requirements of special form sources; or

(iv) Neutron activated metals or metal oxides in solid form in secondary containers; or

(v) Miscellaneous radioactive solid waste materials, including special form materials and powered solids, in secondary containers; or

(vi) For a shipment of the ANL Source Container specified in Drawing C038-349097-001, and disposal of the Container, byproduct material as dry normal form solids. The Co-60 sources are activated cobalt metal enclosed in stainless steel and/or aluminum. The radium-beryllium sources typically are $RaBr_2$ mixed with Be metal powder in a brass capsule that is sealed with soft solder. Other sources may include $RaBr_2$, $RaCl_2$, or $RaSO_4$ in stainless steel, brass, monel, or nickel tubes that were sealed by welding, brazing, or soft soldering or in flamesealed glass vials. These radium sources may be with or without Be; or

(vii) Byproduct material as Co-60 loaded into the source insert; or

(viii) Solid TRU waste defined as Material Form No. 1 (solids – any particle size), Material Form No. 2 (solids – large particle size only, e.g., sand, debris, concrete, etc.), and Material Form No. 3 (solids – objects with no significant dispersible or removable contamination as defined by 49 CFR 173.433). This CoC authorizes these three waste forms in the LANL CMB; or

(ix) For shipment of a GC, normal form, undamaged, metallic, sealed Co-60 and/or Cs-137 sources; or

(x) For a shipment in the 20WC-5, Co-60 pellets, solid metal, or nickel alloy (plated); or

(xi) For shipment in the Model IBL-437C Irradiator, Cs-137 in special form capsules.

(2) Maximum quantity of material per package

(i) Maximum contents are limited to 0.495 TBq (13.4 Ci) of Co-60; 370 TBq. (10,000 Ci) of Co-60, not to exceed mass of 500 lb., contained in the Source Insert (Drawing C-038-145083-004). For contents other than Co-60, the maximum quantity of radioactive materials is determined by the methodology described in Attachment 1 to Chapter 7 of the SAR. Total quantity of radioactive material is not to exceed 3,000 A_2.

(ii) Fissile contents must be limited to the fissile gram equivalent of 325 grams of Pu-239, as determined using the conversion factors in Table 9.1.3, in Chapter 4, Appendix 4.10.2, of the SAR, as supplemented. Plutonium content exceeding 0.74 TBq (20 Ci) must be in solid form.

(iii) TRU exceeding the fissile limits of 10 CFR 71.15 must not be machine-compacted and must have no more than 1% by weight of special reflectors and no more than 25% by volume of hydrogenous material.

(iv) Neutron sources as described in 5(b)(1)(iii) are limited to a maximum emission rate of 1.1E+8 neutrons/sec.

(v) Maximum decay heat not to exceed 200 watts.

(vi) Maximum weight of contents: 14,250 pounds including shoring, secondary containers, and optional shield insert. The maximum weight of the ANL Source Container, with contents, is 12,500 pounds. The maximum weight of the LANL CMB, with contents, and cribbing is less than 9,000 lb. The maximum weight of a GC with contents and cribbing is less than 10,000 lb. The maximum weight of the 20WC-5 with contents and cribbing is less than 5,000 lb. The maximum weight of the IBL-437C Irradiator, cribbing, and slings is approximately 6,249 lb.

(vii) Explosives, corrosives, non-radioactive pyrophorics, and compressed gases are prohibited. Pyrophoric radionuclides may be present only in residual amounts less than 1 weight percent.

(viii) The total amount of potentially volatile organic compounds present in the headspace of a secondary container is restricted to 500 parts per million.

(ix) Powdered solid radioactive materials shall not include radioactive forms of combustible metal hydrides or combustible elemental metals (i.e., magnesium, titanium, sodium, potassium, lithium, zirconium, hafnium, calcium, zinc, plutonium, uranium, and thorium), or combustible non-metals (i.e., phosphorus).

(x) Powdered solids contents with neutron emitters are not permitted.

(xi) 4,030 Ci of Co-60 and 3.49 Ci of Ra-226 (as radium-beryllium sources) contained in an ANL Source Container specified in Drawing C-038-349097-001. Radioactive sources in the ANL Source Container shall have a maximum mass of 7.5 kg with not more than 5% by weight of organic material. The total decay shall not exceed 100 watts.

(xii) Each LANL CMB shall contain ≤ 20 aerosol cans and ≤ 4.0 fluid oz. total residual flammable liquids in any aerosol cans to ensure that CMB contents are below the lower flammability limit and < 500ppm volatile organic compound (VOC) content.

(xiii) Each GC 200 or 200 (with extra shielding band) Shielded Insert shall contain no more than 9,000 Ci of Co-60 only, 27,700 Ci of Cs-137 only, or combination of Co-60 and Cs-137 not to exceed 138.5 watts (i.e., thermal limit for the GC 200 and 200 with extra shielding band). Each GC 220 Shielded Insert shall contain no more than 13,000 Ci of Co-60 only, 40,000 Ci of Cs-137 only, or combination of Co-60 and Cs-137 not to exceed 200 watts (i.e., thermal limit for the GC 220).

(xiv) Each 20WC-5 shall contain no more than 10,000 Ci of Co-60.

(xv) Each IBL-437C Irradiator shall contain no more than 5,100 Ci of Cs-137.

(c) Criticality Safety Index: 0.0

(d) Conditions:

(1) In addition to the requirements of Subparts G and H of 10 CFR Part 71:

(i) The package must be prepared for shipment and operated in accordance with the Operating Procedures of Chapter 7, except Section 7.4, of the SAR, as supplemented and

(ii) Each packaging must meet the Acceptance Tests and Maintenance Program of Chapter 8 of the SAR, as supplemented.

(2) Transport by air of fissile material is not authorized.

(3) Flammable gas (hydrogen) concentration is limited to less than 5% in volume. For contents other than TRU waste, inerting is not allowed to limit the concentration of flammable gases. For TRU waste, compliance with the 5% hydrogen concentration limit is determined by the methods discussed in Appendix 4.10.2 of the SAR as supplemented. For contents with a radioactivity concentration not exceeding that for Low Specific Activity material, the hydrogen concentration can be assumed to be less than 5% provided the package is shipped within 10 days of preparation, or within 10 days after venting of the drums or other secondary containers.

(4) Payload containers authorized for shipment of TRU waste are the 30-gallon and 55-gallon drums. TRU waste characteristics are determined and limited in accordance with Appendix 4.10.2 of the SAR as supplemented.

(5) The non-homogeneity of the package contents may lead to elevated levels of radiation on the package surfaces. Radiation surveys must be performed to obtain measurements from all surfaces of the package, and from outer surfaces of the vehicle enclosure, unless process knowledge or survey history indicates that elevated radiation levels are not likely to be encountered.

(6) Appropriate devices or measures must secure contents in the secondary container, if necessary.

(7) The Shoring design shall be fabricated and inspected per drawing C-038-349097-005, Rev 0, prior to a shipment of the ANL Source Container in the 10-160B.

(8) The 10-160B package shall be shipped “exclusive use”, per 10 CFR Part 71.

(9) The transport limit for the ANL Source container and contents in the 10-160B package is 60 days, starting when the 10-160B lid is set in place, and conservatively accounts for hydrogen buildup within the package even when not fully sealed (lid bolts torqued, etc.)

(10) Revision 11 of this certificate may be used until December 31, 2020.

(11) The cribbing design for the LANL CMB shall be fabricated and inspected per the drawings specified in Reference 3 (Addendum).

(12) The LANL CMB shall be prepared and loaded as specified in Reference 3 (Addendum).

(13) The modified GCs shall meet the acceptance criteria specified in Reference 4 (Addendum).

(14) The GC source container requirements are as follows: a) for the GC 200 and 200 with extra shielding band, the “bucket” configuration is used only for Cs-137 sources, and the “spacer and tungsten plate” is used for all other source combinations (Ref DWG-4132-ST-0004-01); b) for the GC 220, a “large spacer” and “bucket” configuration is used for any combination of sources, and a “small spacer”, “carousel”, and “bucket” are used for Co-60 pencil sources in the “carousel” and any combination of sources in the “bucket” (Ref DWG-4132-ST-0003-01 and DWG-4132-ST-0003-02).

(15) The cribbing design for the GCs shall be fabricated and inspected per the drawings specified in Reference 4 (Addendum).

(16) The GC Shielded Inserts shall be prepared, loaded, and closed as specified in Reference 4 (Addendum).

(17) The steel and wood cribbing designs for the Source Insert shall be fabricated and inspected per the drawings specified in Reference 5 (Addendum).

(18) The cribbing design for the 20WC-5 shall be fabricated and inspected per the drawings specified in Reference 7 (Addendum).

(19) The 20WC-5 shall be prepared, loaded, and closed as specified in Reference 7 (Addendum). The user must perform a radiation survey of the 20WC-5 after the contents are loaded, prior to loading the 20WC-5 in the 10-160B (Reference 7, Addendum, Section 8.1.5).

(20) The package authorized by this certificate is hereby approved for use under the provisions of 49 CFR 173.7(d).

(21) Only DOE or persons working under contract to DOE shall consign the package for shipment.

(22) NRC or Agreement State licensees shall not consign a DOE certified package for shipment, but can transfer the material on-site to DOE or persons working under contract to DOE, for consignment of the package.

(23) The cribbing design for the IBL-437C Irradiator authorized for shipment under 5(b)(2)(xv) shall be fabricated and inspected per the drawings specified in Reference 8 (Addendum) and this Certificate.

(24) The average surface dose rate of the IBL-437C Irradiator authorized for shipment under 5(b)(2)(xv) shall not exceed 2.5 mrem/hr. The Irradiator meeting the average surface dose rate requirement shall be prepared, loaded, and closed as specified in Reference 8 (Addendum)

(e) References:

(1) Source Container Addendum to 10-160B, Energy*Solutions*, December 2011.

(2) Consolidated Safety Analysis Report For Model 10-160B Type B Radwaste Shipping Cask, Revision 4, July 2012 (includes Source Insert Addendum For Model 10-160B Type B Radwaste Shipping Cask, July 2012). As amended by revised Chapter 7 submitted to NRC on July 26, 2012, and by drawing DWG-CSK-12CV01-EG-0002-01, Rev 3 “Cask Secondary Lid Thermal Shield Details submitted to NRC on August 26, 2012.

(3) Corrugated Metal Box Inner Container Addendum for Model 10-160B Type B Radwaste Shipping Cask, dated September 2013, transmitted with Letter from C.H. Keilers to Dr. James M. Shuler, *Transmittal of Q1 Responses and Final SARP Addendum for Type B Packaging Model 10-160B for Corrugated Metal Box Content* dated September 27, 2013.

(4) Gammacell 200, Gammacell 200 (Extra Shielding Band) and Gammacell 220 Inserts Addendum for Model 10-160B Type B Radwaste Shipping Cask, Revision 1, February 28, 2014.

(5) Source Insert Addendum for Model 10-160B Type B Radwaste Shipping Cask, Revision 2, May 22, 2014.

(6) Energy*Solutions* letter to James M. Shuler, dated August 31, 2015

(7) 20WC-5 Shield Insert Shipping Addendum for Model 10-160B Type B RADWASTE Shipping Cask, Revision 1, June 6, 2016.

(8) IBL-437C Irradiator Shipping Addendum for Model 10-160B Type B RADWASTE Shipping Cask, Revision 1, February 2019

(9) Request for Renewal of U.S. Department of Energy (DOE) CoC No. 9204 for the Model No. 10-160B Package, Energy*Solutions* letter to James M. Shuler, dated February 24, 2020