NRC FORM 618
(8-2000)
10 CFR 71

U.S. NUCLEAR REGULATORY COMMISSION

CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIAL PACKAGES

1 a. CERTIFICATE NUMBER	b. REVISION NUMBER	c. DOCKET NUMBER	d. PACKAGE IDENTIFICATION NUMBER	PAGE		PAGES
9341	10	71-9341	USA/9341/B(U)F–96	1	OF	12

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

a. ISSUED TO *(Name and Address)*

Orano Federal Services LLC
505 S. 336th Street, Suite 400
Federal Way, WA 98003

b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

Orano Federal Services LLC application dated November 8, 2021.

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.: BEA Research Reactor (BRR) Package

(2) Description

The purpose of the Model No. BRR package is to transport irradiated fuel elements or loose plates of a square fuel element from various test and research reactors. The package is comprised of a lead–shielded package body, payload basket or canister, square loose plate box, an upper shield plug, a closure lid, upper and lower impact limiters, and utilizes American Society for Testing and Materials (ASTM) Type 304 stainless steel as its primary structural material. The package is a right circular cylinder with a dimension of 77.1 inches in length and 38 inches in diameter, not including the impact limiter attachments and the thermal shield. Lead shielding is located between two circular shells, in the lower end structure, and in the shield plug. The payload cavity has a diameter of 16 inches and a length of 54 inches.

Impact Limiters. Impact limiters are attached to each end of the package body. Each impact limiter is 78 inches in diameter and 34.6 inches in length, with a 15-inches long conical section towards the outer end. The impact limiter design consists of ASTM Type 304 stainless steel shells and polyurethane foam with an approximate density of 9 pounds per cubic foot (lb/ft^3).

Fuel Baskets. There are six baskets used with the package, one for each type of fuel transported and one for isotope production targets. The baskets are made from welded construction using ASTM Type 304 stainless steel in plate, bar, pipe, and tubular forms. Each basket has a diameter of 15.63 inches and a length of 53.45 inches, and features a number of cavities that fit the size and shape of the fuel. The basket for square fuel accommodates two types of fuel assembly: (1) flat type fuels and (2) a 5x5 array of fuel rods enclosed within a rectangular can.

5.(a) Packaging – Description (continued)

Personnel Barrier. When transporting isotope production targets, a personnel barrier is used to limit access to the package body such that personnel are prevented from touching the cask surface where the surface temperature may exceed the allowable limit for exclusive use shipments. The barrier does not have a radiological purpose.

Spacer Pedestals. For fuel elements or assemblies shorter than the length of a basket cavity, spacer pedestals are used in each cavity, as required, to support the fuel elements at the top of the basket. All spacer pedestals are made of stainless steel

Square Box or Loose Plate Box. A square box accommodates square fuel loose plates. A loose plate box is used to transport up to 31 loose plates per box. The square fuel basket and loose plate box are made of stainless steel.

Canister Assembly. A canister accommodates the irradiated metal pieces, which consists of a circular shell with a base and a bolted lid. The lid is attached with four remotely-operated bolts. A circular shell forms the lower skirt of the canister. A lifting bail is welded to the lid. The lid has a vent hole and the baseplate includes a drain hole.

The package is designed to be transported as one package per conveyance, with its longitudinal axis vertical, by highway truck or by rail in exclusive use. When loaded and prepared for transport, the package is 119.5 inches in length, 78 inches in diameter (over the impact limiters) and weighs 32,000 pounds (lb).

(3) Drawings

The packaging is constructed in accordance with AREVA Federal Services LLC drawings:

- 1910–01–01–SAR, “BRR Package Assembly SAR Drawing,” Sheets 1-5, Rev. 8
- 1910–01–02–SAR, “BRR Package Impact Limiter SAR Drawing,” Sheets 1-2, Rev. 1
- 1910–01–03–SAR, “BRR Package Fuel Baskets SAR Drawing,” Sheets 1-5, Rev. 8
- 1910–01–04–SAR, “BRR Package Isotope Target Basket SAR Drawing,” Sheets 1-2, Rev. 1

(b) Contents

(1) Type and form of material

(i) *Irradiated MURR Fuel Element*. Irradiated University of Missouri Research Reactor (MURR) fuel element to a maximum burnup of 180 megawatt-day (MWD) or a depletion of 30.9% of Uranium-235 (^{235}U). The minimum cooling time is 180 days after reactor shutdown. Each MURR element contains 24 fuel plates. Each fresh MURR fuel element contains 775.0 ± 7.8 g ^{235}U. The enrichment range is 93 ±1 wt.% ^{235}U. The MURR element overall length, including irradiation growth, is 32.75 inches. The maximum decay heat per fuel element is 158 watts (W). The maximum number of fuel elements per basket is 8. The bounding weight of one element is 15 lb. Table 1.1 includes characteristics of a pre-irradiated MURR fuel element.

5.(b)(1)(i) Type and form of material - Irradiated MURR Fuel Element (continued)

Table 1.1. MURR - Key Fuel Element Parameters

Maximum active fuel length (inches)	24.8
Overall length (inches)	32.75
Minimum cladding thickness (inch)	0.008
Nominal fuel matrix thickness (inch)	0.02
Fuel matrix	UAl_x
Cladding material	Aluminum
Maximum ^{235}U per element (g)	782.8
Maximum enrichment (wt.%)	94.0
Maximum ^{235}U per fuel plate (g)	46.0

(ii) *Irradiated MITR–II Fuel Element*. Irradiated Massachusetts Institute of Technology Research Reactor (MITR–II) fuel element to a maximum burnup of 165 MWD or a ^{235}Udepletion of 43.9%. The minimum cooling time is 120 days after reactor shutdown. Each MITR-II element contains 15 fuel plates. Each fresh MITR–II element contains 510.0 +3.0/-10.0 g ^{235}U, which is 500 - 513 g ^{235}U. The enrichment range is 93 ±1 wt.% ^{235}U. The MITR–II element overall length, including irradiation growth, is 26.52 inches. The maximum decay heat per element is 150 W. The maximum number of fuel elements per basket is 8. The bounding weight of one element is 10 lb. Table 1.2 includes the key parameters for a pre-irradiated MITR–II fuel element.

Table 1.2. MITR-II - Key Fuel Element Parameters

Maximum active fuel length (inches)	22.76
Overall length (inches)	26.52
Minimum cladding thickness (inch)	0.008
Nominal fuel matrix thickness (inch)	0.03
Maximum fuel matrix width (inches)	2.171
Fuel matrix	UAl_x
Cladding material	Aluminum
Maximum ^{235}U per element (g)	513
Maximum enrichment (wt.%)	94.0
Maximum ^{235}U per fuel plate (g)	34.3

(iii) *Irradiated ATR Fuel Element.* Irradiated Advanced Test Reactor (ATR) fuel element to a maximum burnup of 480 MWD or a ^{235}U depletion of 58.6%. The minimum cooling time is 1,670 days (4.6 years) after reactor shutdown. Each ATR fuel element contains 19 plates. The YA fuel element has 19 plates, but only 18 contain fuel.

5.(b)(1) (iii) Type and form of material - *Irradiated ATR Fuel Element* (continued)

There are two general classes of ATR fuel element, XA and YA. The enrichment range is 93 ± 1 wt.% ^{235}U. The XA fuel element has a fresh fuel loading of 1,075 ± 10 g ^{235}U. The YA fuel element has a fresh fuel loading of 1,022.4 ± 10 g ^{235}U. A second YA fuel element design (YA–M) has the side plate width reduced by 15 mils. The ATR element overall maximum length, after removal of the end box structures, 51.0 inches. The maximum number of fuel elements per basket is 8. The bounding weight of one element is 25 lb. The maximum decay heat per element is 30 W. Table 1.3 includes characteristics of a pre-irradiated ATR fuel element.

Table 1.3. ATR - Key Fuel Element Parameters

Maximum active fuel length (inches)	48.77
Overall length (inches)	51
Minimum cladding thickness for Plate 1 (inch)	0.018
Minimum cladding thickness for Plates 2-18 (inch)	0.008
Minimum cladding thickness for Plate 19 (inch)	0.018
Nominal fuel matrix thickness (inch)	0.02
Fuel matrix	UAl_x
Cladding material	Aluminum
Maximum ^{235}U per element (g)	1,085
Maximum enrichment (wt.%)	94.0
Maximum ^{235}U per fuel plate (g)	85.2

(iv) *Irradiated TRIGA fuel elements*. Table 1.4 includes the dimensions of pre-irradiated Training, Research, Isotopes, General Atomics (TRIGA) fuel elements. The TRIGA fuel matrix is uranium mixed with zirconium hydride. The BRR package is limited to the transportation of the following types of TRIGA fuel:

1. Standard 100 series.
2. Instrumented 200 series. The fuel region is as the same as 100 series but contain thermocouples used to measure temperature during reactor operation. Instrumented rods may be longer than 100 series.
3. Fueled Follower Control Rods (FFCR) (300 series). The rods contain boron carbide neutron absorber outside the active fuel region.
4. Cluster Rods (400 series). It is typically built with three or four cluster rods to make a cluster assembly.
5. Instrumented Cluster Rods (500 series). Fuel is the same as cluster rod but thermocouples used to measure temperature during reactor operation. Instrumented cluster rods may be longer.

Cluster rods (i.e., TRIGA fuel series 400 and 500) must be disassembled from the cluster assembly for transport in the BRR package.

5.(b)(1) (iv) Type and form of material - *Irradiated TRIGA fuel elements* (continued)

Table 1.4. Characteristics of Pre-Irradiated TRIGA Fuel

Type	ID[1]	Cladding	Fuel Length (in.)	U (wt. % Fuel)	^{235}U (wt. %)	U (g)	^{235}U (g)	Fuel OD[2] (in.)	Rod OD (in.)	Cladding Thickness (in.)	H/Zr	Overall Length[3] (in.)	Erbium (wt. %)
Standard 100 series	101	Aluminum	14	8.0	20	166	32	1.41	1.48	0.03	1.0	28.62	0
	101		15	8.5	20	189	37	1.41	1.48	0.03	1.6	28.62	0
	103	Stainless Steel	15	8.5	20	197	39	1.44	1.48	0.02	1.6	29.15	0
	105		15	12	20	285	56	1.44	1.48	0.02	1.6	29.15	0
	107		15	12	20	271	53	1.4	1.48	0.02	1.6	30.14	0
	109		15	8.5	70	194	136	1.44	1.48	0.02	1.6	29.15	1.2
	117		15	20	20	503	99	1.44	1.48	0.02	1.6	29.93	0.5
	119		15	30	20	825	163	1.44	1.48	0.02	1.6	29.93	0.9
Instrumented 200 series	201	Aluminum	15	8.5	20	189	37	1.41	1.48	0.03	1.6	28.78	0
	203	Stainless Steel	15	8.5	20	197	39	1.44	1.48	0.02	1.6	45.5	0
	205		15	12	20	285	56	1.44	1.48	0.02	1.6	45.5	0
	207		15	12	20	271	53	1.4	1.48	0.02	1.6	45.5	0
	217		15	20	20	503	99	1.44	1.48	0.02	1.6	40.35	0.5
	219		15	30	20	825	163	1.44	1.48	0.02	1.6	40.35	0.9
Fueled Follower Control Rods (FFCR) (300 series)	303	Stainless Steel	15	8.5	20	163	32	1.31	1.35	0.02	1.6	44	0
	305		15	12	20	237	47	1.31	1.35	0.02	1.6	44	0
	317		15	20	20	418	82	1.31	1.35	0.02	1.6	44	0.5
	319		15	30	20	685	135	1.31	1.35	0.02	1.6	44	0.9
Cluster rods (400 series)	403	Stainless Steel	15	8.5	20	166	33	1.37	1.41	0.02	1.6	30.38	0
	405		15	12	20	243	48	1.37	1.41	0.02	1.6	30.38	0
	417		15	20	20	427	85	1.37	1.41	0.02	1.6	30.38	0.5
	419		15	30	20	710	141	1.37	1.41	0.02	1.6	30.38	0.9
Instrumented cluster rods (500 series)	503	Stainless Steel	15	8.5	20	166	33	1.34	1.41	0.02	1.6	45.5	0
	505		15	12	20	243	48	1.34	1.41	0.02	1.6	45.5	0
	517		15	20	20	427	85	1.34	1.41	0.02	1.6	45.5	0.5
	519		15	30	20	710	141	1.34	1.41	0.02	1.6	45.5	0.9

[1] General Atomics catalog numbers are not necessarily unique. TRIGA elements with the same ID could have different fuel parameters. Table 1.4 includes two variants of the Type 101 element.

[2] Outer Diameter.

[3] Overall length includes 0.25 inches for irradiation growth.

5.(b)(1) (iv) Type and form of material - *Irradiated TRIGA fuel elements* (continued)

The maximum length of a TRIGA fuel element, including irradiation growth, is 45.50 inches. For all fuel elements, stainless steel spacers are utilized within the TRIGA baskets. The bounding weight of any TRIGA fuel element is 10 lb. The maximum decay heat per element is 20 W. The number of TRIGA rods per element is 1. Table 1.5 includes parameters for irradiated TRIGA fuel.

Table 1.5. Maximum Burnup and Minimum Cooling Time for TRIGA Fuel Elements[4]

TRIGA Fuel Type (Enrichment)	Maximum Burnup (MWD)	Minimum Cooling Time (days)
101 (8.0%)	23	90
201/101 (8.5%)	26	90
109	88	350
	70	250
	52	170
	34	90
203/103	27	90
205/105	39	120
	33	90
207/107	38	120
	33	90
217/117	71	280
	52	180
	34	90
219/119	122	600
	91	370
	63	220
	34	90
303	22	90
305	32	90
317	58	210
	46	150
	34	90
319	97	420
	76	290
	55	180
	34	90
503/403	23	90
505/405	33	90
517/417	60	220
	47	150
	34	90
519/419	101	430
	79	290
	56	180
	34	90

[4] Based on an in-core residence time of 4 years resulting on a decay heat less than or equal to 20 W. Not applicable to fuel with an in-core residence time less than 4 years with a decay heat greater than 20 W.

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

(v) *PULSTAR Fuel*. Table 1.6 includes the characteristics of the PULSTAR fuel. A 5×5 array of fuel rods enclosed within a rectangular can. Each fuel rod contains cylindrical uranium oxide fuel pellets. The weight of a PULSTAR element is 48 lb, including a spacer pedestal. The maximum heat load of the square fuel basket per compartment is 30 W.

Table 1.6. Characteristics of PULSTAR Fuel

Parameter	Value
Nominal ^{235}U Enrichment (%)	4.0/6.0
Fuel matrix	UO_2
Maximum burnup (MWD/MTU)	20,000
Decay time (years)	1.5
Maximum fuel pellet diameter (in.)	0.423
Minimum cladding thickness (in.)	0.0185
Cladding material	Zirconium alloy
Maximum cladding OD (in.)	0.474
Maximum active fuel length (in.)	24.1
Fuel rod pitch X (in.)	0.607
Fuel rod pitch Y (in.)	0.525
Box outer dimensions (in.)	3.15 x 2.74
Box thickness (in.)	0.06
Box material	Zirconium alloy
*Maximum overall length (in.)*①	38.23

Note: Maximum length includes 0.25 in. for irradiation growth.

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

(vi) *Square Fuel and Loose Plates (excluding PULSTAR)*. Table 1.7 includes the main characteristics of square fuel and square-loose-plate fuel. These types of fuel have a square, or nearly square-rectangular cross section. The flat-type fuels consist of either a uranium-oxide dispersion or uranium-silicide dispersion meat in an aluminum matrix, bonded with an aluminum alloy cladding. The maximum heat load of the square fuel basket per compartment is 30 W.

Table 1.7. Square Plate Fuel Characteristics

Parameter	RINSC	Ohio State	Miss. S&T	U-Florida	Purdue	U-Mass (Al)	U-Mass (Si)
^{235}U loading (g)	275±7.7	200±5.6	225±6.3	175±4.9	129.92±2.52	167±3.3	200±5.6
Nominal ^{235}U enrichment (%)	19.75	19.75	19.75	19.75	19.75	19.75	19.75
Fuel matrix	U_3Si_2+Al	U_3Si_2+Al	U_3Si_2+Al	U_3Si_2+Al	U_3Si_2+Al	UAl_x	U_3Si_2+Al
Maximum burnup per fuel element (MWD)	52.5	64.0	74.0	87.0	0.57	9.7	9.7
Minimum decay time (D)	120	120	365	120	120	1,000	1,000
Nominal fuel meat width (in.)	2.395	2.395	2.395	2.395	2.395	2.320	2.395
Nominal fuel meat thickness (in.)	0.02	0.02	0.02	0.02	0.02	0.03	0.02
Nominal fuel plate thickness (in.)	0.05	0.05	0.05	0.05	0.05	0.06	0.05
Nominal active fuel length (in.)	23.25	23.25	23.25	23.25	23.25	23.25	23.25
Number of fuel plates	22	16	18	14	14	18	16
Maximum channel spacing (in.)	0.099	0.127	0.139	0.117	0.175	0.119	0.122
Weight (lb)	14	12	14	10	10	12	12
Maximum overall length (in.) ④	39.75	35.25	34.50	27.38	32.49	39.75	39.75
Maximum cross section (in.)	3.097×3.097	3.05×3.05	3.036×3.212	2.9×2.424	3.011×3.011	3.097×3.097	3.097×3.097
Loose plate ④⑤	no	no	no	yes②	yes③	yes①	no

Notes:
1. U-Mass (Al) loose plates have a ^{235}U loading of 9.28 ± 0.18g and dimensions of 2.78 inches wide by 24.88 inches long.
2. U-Florida loose plates have a ^{235}U loading of 12.5 ± 0.35g and dimensions of 2.85 inches wide by 25.88 inches long.
3. Purdue loose plates have a ^{235}U loading of 9.28 ± 0.18g and dimensions of 2.85 inches wide by 25.88 inches long.
4. Maximum length includes 0.25 inches for irradiation growth.
5. Loose plates shall be extracted from fuel elements that meet the per-element burnup limits provided in this table.

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

(vii) *Isotope Production Targets*. Targets are irradiated in nuclear reactors to produce Co-60 and may be made of aluminum and contain a large quantity of small pellets, or they may consist of a cylindrical rod of cobalt material inside a stainless steel tube. All targets must be placed into target holders prior to loading into the basket. There are two different payload types:

1. *Payload Type 1*. Type 1 consists primarily of higher-activity targets of a newer design, which may also include lower-activity targets as described under Payload Type 2. The pellets are arranged in several stacks in an annular configuration within the target body. Payload Type 1 consists of up to 10 targets, which must be loaded in the inner row of basket holes, and be arranged using a loading plan into five zones of two holes each. The maximum activity in any zone is 22,000 Ci. A loading collar must be installed to block access to the outer row of holes before loading payload Type 1 targets. Table 1.8 includes the characteristics of payload type 1 of the isotope production targets.

Table 1.8. Characteristics of Isotope Production Targets, Payload Type 1

Parameter	Value
Target Diameter	1/2 inches
Target Length	16 inches
Cladding Material	6061-T6 aluminum alloy
Target Contents	6,000 pellets (approximately)
Pellet Size	1mm diameter × 1mm thick
Maximum Activity	up to 14,100 Ci, Co-60
Payload Quantity	10 targets
Total Activity	up to 82,000 Ci

2. *Payload Type 2*: Type 2 consists of lower-activity targets of an older design, which include:

   A. Design in which an aluminum core rod holds pellets placed in dimples on the outer surface and which are retained by a close-fitting outer sleeve, welded to the core rod on each end and

   B. Design using a solid rod of cobalt inside a stainless steel tube with welded ends.

   Table 1.9 includes the characteristics of payload type 2 of the isotope production targets.

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

Table 1.9. Characteristics of Isotope Production Targets, Payload Type 2

Parameter	Value
Target Diameter	5/8 inches (pellet design) 5/16 inches (solid rod design)
Target Length	Up to 16.5 inches
Cladding Material	Aluminum alloy 6061-T6 (pellet design) Stainless steel (solid rod design)
Target Contents	Approximately 5,500 pellets or one solid or segmented rod of cobalt metal
Pellet Size	1 mm diameter x 1 mm thick
Maximum Activity	Up to 4,000 Ci, Co-60
Payload Quantity	20 targets
Total Activity	Up to 80,000 Ci

(viii) *Irradiated fuel rods*. The irradiated fuel rod payload consists of up to the equivalent of four commercial irradiated fuel rods with a minimum enrichment of 4.7385% and a maximum burnup of 73,225 MWD/MTU. Each full-length rod may contain up to 1,573.5 grams of uranium and has an active fuel length of 152.9 inches. The fuel pellet diameter is 0.315 inches, and the cladding material is Zircaloy-4. Table 1.2-5 “Irradiated Fuel Rod Gamma Spectrum Per Full Length Rod” provides gamma source strength limits at given gamma energies likely in the payload. Table 1.2-6 “Irradiated Fuel Rod Neutron Spectrum Per Full Length Rod” provides neutron source strength limits at given neutron energies likely in the payload.

(ix) *Irradiated metal*. The irradiated metal payload consists of up to 350 lb of radioactive metal and may include both activation of the solid material and a layer of surface contamination. The payload may include commercial reactor surveillance samples containing small dosimeter wires made using uranium and neptunium. The decay heat is bounded by a value of 120 W. Table 1.2-7 in the application provides Irradiated Metal Gamma Source limits. The values in this table provide maximum source strengths at different gamma energies likely in the payload. Neutron emission for each payload must be less than $1x10^5$ neutrons/sec.

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

(i) For the contents described in 5(b)(1)(i): 8 irradiated MURR fuel elements. Only one fuel element is allowed per basket location.

(ii) For the contents described in 5(b)(1)(ii): 8 irradiated MITR-II fuel elements. Only one fuel element is allowed per basket location.

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

(iii) For the contents described in 5(b)(1)(iii): 8 irradiated ATR fuel elements. Only one fuel element is allowed per basket location.

(i) For the contents described in 5(b)(1)(iv): 19 irradiated TRIGA fuel elements. Only one fuel element is allowed per basket location. There are 26 types of TRIGA fuel.

(ii) For the contents described in 5(b)(1)(v): 8 irradiated PULSTAR fuel elements. Only one fuel element is allowed per basket location.

(iii) For the contents described in 5(b)(1)(vi): 8 irradiated square fuel elements or loose plate boxes. Only one fuel element or loose plate box is allowed per basket location (i.e., compartment). Up to 31 loose plates may be placed in each loose plate box.

(iv) *Plutonium Quantity*. The maximum quantity of plutonium in the BRR package is 6,500 Ci (at 4% ^{235}U enrichment of PULSTAR fuel).

(v) For the contents described in 5(b)(1)(vii)(1), 10 target holders. For payload type 1, up to 10 target holders may be placed into the inner row of holes in the isotope basket.

(vi) For the contents described in 5(b)(1)(vii)(2), 20 target holders. For payload Type 2, up to 20 target holders may be placed into any of the 20 holes in the isotope basket.

(vii) For the contents described in 5(b)(1)(viii), 12 segmented irradiated fuel rods.

(viii) For the contents described in 5(b)(1)(ix), 350 lb of irradiated metal.

(c) Criticality Safety Index (CSI): 0

6. In addition to the requirements of Subpart G of 10 CFR Part 71:

(a) Each package shall be operated and prepared for shipment in accordance with Chapter 7 of the application, as supplemented

(i) For TRIGA fuel, spacer pedestals shall be used as described in Table 7.1-2 of the application.

(ii) For PULSTAR fuel, spacer pedestals shall be used as described in Table 7.1-1 of the application.

(iii) For square fuel and loose plates, spacer pedestals shall be used as described in Table 7.1-1 of the application.

(iv) When shipping loose plates, use aluminum dunnage sheets to reduce the free space between the flat face of the loose plates and the box opening to a value of ¼ inches or less. The dimensions of the dunnage sheets shall be as shown in Figure 7.1-1 of the application.

6.(a) In addition to the requirements of Subpart G of 10 CFR Part 71 (continued)

(v) For isotope production targets, a personnel barrier shall be used as described in Section 7.1.4 of the application.

(vi) Up to six encapsulated fuel rod segments may be placed into any single opening of the ATR basket. A removable stainless steel mesh screen will be placed in the bottom of each cavity which is used to hold the encapsulated rods.

(vii) Irradiated metal must be shipped using the canister shown in Drawing 1910-01-03-SAR, Rev. 8 of the application. Up to 200 lb of metallic fixturing or dunnage may be added to stabilize the contents.

(b) Each package shall be acceptance tested and maintained in accordance with Chapter 8 of the application.

7. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR 71.17.

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

9. Revision No. 9 of the certificate may be used until October 31, 2023.

10. Expiration date: February 28, 2025.

REFERENCES

Orano Federal Services LLC application dated November 8, 2021, as supplemented on June 27, 2022.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Yoira Y. Diaz Sanabria Signed by Diaz-Sanabria, Yoira
on 09/29/22

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

Date: September 29, 2022