



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 88TH AIR BASE WING (AFMC)  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

19 March 2014

MEMORANDUM FOR 36 SFS/S3T  
Attention: TSgt. Scottie Boyd  
Unit 14013  
APO, AP 96543-4013

FROM: 88 ABW/CEIEC  
Air Force Radioactive Recycling and Disposal (AFRRAD)  
1450 Littrell Road  
Wright-Patterson AFB, OH 45433

SUBJECT: Excess Radioactive Material Control No.: AFS14-084

1. The subject Control Number has been assigned to your request 19 March 2014 to transfer excess radioactive material. This number must be annotated on all correspondence, forms, shipping documents, requests for further instructions, and on the shipment package(s).
2. The items described on the attached Shipment Quality Assurance Checklist have been identified as acceptable to transfer.
3. Certification is hereby made, in accordance with 10 CFR 30.41, 10 CFR 40.51 and AFI 40-201, as applicable, that 88 ABW/CEIEC is authorized receipt of the requested radioactive material pursuant to USAF Radioactive Material Permit Number OH-00472-03/XXAFP (expiration date, 31 May 2018), issued by the USAF Radioisotope Committee (RIC) under the authority of the US Nuclear Regulatory Commission (USNRC) Master Material License Number 42-23539-01AF. This office will notify the USNRC of any General Licensed device transfer. Information required for this notification can be found in 10 CFR Part 31.5(c)(8)
4. Shipping instructions and a Quality Assurance Checklist for this consignment are attached and shall be followed. You have 45 days from the date of this letter to ship the material to Wright-Patterson AFB, OH. No materials or items may be added to this consignment without prior authorization from this office.
5. If you have any questions pertaining to this shipment feel free to e-mail AFRRAD @wpafb.af.mil or call DSN 787-2010, commercial 937-257-2010 or by cell (937)269-4487.

A handwritten signature in blue ink, appearing to read "Christopher L. Anthony", is positioned above the typed name.

CHRISTOPHER L. ANTHONY  
Physical Scientist  
Air Force Radioactive Recycling and Disposal

Attachments:

1. Shipping Instructions
2. Shipping QA Checklist

**PACKAGING INSTRUCTIONS**  
**AFRRAD CONTACT INFORMATION**  
**DSN 787-2010 {(937)257-2010}; DSN 785-1852 {(937) 255-1852};**  
**24 Hour Cell (937) 269-4487**

1. All radioactive material authorized shipment to AFRRAD must be packaged and shipped in accordance with U.S. Department of Transportation (DOT), Title 49 Code of Federal Regulations. Attached to this instruction sheet is a Quality Assurance Checklist developed by this office to assist you in compliance with excepted package shipments.
2. Materials packaging:
  - a. **Non-radioactive** components associated with radioactive material sources must be removed prior to shipping. **DO NOT** ship any non-radioactive hazardous items, i.e. NiCd batteries
    - COMPASSES** – Remove all lanyards (strings), carrying cases and condition code tags. **DO NOT** individually bubble, plastic, fiber paper, etc. wrap each compass. Filling void spaces in the package will protect the compasses while in transit.
    - SMOKE DETECTORS** – Keep all smoke detectors intact, as received from the manufacturer. Any external wiring and batteries may be removed.
    - EXIT SIGNS** – Keep all exit signs intact, as received from the manufacturer. **DO NOT** remove any manufacturer applied labels or covers. Mounting brackets may be removed if there is no risk of damaging the sign
    - CHECK SOURCES** – **DO NOT** ship any check source with the radiation detection instrument (RADIAC). Only the radioactive check sources will be accept unless specific approval is granted by AFRRAD to include the RADIAC with the shipment.
  - b. If the material you are shipping is stored in the source manufacturer approved, supplied shielded container (pig), you may package the “pig” within the shipping container.
  - c. **DO NOT** attach condition code cards to any items being shipped, you may include loosely within the package.
  - d. **DO NOT** individually plastic or bubble wrap compasses, smoke detectors, chemical agent detector cells.
  - e. Package items within the shipping container to minimize shifting during transport. **Do not** use dispersible packing materials (i.e. Styrofoam peanuts, vermiculite, etc.). **Bubble wrap packing material is preferred.**
  - f. The gross weight of any individual package shipped for recycling must not exceed 200 pounds. Exceptions may be granted for Depleted Uranium (DU).
  - g. If shipping by drum, use drums with a capacity 30-gallons or less, such as NSN-8110-01-454-1841.
3. When your shipment arrives at WPAFB, it will inspect to ensure compliance with DOT requirements. Packages are opened to verify that the contents agree with what was specified on the authorization letter. Any radioactive material received, which was not approved for shipment, will be returned to your facility and a notice to the USAF Radioisotope Committee (USAF RIC) will be made. This office will send a written report documenting what materials were received and any shipping discrepancies, if any, to you. If a 10 CFR 31.5 item is transferred, 88 ABW/CEIEC will make the notification to Nuclear Regulatory Commission.
4. Enclose a completed copy of the Shipping QA Checklist in each package. Any assistance in completing this checklist can be obtained by contacting AFRRAD.
5. Mark the outside of each package with the authorization number listed in the Subject Line of this letter.
6. Make sure your Installation Radiation Safety Officer, Bioenvironmental Engineer, notified of this shipment.
7. The following addresses should be used:

Package Shipment	Correspondence
<b>DODAAC: FH2300</b> AF Radioactive Recycle and Disposal 1400 Air Freight Road, Bldg 143 Wright-Patterson AFB, OH 45433	AF Radioactive Recycle and Disposal 88 ABW/CEIEC Bldg. 30022 1450 Littrell Road Wright-Patterson AFB, OH 45433



U.S. AIR FORCE

WPAFB RADIATION MANAGEMENT BRANCH

88 ABW/CEIEC

Wright-Patterson AFB, OH 45433-5332

IAEA Safety Standards Series Requirements TS-R-1 (2005 Edition)

Date: \_\_\_\_\_

Shipper: 36 SFS/S3T, Andersen AFB, GU Control #: AFS14-084

Destination: AFRRAD, 1400 Air Freight Road, Bldg 143, Area A Wright-Patterson AFB, OH 45433

Item Description	Radionuclide	Activity Each	Number of Items	Total Activity
Vaportracer	<sup>63</sup> Ni	10 mCi	4	40 mCi

Instrument Used: Mfrg: \_\_\_\_\_ Model: \_\_\_\_\_ S/N: \_\_\_\_\_ Cal Date: \_\_\_\_\_

Highest Package Surface (all sides) Measurement: \_\_\_\_\_ mR/hr

Person Completing Checklist: \_\_\_\_\_ Signature: \_\_\_\_\_

PACKAGES and PACKAGING (General Requirements (§ 606-616))

YES NO

- 1. Designed in relation to its mass, volume and shape that it can be easily and safely handled and transported.
- 2. Designed so it can be properly secured in or on the conveyance during transport.
- 3. Design such that any lifting attachments on the package will not fail.
- 4. Packaging is such that the external surfaces are free from protruding features and can be easily decontaminated.
- 5. The outer layer of the package is so designed as to prevent the collection and retention of water.
- 6. Package capable of withstanding the effects encountered in transport.
- 7. Securing devices are designed to prevent them from becoming loose or being released unintentionally.

CONTENTS LIMITS FOR EXCEPTED PACKAGES

YES NO

- 1. Is the material enclosed in or included as a component part of an instrument or other manufactured article: INSTRUMENT OR ARTICLE (§409(a)).
  - a. Radiation level at 10 cm from external surface of any unpackaged instrument or article is not greater than 0.1 mSv/hr (10 mrem/hr). (§517(a)).
  - b. Each Instrument or Article (except radioluminescent time-pieces or devices) bears the marking "Radioactive". (§517(b)).
  - c. Consumer products need not be marked Radioactive, provided internal surface of the package bears the marking "Radioactive" such that is visible on opening the package. (§517(b)(ii))
  - d. Item limit: Permissible Item Activity: \_\_\_\_\_ Actual Maximum Item Activity: \_\_\_\_\_  
 Package limit: Permissible Package Limit: \_\_\_\_\_ Actual Package Activity: \_\_\_\_\_
- 2. If the material is not enclosed or another manufactured article, the following apply: LIMITED QUANTITY (§409(b)).
  - a. The package retains its contents under routine conditions of transport. (§518(a)).
  - b. The internal surface of the package bears the marking "Radioactive" such that is visible on opening the package. (§518b)).
  - c. Package limit: Permissible Package Limit: \_\_\_\_\_ Actual Package Activity: \_\_\_\_\_

REQUIREMENTS AND CONTROLS FOR EXCEPTED PACKAGES

YES NO

- 1. Package Marking (§535-537)
  - a. Each package durably marked on the outside with either the cosignor or consignee or both. (§535).
  - b. United Nations Number preceded by the letters "UN". (UN2910 for Limited Quantities; UN2911 for Instruments or Articles). (§536).
  - c. Gross mass exceeding 50 kgm (110 lbs) durably marked on the outside of the package. (§537).
- 2. Other dangerous properties are taken into account. (§507).
- 3. The radiation level at any point on the external surface of the package shall not exceed 5 µSv/hr (0.5 mrem/hr). (§516).
- 4. The non-fixed radioactive contamination on any external surface of the package shall not exceed 4 Bq/cm<sup>2</sup> (10<sup>-4</sup> µCi beta-gamma) and 0.4 Bq/cm<sup>2</sup> (10<sup>-5</sup> µCi/cm<sup>2</sup> alpha) when averaged over any area of 300 cm<sup>2</sup>. (§508).
- 5. The transport document includes: The appropriate United Nations Number. (§550(c)).

COMMENTS

### QUANTITIES FOR SELECTED RADIONUCLIDES

(IAEA Safety Standards Series No. TS-R-1, Section IV, Table I)

Radionuclide	A <sub>1</sub> (TBq)	A <sub>2</sub> (TBq)	Exempt Exempt Concentration (Bq/gm)	Exempt Activity (Bq)
<sup>241</sup> Am	10	0.001	1	1E4
<sup>14</sup> C	40	3	1E4	1E7
<sup>109</sup> Cd	30	2	1E4	1E6
<sup>57</sup> Co	10	10	100	1E6
<sup>60</sup> Co	0.4	0.4	10	1E5
<sup>137</sup> Cs	2	0.6	10	1E4
<sup>3</sup> H	40	40	1E6	1E9
<sup>125</sup> I	20	3	1000	1E6
<sup>192</sup> Ir	1	0.6	10	1E4
<sup>85</sup> Kr	10	10	1E5	1E4
<sup>63</sup> Ni	40	30	1E5	1E8
<sup>147</sup> Pm	40	2	1E4	1E7
<sup>210</sup> Po	40	0.02	10	1E4
<sup>239</sup> Pu	10	0.001	1	1E4
<sup>226</sup> Ra	0.2	0.003	10	1E4
<sup>187</sup> Re	Unlimited	Unlimited	1E6	1E9
<sup>90</sup> Sr	0.3	0.3	100	1E4
<sup>232</sup> Th	Unlimited	Unlimited	10	1E4
Th (Nat)	Unlimited	Unlimited	1	1000
<sup>238</sup> U	Unlimited	Unlimited	10	1E4
U (depleted)	Unlimited	Unlimited	1	1000
U (Nat)	Unlimited	Unlimited	1	1000

### OTHER DEFINITIONS

A<sub>1</sub> shall mean the activity of special form radioactive material and A<sub>2</sub> shall mean the activity of radioactive material other than special form radioactive material.

COSIGNEE – shall mean any person, organization or government which receives a consignment.

CONSIGNMENT – shall mean any package or packages, or load of radioactive material, presented by a consignor for transport.

CONSIGNOR – shall mean any person, organization or government which prepares a consignment for transport, and is named as consignor in the transport documents.

LOW TOXICITY ALPHA EMITTERS – natural uranium; depleted uranium; natural thorium; uranium-235 or uranium 238; thorium 232; thorium-228 and thorium –230 when contained in ores or physical and chemical concentrates; or alpha emitters with a half-life of less than 10 days.

SPECIAL FORM RADIOACTIVE MATERIAL – means either an indispersible solid radioactive material or a sealed capsule containing radioactive material

### Activity Limits For EXCEPTED PACKAGES

(IAEA Safety Standards Series No. TS-R-1, Section IV, Table III)

PHYSICAL STATE OF CONTENTS	INSTRUMENT & ARTICLES		MATERIALS
	Item Limits*	Package Limits*	Package Limits*
<b>SOLIDS</b>			
Special Form	10 <sup>-2</sup> A <sub>1</sub>	A <sub>1</sub>	10 <sup>-3</sup> A <sub>1</sub>
Other Form	10 <sup>-2</sup> A <sub>2</sub>	A <sub>2</sub>	10 <sup>-3</sup> A <sub>2</sub>
<b>LIQUIDS</b>			
Liquids	10 <sup>-3</sup> A <sub>2</sub>	10 <sup>-1</sup> A <sub>2</sub>	10 <sup>-4</sup> A <sub>2</sub>
<b>GASES</b>			
Tritium	2x10 <sup>-2</sup> A <sub>2</sub>	2x10 <sup>-1</sup> A <sub>2</sub>	2x10 <sup>-2</sup> A <sub>2</sub>
Special Form	10 <sup>-3</sup> A <sub>1</sub>	10 <sup>-2</sup> A <sub>1</sub>	10 <sup>-3</sup> A <sub>1</sub>
Other Form	10 <sup>-3</sup> A <sub>2</sub>	10 <sup>-2</sup> A <sub>2</sub>	10 <sup>-3</sup> A <sub>2</sub>
<b>NOTES:</b>			
* For mixture of Radionuclides, see §404-406			

### PACKAGE RADIATION LEVEL LIMITS

(IAEA Safety Standards Series No. TS-R-1)

**LIMITED QUANTITY** = ≤ 0.5 mrem/hr on any surface.

**INSTRUMENTS & ARTICLES** = ≤ 0.5 mrem/hr on any surface. ≤ 10 mrem/hr at 4 inches from external surface of instrument.)

### REMOVABLE EXTERNAL PACKAGE CONTAMINATION LIMITS

(averaged over 300 cm<sup>2</sup>)

(IAEA Safety Standards Series No. TS-R-1, §508)

#### External Surfaces

<u>EXCEPTED PACKAGES</u>	<u>Bq/cm<sup>2</sup></u>	<u>dpm/cm<sup>2</sup></u>
Beta and gamma emitters and low toxicity alpha emitters	4.0	220.0
All other alpha emitting radionuclides	0.4	22.0

### WORKSHEET

Item Activity \_\_\_\_\_ μCi X 0.037 MBq/μCi = \_\_\_\_\_ MBq

Item Activity \_\_\_\_\_ MBq X 10<sup>-6</sup> TBq/MBq = \_\_\_\_\_ TBq