



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING
WRIGHT-PATTERSON AIR FORCE BASE OHIO

12 August 2014

MEMORANDUM FOR 36 SFS/S3T
Attention: TSgt Scottie Boyd
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 Authorization No.: AFS14-286

1. The subject Authorization Number has been assigned to your request 11 August 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. Device Turn-In Instructions, Packaging Instructions and a Shipment 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 email us at AFRRAD@us.af.mil or call DSN 787-2010, commercial 937-257-2010 or by cell (937)269-4487.

A handwritten signature in cursive script, reading "Richard Baumann", is positioned above the typed name.

RICHARD BAUMANN
Health Physicist
Air Force Radioactive Recycling and Disposal

Attachments:

1. Packaging Instructions
2. Shipment 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 to be shipped 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. For Type A package shipments, contact us direct. Our SharePoint site is :
<https://cs3.eis.af.mil/sites/OO-MS-MC-05/default.aspx>
2. Materials packaging:
 - a. **Non-radioactive** components associated with APD/Sabre 2000/4000; Ionscans must be removed prior to shipping. **DO NOT** ship any non-radioactive hazardous items, i.e. NiCd batteries, carrying straps, simulants. Ship only the device that contains the radioactive source.
 - b. **DO NOT** attach condition code cards to any items being shipped, you may include loosely within the package.
 - c. **DO NOT** individually plastic or bubble wrap items.
 - d. Package items within the shipping container to minimize shifting during transport. **Do not** use dispersible packing materials (i.e. Styrofoam peanuts, vermiculite, etc.)
 - e. The gross weight of any individual package shipped for recycling must not exceed 200 pounds. Exceptions may be granted by contacting AFRRAD.
3. When your shipment arrives at WPAFB, it will be inspected 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 shipping discrepancies, if any, to the requestor. If a 10 CFR 31.5 item is transferred, AFRRAD will make the notification to Nuclear Regulatory Commission.
4. **Enclose a completed copy of the Shipment Quality Assurance Checklist in each package. 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, is notified of this shipment.
7. The following addresses should be used:

Package Shipment	Correspondence
DODAAC: FH2300 AF Radioactive Recycling and Disposal 1400 Air Freight Road, Bldg. 143 Wright-Patterson AFB, OH 45433	AF Radioactive Recycling and Disposal 88 ABW/CEIEC, Bldg. 22 1450 Littrell Road Wright-Patterson AFB, OH 45433

Excepted Package
IAEA Specific Safety Requirements SSR-6 (2012 Edition)
AIR FORCE RADIOACTIVE RECYCLING AND DISPOSAL OFFICE
SHIPMENT QUALITY ASSURANCE CHECKLIST

June 2014

Date: _____ Shipper: 36 SFS/S3T, APO, AP Authorization No.: AFS14-286
 Destination: AFRRAD, 1400 Air Freight Road, WPAFB, OH 45433

Item Description	Radionuclide	Activity Each	Number of Items	Total Activity
Vaportracer	⁶³ Ni	10.0 mCi	4	40.0 mCi

Instrument Used: Mfgr: _____ Model: _____ S/N: _____ Cal Date: _____

Radiation Survey Results: Background: _____ mR/hr Package Surface: _____ mR/hr

Person Completing Checklist: _____ Signature: _____

PACKAGES and PACKAGING (General Requirements (§ 607-622))

- 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 (§423).
- 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). (§423(a)).
- b. Each Instrument or Article (*except radioluminescent time-pieces or devices*) bears the marking "Radioactive". (§423(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. (§423(b)(ii))
- d. Item limit: Permissible Item Activity: 0.30 TBq (8.1 Ci) Actual Maximum Item Activity: 0.00037 TBq (10 mCi)
 Package limit: Permissible Package Limit: 30 TBq (810 Ci) Actual Package Activity: 0.00111 TBq (30 mCi)
2. If the material is not enclosed or another manufactured article, the following apply: LIMITED QUANTITY (§424).
- a. The package retains its contents under routine conditions of transport. (§424(a)).
- b. The internal surface of the package bears the marking "Radioactive" such that is visible on opening the package. (§424(b)).
- c. Package limit: Permissible Package Limit: _____ Actual Package Activity: _____

REQUIREMENTS AND CONTROLS FOR EXCEPTED PACKAGES

- YES NO
1. Package Marking (§531-533)
- a. Each package durably marked on the outside with either the consignor or consignee or both. (§531).
- b. United Nations Number preceded by the letters "UN". (UN2910 for Limited Quantities; UN2911 for Instruments *or* Articles). (§532).
- c. Gross mass exceeding 50 kgm (110 lbs) durably marked on the outside of the package. (§533).
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/cm² (10⁻⁴ µCi beta-gamma) and 0.4 Bq/cm² (10⁻⁵ µCi/cm² alpha) when averaged over any area of 300 cm². (§508).
5. The transport document includes: The appropriate United Nations Number. (§546(a)).
6. The transport document includes a signed declaration: "It is declared that the packing of the goods into the container/vehicle has been carried out in accordance with the applicable provisions". (§552).

QUANTITIES FOR SELECTED RADIONUCLIDES

(IAEA Specific Safety Requirements SSR-6, Section IV, Table 2)

Radionuclide	A ₁ (TBq)	A ₂ (TBq)	Exempt Concentration (Bq/gm)	Exempt Activity (Bq)
²⁴¹ Am	10	0.001	1	1E4
¹³³ Ba	3	3	1E2	1E6
¹⁰⁹ Cd	30	2	1E4	1E6
⁵⁷ Co	10	10	100	1E6
⁶⁰ Co	0.4	0.4	10	1E5
¹³⁷ Cs	2	0.6	10	1E4
³ H	40	40	1E6	1E9
¹²⁵ I	20	3	1000	1E6
⁵⁴ Mn	1	1	10	1E6
²² Na	0.5	0.05	10	1E6
⁶³ Ni	40	30	1E5	1E8
¹⁴⁷ Pm	40	2	1E4	1E7
²¹⁰ Po	40	0.02	10	1E4
²³⁹ Pu	10	0.001	1	1E4
²²⁶ Ra	0.2	0.003	10	1E4
¹⁸⁷ Re	Unlimited	Unlimited	1E6	1E9
⁹⁰ Sr	0.3	0.3	100	1E4
²³² Th	Unlimited	Unlimited	10	1E4
Th (Nat)	Unlimited	Unlimited	1	1000
²³⁸ U	Unlimited	Unlimited	10	1E4
U (depleted)	Unlimited	Unlimited	1	1000
U (Nat)	Unlimited	Unlimited	1	1000

OTHER DEFINITIONS

A₁ shall mean the activity of special form radioactive material and A₂ 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 Specific Safety Requirements SSR-6, Section IV, Table 4)

PHYSICAL STATE OF CONTENTS	INSTRUMENT & ARTICLES		MATERIALS
	Item Limits*	Package Limits*	Package Limits*
SOLIDS			
Special Form	10 ⁻² A ₁	A ₁	10 ⁻³ A ₁
Other Form	10 ⁻² A ₂	A ₂	10 ⁻³ A ₂
LIQUIDS			
Liquids	10 ⁻³ A ₂	10 ⁻¹ A ₂	10 ⁻⁴ A ₂
GASES			
Tritium	2x10 ⁻² A ₂	2x10 ⁻¹ A ₂	2x10 ⁻² A ₂
Special Form	10 ⁻³ A ₁	10 ⁻² A ₁	10 ⁻³ A ₁
Other From	10 ⁻³ A ₂	10 ⁻² A ₂	10 ⁻³ A ₂
NOTES:			
* 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 cm²)

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

External Surfaces

<u>EXCEPTED PACKAGES</u>	<u>Bq/cm²</u>	<u>dpm/cm²</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 3.7 X 10⁻⁸ TBq/μCi = _____ TBq

Item Activity _____ mCi X 3.7 X 10⁻⁵ TBq/mCi = _____ TBq

Item Activity _____ MBq X 27.027 μCi/MBq = _____ μCi

Item Activity _____ MBq X 0.027 mCi/MBq = _____ mCi