



Research Reactor Center

University of Missouri

1513 Research Park Drive
Columbia, MO 65211

PHONE 573-882-4211

FAX 573-882-6360

WEB <http://web.missouri.edu/~murrwww>

January 7, 2009

Ms. Colleen Casey
Materials Licensing Branch
US Nuclear Regulatory Commission, Region III
2443 Warrensville Rd., Suite 210
Lisle, IL 60532-4352

Reference: License Number 24-00513-39
Control Number 317480

Dear Ms Casey,

The following information is provided in response to your request for more information dated December 10, 2008.

1. *Please submit a copy of acknowledgment of receipt from the appropriate vendor who took possession of your sources. The acknowledgement of receipt must show that the vendors received your sources and were appropriately licensed to take possession of these sources. They must also be signed and dated appropriately by vendor representative.*

Please also provide a copy of the most recent leak test for the sealed sources you possessed and transferred.

The sources were shipped to the Texas Engineering Experiment Station, Nuclear Science Center at the Texas A&M University on May 18, 1994, addressed to L. A. Krisanits, Health Physics Coordinator. Documentation of their receipt by the Nuclear Science Center on May 25, 1994, is provided in Attachment 1 of this letter. The documentation lists the isotopes and source serial numbers and is signed by L. Krisanits. A copy of the Texas Engineering Experiment Station, Facility Operating License No. R-83, Amendment 13, is provided as Attachment 2 of this letter. Amendment No.13 was current at the time of the shipment and shows that they were authorized to receive the radioactive material.

RECEIVED JAN 09 2009

The sources were leak tested on May 11, 1994, just a few days prior to shipment. Copies of those leak test reports are provided as Attachment 3 of this letter.

- 2. Please note that, at this time, I was unable to authorize the addition of americium-243 and plutonium-242 to your license because the information submitted in your letter dated November 25, 2008, was insufficient to complete my review.*

These radioisotopes that we have requested to be added to our license are to be used for our Mo-99 project associated with the potential production of Mo-99 for the national medical community. We have adopted a European Pharmacopeia Commission (EPC) test methods for Radionuclidic Purity of the Mo-99 product. The EPC method for determination of alpha emitting contaminants uses the non fission product isotopes Am-243 and Pu-242 as tracers. Essentially, the efficiency of recovery of alpha contaminants in testing of the Mo-99 product is gauged by following similar non-fission product tracers. Sub nano-Curie amounts of each tracer are used in the test.

Please evaluate your request again from a Decommissioning Financial Assurance perspective and provide us with a briefly detailed assessment that supports your assertion of no significant impact on your DFP or instrument.

A requirement to provide assurance of funds for decommissioning was established for reactor licenses in 10 CFR 50.33 (k)(2). The University of Missouri submitted to the NRC a statement of intent that the University would request appropriation of funds for decommissioning of the University of Missouri-Columbia Research Reactor (MURR) sufficiently in advance of decommissioning to prevent delay of required activities (letter dated June 29, 1990). As required by 10 CFR 50.75 (e)(2)(iv), a detailed cost estimate for decommissioning MURR was included with this statement of intent. In accordance with 10 CFR 50.33 (d), the letter also describes the means of adjusting the cost estimate and associated funding level periodically over the life of the facility. Since reactor licensed radioactive materials and materials licensed radioactive materials are accounted for separately but used in the same laboratory facilities, the detailed cost estimate for the MURR encompasses decommissioning of the entire facility irrespective of which license or registration authorizes the use of radioactive material. The most recent estimate for the cost of decommissioning of MURR was made in August, 2005.

Using the guidance of NUREG 1757, "Consolidated NMSS Decommissioning Guidance" Appendix A, page A-184, both of the isotopes requested above would not require financial assurance plans if possessed in the quantities requested. Thus, it is the assessment of the university that the addition of one μCi of americium-243 and one μCi of plutonium-242 will have an insignificant impact on our total decommissioning funding costs.

If you have any additional questions regarding our submittal, please do not hesitate to contact me.

Sincerely,



Ronald J. Dobey, Jr., CHP
Health Physics Manager/RSO

Reviewed and Approved



Ralph Butler, PE
Director

Attachments

NUCLEAR SCIENCE CENTER

INITIAL PROPERTY INVENTORY

11175
NSC Property No:

Source, Americium 241 Am-241
Physical Description: 2 units

Isotope Products Labs for
Manufacturer: Martins Marietta Energy

Radioactive: (T) / (F)

Am-241 2 units
Model No: / Part No:

438-23-2 293 mli ea
Serial No: 438-23-1

Nuclear Science Center
Supplier: from Univ. Missouri - Habach

05/25/94
Purchase Date: Cost:

Capital: (T) (F)

N TEES Property No: N TAMU Property No:

Calibrated: (T) (F)

N Next Due Date: 5/25/94 Assey Date:

Am-241
Isotope:

293 mli
Activity:

R83
License:

Items In Folder:

- | | |
|------------------------------|----------------------------|
| () Maint Manual: | () Operating Manual: |
| () Purchase Requisition: | () Warranty Card: |
| () Purchase Voucher: | () Service Agreement: |
| () Bid Report: | () Leak Test Certificate: |
| () Specifications | () Handling Instructions: |
| () Shippers Report: | () TBO Form: |
| () Analysis Of Uncertainty: | () Spare Parts: |

L. Krosanits
Manager Assigned:

304
Room No:

FSV
Location:

Floor
Area:

NSC Form 601
10/06/94
Approved: [Signature]

NUCLEAR SCIENCE CENTER

INITIAL PROPERTY INVENTORY

11174
NSC Property No: Source, Neptunium Np 237
Physical Description:

2 samples 200 uli

Tecapex Products Labs for
Manufacturer: Martin Marietta Energy Sys. Radioactive: (T) / (F)

Np-237 2 units
Model No: / Part No: 438-23-4 200uli
Z 893 0.7uli
Serial No:

Nuclear Science Center
Supplier: from Univ Missouri/Unibeck Purchase Date: 05/19/1994 Cost: _____

Capital: (T) (F) N TEES Property No: _____ TAMU Property No: _____

Calibrated: (T) (F) N Next Due Date: _____ Assey Date: 05/19/94

Np-237
Isotope: _____ Activity: 0.2 mli License: R83

Items In Folder:

- () Maint Manual:
- () Purchase Requisition:
- () Purchase Voucher:
- () Bid Report:
- () Specifications
- () Shippers Report:
- () Analysis Of Uncertainty:
- () Operating Manual:
- () Warranty Card:
- () Service Agreement:
- () Leak Test Certificate:
- () Handling Instructions:
- () TBO Form:
- () Spare Parts:

L. Krasnits
Manager Assigned: _____ Room No: 304 Location: F8V Area: Floor

NSC Form 6091
10/06/94
Approved [Signature]

NUCLEAR SCIENCE CENTER

INITIAL PROPERTY INVENTORY

11176
NSC Property No:

Source, Americium 243 Am-243
Physical Description: 2 units

Isotope Production Labs
Manufacturer: Martin Marietta Energy

Radioactive: (T) / (F)

Am-243 2 units
Model No: / Part No:

438-23-3
Serial No:
4-070

Nuclear Science Ctr
Supplier:
from Univ Missouri / Urbach

05/19/94
Purchase Date: Cost:

Capital: (T) (F)

D TEES Property No: N TAMU Property No:

Calibrated: (T) (F)

Next Due Date: 5/19/94
Assey Date:

Am-243
Isotope:

292.1 mg
Activity: 438-23-3
50 uLi
400 uLi 4-070
License: 283

Items In Folder:

- () Maint Manual:
- () Purchase Requisition:
- () Purchase Voucher:
- () Bid Report:
- () Specifications
- () Shippers Report:
- () Analysis Of Uncertainty:
- () Operating Manual:
- () Warranty Card:
- () Service Agreement:
- () Leak Test Certificate:
- () Handling Instructions:
- () TBO Form:
- () Spare Parts:

L. Kroschwitz
Manager Assigned:

304
Room No:

781
Location:

Flour
Area:

NSC Form 601
10/06/94
Approved: [Signature]

NUCLEAR SCIENCE CENTER

INITIAL PROPERTY INVENTORY

11177
NSC Property No: Source, Californium Cf-252
Physical Description: 3 units

Isilon Production Labs
Manufacturer: Martini Marietta Energy Radioactive: (T) / (F)

Cf-252 3 units
Model No: / Part No: 4-657 Z-192 FF
Serial No: Z-191 FF

Nuclear Science Ctr
Supplier: Univ Missouri / Unheals Purchase Date: 5/23/94 Cost: _____

Capital: (T) (F) N
TEES Property No: N TAMU Property No: N

Calibrated: (T) (F) N
Next Due Date: N Assey Date: N

Cf 252
Isotope: 97.6 uCi Activity: R83 License:

Items In Folder:

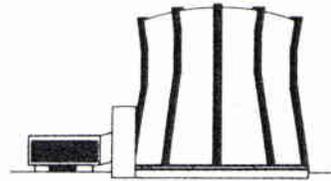
- () Maint Manual:
- () Purchase Requisition:
- () Purchase Voucher:
- () Bid Report:
- () Specifications
- () Shippers Report:
- () Analysis Of Uncertainty:
- () Operating Manual:
- () Warranty Card:
- () Service Agreement:
- () Leak Test Certificate:
- () Handling Instructions:
- () TBO Form:
- () Spare Parts:

L. Krizanits
Manager Assigned: 304 Room No: FSV Location: Floor Area:

NSC Form 601
10/06/94
Approved: [Signature]

TEXAS ENGINEERING EXPERIMENT STATION

TEXAS A&M UNIVERSITY
COLLEGE STATION, TEXAS 77843-3575



NUCLEAR SCIENCE CENTER
409/845-7551

11 April 1994

Ms. Susan M. Langhorst
University of Missouri
Research Reactor Facility
Research Park
Columbia, Missouri 65211

94-0098

Reference: Transfer of Radioactive Material

Dear Ms. Langhorst:

Mr. Habeeb H. Saleh's request for the transfer of radioactive material to the Nuclear Science Center, Texas Engineering Experiment Station, license is approved. A certificate containing the latest amendment information to the Facility Operating License (R-83) is attached for your records. Please directly forward a copy to me of all documents transferring radioactive material to this license.

Sincerely,

L. A. Krisanits
Health Physics Coordinator

LAK/ym

Attachment

BSC xc: Chrono File
17122/R-83
Faxed 4/18/94



Texas Engineering Experiment Station/

Texas A&M University System

Docket No. 50-128

Facility Operating License No. R-83

As Amended Through Amendment No. 13

Facility Operating License No. R-83 is hereby amended in its entirety to read as follows:

- A. This license applies to the TRIGA-type nuclear research reactor owned by the Texas Engineering Experiment Station/Texas A&M University System (the licensee), located on the campus of the Texas A&M University at College Station, Texas and described in the application for license renewal.
- B. Subject to the conditions and requirements incorporated herein, the Commission, hereby, licenses the Texas Engineering Experiment Station/Texas A&M University System:
 - (1) Pursuant to Section 104c of the Act and 10 CFR, Chapter I, Part 50, "Domestic Licensing of Production and Utilization Facilities," to possess, use and operate the reactor in accordance with the procedures and limitations described in the application and this license.
 - (2) Pursuant to the Act and 10 CFR, Chapter I, Part 70, "Domestic Licensing of Special Nuclear Material" to receive, possess and use up to 17.0 kilograms of contained uranium-235 in connection with operation of the reactor; and
 - (3) Pursuant to the Act and 10 CFR, Chapter I, Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," to receive, possess, and use in amounts as required, any byproduct material without restriction to chemical or physical form, for analysis or instrument calibration but not to separate such byproduct material as may be produced by operation of the reactor; and
 - (4) Pursuant to the Act and 10 CFR, Chapter I, Part 70, "Domestic Licensing of Special Nuclear Material" to receive, possess and use up to 20

grams each of the following isotopes:

uranium-233, plutonium-236, plutonium-238,
plutonium-239, plutonium-240, plutonium-241,
plutonium-242 and uranium-235.

in the form of detectors, fission plates, foils
and solutions for support of operations of the
reactor and associated facilities; and

- (5) Pursuant to the Act and 10 CFR, Chapter I, Part 40 "Domestic Licensing of Source Material," to receive, possess and use not more than fifteen (15) pounds of source material at any one time for research, development, educational, commercial or operational purposes; and
- (6) The Texas Engineering Experiment Station/Texas A&M University System will maintain all byproduct, source, and special nuclear materials within the site boundary until transfer to an appropriate material license for shipment.

C. This license shall be deemed to contain, and be subject to, the conditions specified in the following Commission regulations: 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Sections 50.54 and 50.59 of 10 CFR Part 50, and Section 70.32 of 10 CFR Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission, now, or conditions specified or incorporated below.

(1) Maximum Power Level

The Texas Engineering Experiment Station/Texas A&M University System is authorized to operate the reactor at steady state power levels up to a maximum of 1000 kilowatts (thermal) and to pulse the reactor in accordance with the limitations in the Technical Specifications.

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 12, are hereby incorporated in their entirety in the license. The Licensee shall operate the facility in accordance with the Technical Specifications.

(3) Physical Security Plan

The licensee shall maintain and fully implement all provisions of the Commission-approved physical security plan, including amendments and changes made pursuant to the authority of 10 CFR 50.54(p). The approved security plan consists of documents withheld from public disclosure pursuant to 10 CFR 73.21, entitled "Texas Engineering Experiment Station/Texas A&M University System, Nuclear Science Center Physical Security Plan, Revision 1," dated June 1979, as revised by letters dated January 15, 1980, and September 18, 1980.

This license is effective as of the date of issuance and shall expire at midnight 20 years from the date of issuance.

(Expiration date is March 30, 2003.

The following Amendments have been incorporated into the Amended R-83 License Copy and verified accurate on 11/09/93.

Amendment 9
Amendment 10
Amendment 11
Amendment 12
Amendment 13


Verified By

University of Missouri Research Reactor Report of Leak Test of Contained Source

A leak test has been performed on the source(s) identified in items 4, 5, & 6 below.

1. **Date of Test:** 5/11/94
2. **Project Leader:** William Miller **Project No:** RL-10
3. **NRC license No:** R-103

4. Radioactive Material	5. Quantity	6. ID	7. Results of Test
Am-241	293 mCi	438-23-1	<MDC
Am-241	292 mCi	438-23-2	1.34E-5 μ Ci alpha < MDC beta/gamma
Np-237	0.87 μ Ci	Z-893	<MDC
Np-237	200 μ Ci	438-23-4	< MDC alpha 3.00E-5 μ Ci beta/gamma

Comments:

The Np-237 source with identification of Z-893 has 0.7 μ Ci listed on the source, the 0.87 μ Ci quantity comes from the paperwork received with this source. The source(s) were found to have less than 0.005 μ Ci of removable contamination (0.05 μ Ci, if applicable). Note: If the results of the test indicated a removable contamination is excess of 0.005 μ Ci, the source SHALL be taken from service immediately and arrangements made for decontamination or disposal.

8. Equipment used for the test:

For Beta and Gamma contamination: Canberra 2400 System

Minimum Detectable contamination by use of this system: 2.539E-6 μ Ci

For alpha contamination: Canberra 2400 System

Minimum Detectable contamination by use of this system: 1.577E-6 μ Ci

Other as follows:

5-11-94
Date of report

Andrea Stupp *JE*
Test performed by

University of Missouri Research Reactor Report of Leak Test of Contained Source

A leak test has been performed on the source(s) identified in items 4, 5, & 6 below.

1. **Date of Test:** 5/11/94
2. **Project Leader:** William Miller **Project No:** RL-10
3. **NRC license No:** R-103

4. Radioactive Material	5. Quantity	6. ID	7. Results of Test
Am-243	400.0 μ Ci	Y-070	2.01E-4 μ Ci alpha 2.48E-4 μ Ci beta/gamma
Am-243	50.0 mCi	438-23-3	<MDC

Comments:

The source(s) were found to have less than 0.005 μ Ci of removable contamination (0.05 μ Ci, if applicable). Note: If the results of the test indicated a removable contamination is excess of 0.005 μ Ci, the source SHALL be taken from service immediately and arrangements made for decontamination or disposal.

8. Equipment used for the test:

For Beta and Gamma contamination: Canberra 2400 System

Minimum Detectable contamination by use of this system: 2.539E-6 μ Ci

For alpha contamination: Canberra 2400 System

Minimum Detectable contamination by use of this system: 1.577E-6 μ Ci

Other as follows:

5-11-94
Date of report

Andrea Slipp JE
Test performed by

University of Missouri Research Reactor Report of Leak Test of Contained Source

A leak test has been performed on the source(s) identified in items 4, 5, & 6 below.

1. **Date of Test:** 5/11/94
2. **Project Leader:** John Ernst **Project No:** ML-1
3. **NRC license No:** 24-00513-39

4. Radioactive Material	5. Quantity	6. ID	7. Results of Test
Cf-252	112.7 nCi	Z-191	< MDC alpha 2.27E-5 μ Ci beta/gamma
Cf-252	111.3 nCi	Z-192	< MDC
Cf-252	97.6 nCi	Y-657	< MDC

Comments:

The source(s) were found to have less than 0.005 μ Ci of removable contamination (0.05 μ Ci, if applicable). Note: If the results of the test indicated a removable contamination is excess of 0.005 μ Ci, the source SHALL be taken from service immediately and arrangements made for decontamination or disposal.

8. Equipment used for the test:

For Beta and Gamma contamination: Canberra 2400 System

Minimum Detectable contamination by use of this system: 2.539E-6 μ Ci

For alpha contamination: Canberra 2400 System

Minimum Detectable contamination by use of this system: 1.577E-6 μ Ci

Other as follows:

5-11-94
Date of report

Andrea Shipp *JE*
Test performed by

FEDEX

Express

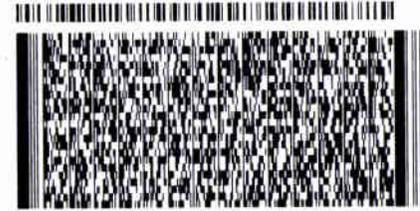
RT 341 B 2189
FZ 01.09

FedEx Express Shipping Label
ORIGIN ID: COUR (573) 882-5311 Ship Date: 08JAN09
MIKE KILFOIL ActWgt: 0.3 LB
MURR System#: 0734789/CAFE2358
1513 RESEARCH PARK DRIVE Account: S *****
COLUMBIA, MO 65211
UNITED STATES US

TO COLLEEN CASEY (630) 829-9841
US NUCLEAR REG COMMISSION, REGION 3 **FedEx**
2443 WARRENSVILLE RD Express
SUITE 210, MATERIALS LICENSING
LISLE, IL 60532



Ref: RONALD DOBEY
Dept: Scott Keithley



Delivery Address
Barcode

BILL SENDER

STANDARD OVERNIGHT

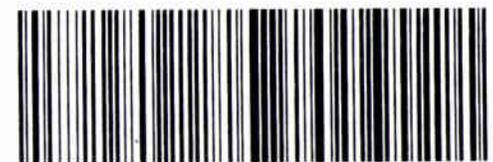
FRI
Deliver By:
09JAN09

TRK# 9348 0896 2189 Form 0201

ORD A2

60532 -IL-US NY BDF A

Part # 156148-434 NRITB-05



The World On

Envelope

For FedEx Express® Shipments Only

Align bottom of **Peel and Stick Airbill** here.