

Amersham Corporation
40 North Avenue
Burlington, Massachusetts 01803
Telephone (617) 272-2000

18 October 1990

Mr. Charles E. MacDonald, Chief
Transportation Branch
Division of Safeguards and
Transportation, NMSS
U.S. Nuclear Regulatory Commission
OWFN, 4E4
Washington, D.C. 20555

Re: 71-9053

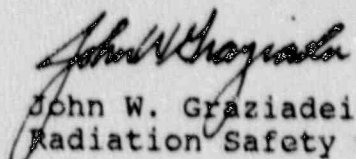
Dear Mr. MacDonald:

Enclosed please find the additional information you requested in your letter dated July 25, 1990, concerning Amersham's application for renewal of Certificate of Compliance No. 9053 for the Model 683 shipping container.

Revision instructions are provided to facilitate incorporating the new revisions in the original submission.

Please contact me should you have further questions.

Sincerely,


John W. Graziadei
Radiation Safety Specialist

JWG/td

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PDR ADOCK 07109053
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Amersham

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REVISION INSTRUCTIONS

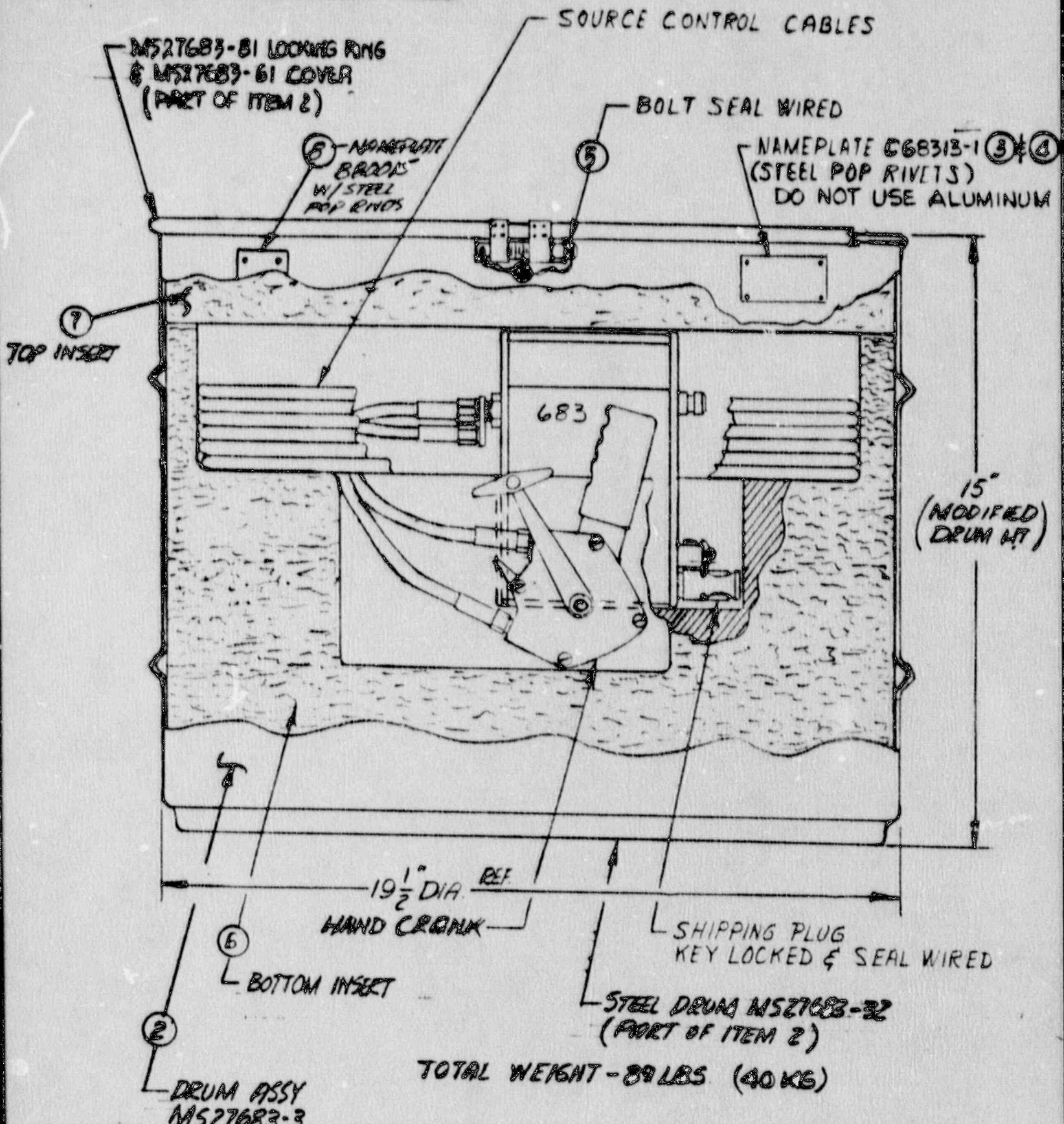
- o Remove Page 1-4
Revision 0
June 1980 Replace with Page 1-4
Revision 1
October 1990

- o Remove Pages 2-8 through 2-10
Revision 0
June 1980 Replace with Pages 2-8 through 2-10
Revision 1
October 1990

- o Remove Pages 7-1 through 7-11
Revision 0
June 1980 Replace with Pages 7-1 through 7-9
Revision 1
October 1990

- o Remove Pages 8-1 and 8-2
Revision 0
June 1980 Replace with Pages 8-1 through 8-3
Revision 1
October 1990

REV.	DATE	DESCRIPTION
E	07-93	REVISED (OFF BY BOWLING)
D	9-2-90	REVISED ITEM B/RCO# 719




TECHNICAL OPERATIONS INC
TYPE B SHIPPING CONTAINER ASSY
(FOR MODEL 683)

Revision 1
September 1990
REV. D

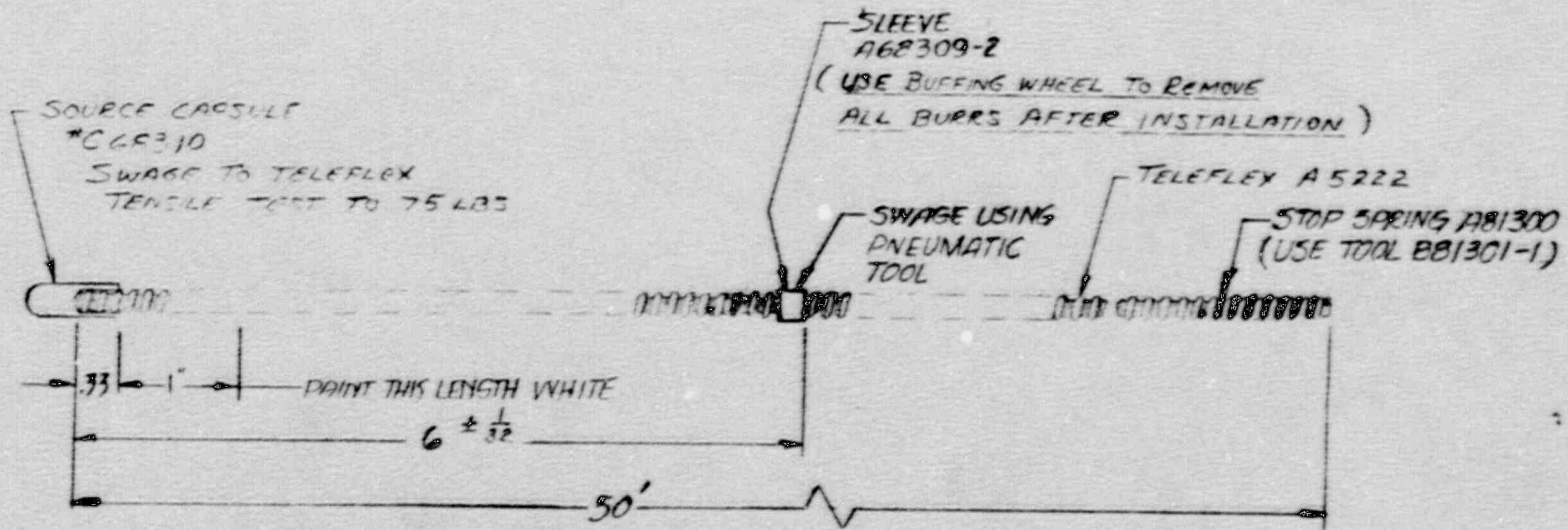
SEE BM 68313

DWG NO. A68313

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- 2.10 Appendix
 - 2.1.1 Descriptive Assembly Drawings, 683 Source and Cable Assembly
 - 2.1.2 Descriptive Assembly Drawings, Stubby Capsule Weldment
 - 2.1.3 IAEA Certificate of Competent Authority USA/0154/S

68309

REV.	DATE	DESCRIPTION
E	3-16-89	CHANGED TO 9/28/91 (WORK SPACES) EXLETED QUOTE 172 (209. 209 I CH 1 10)

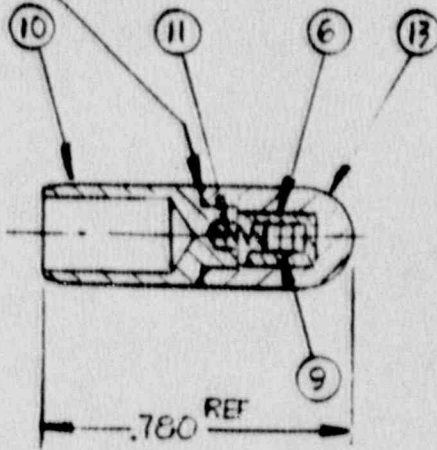


Revision 1
 September 1990

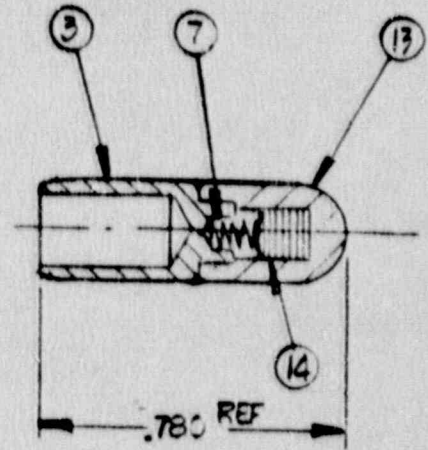
MATERIALS SEE BM 68309		TECHNICAL OPERATIONS INC. RADIATION PRODUCTS DIVISION DURHAM, N.C. 27609	
FINISH		ORIG TITLE 683 SOURCE & CABLE ASSY	
DRAWN BY GP 11/1/78	UNLESS OTHERWISE SPECIFIED TOLERANCES ARE X .015 XX .030 XXX .060	CLASSIFICATION	SIZE B
CHECKED BY	ANGLES	ORIG. NO. 68309	ORIG.
APPROVED BY	FRACTIONS 1/16	SCALE FULL	SHEET 1 OF 1

WELD IN ACCORDANCE WITH
RADIATION SAFETY MANUAL
PART B, SECTION 2 (TYP-ALL ASSYS)

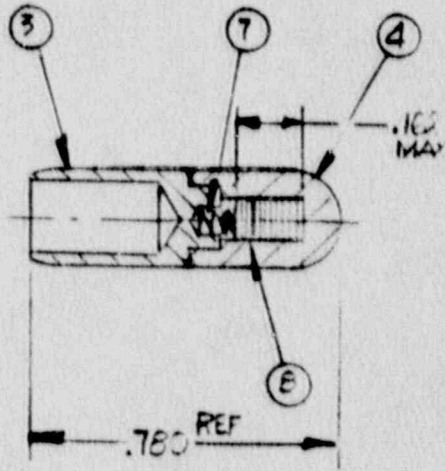
REV.	DATE	DESCRIPTION
L	5-15-86	REDRAWN FROM B68310 REV K. ADDED ITEM 15 ASSY 5/86



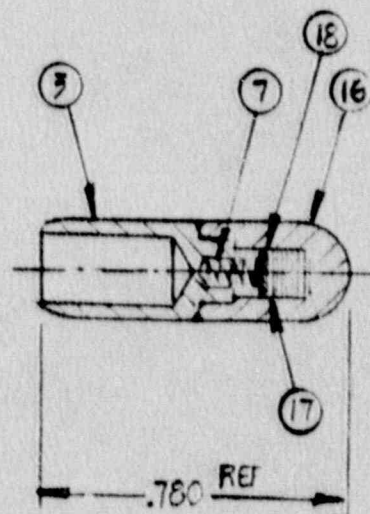
②
PELLET STYLE
(.062 ID PELLETS)



⑫
LARGE WAFER STYLE
(.141 ID WAFER)



①
SMALL WAFER STYLE
(.107 DIA WAFER)



⑮
MEDIUM WAFER STYLE
(3 MM (.118 D) WAFER)

MATERIALS SEE EIM 68310		Tech Ops TECH/OPS, INC. RADIATION PRODUCTS DIVISION BURLINGTON, MA 01803	
FINISH 		DWG TITLE STUBBY CAPSULE WELD'T (FOR .187 DIA WIRE)	
DRAWN BY S. ARTHUR BRYAN JR.	UNLESS OTHERWISE SPECIFIED TOLERANCES ARE	Revision 1 September 1990	
CHECKED BY GP 5-16-86	X ±	CLASSIFICATION	SIZE
APPROVED BY	JXX ±	A	DWG. NO
	.JXX ±		68310
	ANGLES ±	SCALE	SHEET
	FRACTIONS ±	2:1	1 OF 1
			REV. L

122812

7.0 Operating Procedures

7.1 Procedures for Loading the Package

The procedure used in preparing the Model 683 shipping container for transport is presented in Section 7.4.1.

7.2 Procedures for Unloading the Package

The procedure for unloading the Model 683 shipping container is presented in Section 7.4.1.

7.3 Preparation of an Empty Package for Transport

The procedure for preparing an empty package for transport is presented in Section 7.4.1.

7.4 Appendix

7.4.1 Model 683 Shipping Container Operating Instructions

7.4.1 AMERSHAM MODEL 683 SHIPPING CONTAINER OPERATING INSTRUCTIONS

Technical Data

Size: 18.5 in. diameter, 14.25 in. high
(469.9 mm diameter, 362 mm high)

Capacity: 120 curies of Iridium-192 as special form in
Model 683 gamma ray projector.

Transport Status: Type B USNRC USA/9053/B(U)
IAEA USA/9053/B(U)

General

The Model 683 shipping container is designed as Type B(u) packaging for the transport of the Amersham Model 683 gamma ray projector.

Receipt

1. Upon receipt of the Model 683 shipping container, survey the package on all sides to ensure radiation levels do not exceed the following:

Surface 200 mR/hr

At One Meter 10 mR/hr

2. Check surface of container for obvious damage.
3. Check invoice and bill of lading to ensure all are intact and are representative of the equipment.
4. If there are any discrepancies in Items 1-3, secure the shipping container and contact Amersham Corporation immediately to resolve the discrepancy.
(Telephone: (800)225-1383, Telecopier: (617) 273-2216)
5. If Items 1-3 are determined to be in order, place the shipping package in a restricted area until the gamma ray projector is to be unpacked.

PREPARATION FOR SHIPMENT

A: Shipment of Radioactive Sources in the Model 683

NOTE: Personnel loading the Model 683 shipping container must have a calibrated and operational survey meter with a range of at least 0-1000 mR/hr. In addition, personnel monitoring devices must be worn during the operation. They are: a film badge or thermoluminescent dosimeter (TLD) and a direct reading pocket dosimeter.

1. Wearing a film badge and dosimeter, approach the gamma ray projector to be shipped with a calibrated and operable survey instrument.
2. Assure that the source is locked in the storage position in the Model 683 by depressing the lock plunger, installing the shipping plug and inserting a seal wire through the shipping plug to the body of the lock assembly.
3. Survey the exterior surfaces of the gamma ray projector to insure that the radiation intensities are normal. (Less than 50mR/hr at six inches from the surface).
4. Prior to each shipment a visual inspection should be performed on the entire barrel. This inspection should include the following:
 - a. Check for rust, holes or large dents in the steel.
 - b. Check for loose handles on the barrel.
 - c. Be sure the barrel is labeled properly:

DANGER - RADIOACTIVE MATERIAL
SPECIAL FORM, n.o.s. UN2974
USA/9053/B(U) TYPE B
 - d. Make sure the ring is not broken and can secure the top to the barrel.
 - e. Check the sides, top and bottom of the chalk insulation liner. It should be replaced if there is significant damage to or obvious cracks through the insulation.
 - f. Check the rubberized hair insert. It should be replaced when it no longer allows the gamma ray projector to sit in the center of the barrel, or does not prevent shifting of the projector when inside the barrel.
 - g. If the barrel fails any of the above criteria, it should not be used for shipping any of the authorized gamma ray projectors.

5. Insure that the proper molded filler is installed in the Model 683 for the projector which is to be transported. Also, insure that the insulation is in place.
6. Place the gamma ray projector in the Model 683 shipping container. Place the top section of the molded filler over the projector. Place the top section of the insulation in the container. Cover the container top with the gasket and lid.
7. Place the clamp ring in place and tighten the bolt. Seal-wire the bolt and nut using a tamper-proof seal.
8. Survey the exterior surfaces of the container and insure that the maximum radiation level is less than 200 milliroentgens per hour.
9. Measure the radiation level one meter from all exterior surfaces of the container and insure that the radiation level is less than 10 milliroentgens per hour.
10. Determine the proper shipping label to be applied to the package using Table I. The maximum radiation level measured one meter from any exterior surface of the shipping container is the Transport Index.
11. Fill out the information requested on the label indicating:
 - a. Contents (Ir-192)
 - b. Number of Curies
 - c. Transport Index (Maximum Radiation Level measured at one meter from the surface)
12. Remove all old shipping labels. However, do not remove the metal container identification tag.
13. Affix new DOT shipping labels to two opposite sides of the package.
14. Properly complete the shipping papers indicating:
 - a. Proper shipping name (i.e. radioactive material, special form, n.o.s UN 2974)
 - b. Name of radionuclide (i.e. Iridium-192)
 - c. Physical or chemical form (or special form)
 - d. Activity of Source (expressed in curies or millicuries)

- e. Category of label applied (i.e. radioactive Yellow II)
- f. Transport Index
- g. USNRC Identification Number (USA/9053/B(U))
- h. For export shipments, IAEA Identification Number (USA/9053/B(U))

Shipper's Certification required:

"This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transport according to the applicable regulations of the Department of Transportation".

- NOTES: 1. For air shipments, the following shipper's certification may be used:

"I hereby certify that the contents of this consignment are fully and accurately described above by properly shipping name and are classified, packed, marked and labeled and are in proper condition for carriage by air according to applicable National Governmental Regulations."




2. For air shipments, the package must be labeled with a "Cargo Aircraft Only" label and the shipping papers must state:

"THIS SHIPMENT IS WITHIN THE LIMITATIONS PRESCRIBED FOR CARGO-AIRCRAFT ONLY."

15. Return the Model 683 shipping container to:

Amersham Corporation
40 North Avenue
Burlington, MA 01803
USA

TABLE I

	MAXIMUM RADIATION LEVELS	
	Surface	One Meter
<p>RADIOACTIVE-WHITE I</p> 	0.5mR/hr	None
<p>RADIOACTIVE-YELLOW II</p> 	50mR/hr	1.0mR/hr
<p>RADIOACTIVE-YELLOW III</p> 	200mR/hr	10mR/hr

B: Shipment of an Empty Projector in the Model 683

NOTE: Wear personnel monitoring devices during all source changing operations. Monitor all operations with a calibrated, operable survey meter.

1. The Iridium-192 source is to be secured in an Amersham Corporation Model 750 source changer when it is necessary to ship an empty Model 683 package. The procedures for source changing using the Model 750 are to be followed according to the 750 Operations manual. The precautions used when making a radiographic exposure must also be followed.
2. For shipment of an empty device in a Model 683 barrel, you must assure that there are no unauthorized source assemblies or copped sources within the container by performing the following step.
3. Assure that the Model 683 is empty by removing the shipping plug and placing a survey meter at the rear of the camera. Slowly crank out the drive cable while observing the survey meter.

NOTE: If radiation levels increase or an obstruction is felt, immediately discontinue the test and secure the device, contact Amersham Corporation for further instructions.

4. After assuring that the Model 683 is empty, crank back the drive cable, replace the shipping plug, and insert a security seal through the shipping plug. Attach an EMPTY tag to the device.
5. Assure that the levels of removable radioactive contamination the outside surface of the outer package do not exceed 0.001 microcurie per 100 square centimeters.
6. When you have assured the device is empty, survey the device and prepare the package for transport depending upon the radiation levels obtained, as given below.
 - a) If the radiation level is below 0.5 mR/hr at the surface, and there is no measurable radiation level at one meter from the container, no label is required. Mark the outside of the package with the proper shipping name (Radioactive material, articles manufactured from depleted uranium, UN 2909). Mark the outside of the package:

"Exempt from specification packaging, shipping paper and certification, marking and labeling and exempt from the requirements of Parts 171-178 per 49 CFR 173.421-1 and 49 CFR 173.424".

NOTE: This does not exempt the shipment from the reporting requirements listed in Parts 171-178 pertaining to the reporting of contamination incidents.

Additionally, a notice must be enclosed in or on the package included with the packing list or otherwise forwarded with the package. This notice must include the name of the consignor or consignee and the statement:

"This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive materials, articles manufactured from depleted uranium, UN 2909".

- b) If the surface radiation level exceeds 0.5mR/hr or is a measurable radiation level at one meter from the surface, use the criteria of Table I to determine the proper shipping name and identification number (Radioactive Material, LSA, n.o.s., UN 2912).

Properly complete the shipping papers by following steps 10 through 13 in section A of the Operating Procedures on page 7-8. The isotope will be uranium-238 and the activity will be 5mCi.

8. Acceptance Tests and Maintenance Program

8.1 Acceptance Tests

8.1.1 Quality Inspection

Each Model 683 shipping container is quality inspected prior to first use to assure that the container meets the specifications as described in drawing number A68313. This inspection procedure is on file at Amer-sham Corporation.

8.1.2 Visual Inspection

Each Model 683 gamma ray projector to be shipped in the Model 683 container is visually examined to assure that the appropriate fasteners are properly sealwired and that the package is properly labeled.

The seal weld of the radioactive source capsule is visually inspected for proper closure.

8.1.3 Structural and Pressure Tests

The swage coupling between the source capsule and cable is subjected to a static tensile test with a load of seventy-five pounds. Failure of this test will prevent the source assembly from being used.

8.1.4 Leak Tests

The radioactive source capsule (the primary contain-ment) is wipe tested for leakage of radioactive contam-ination. The source capsule is subjected to a vacuum bubble leak test. The capsule is then subjected to a second wipe test for radioactive contamination. Fail-ure of any of these tests will prevent use of this source assembly.

8.1.5 Component Tests

The lock assembly of the Model 683 gamma ray projector is tested to assure that the security of the radioac-tive source will be maintained. Failure of this test prevents use of the gamma ray projector until the lock assembly is corrected and retested. Only when the source assembly is correctly secured in the gamma ray projector is the Model 683 used as a shipping contain-er.

8.1.6 Tests for Shielding Integrity

The radiation levels at the surface of the package and at one meter from the surface are measured prior to each shipment. These radiation levels, when extrapolated to the rated capacity of the package, must not exceed 200 milliroentgens per hour at the surface nor ten milliroentgens per hour at one meter from the surface of the package. Failure of this test will prevent use of the package.

8.1.7 Thermal Acceptance Tests

Not applicable.

8.2 Maintenance Program

8.2.1 Maintenance Procedures

Maintenance procedures to ensure continued performance of the Model 683 shipping container are described in Section 7.4.

8.2.2 Structural and Pressure Tests

Not applicable.

8.2.3 Leak Tests

As described in Section 8.1.3, the radioactive source assembly is leak tested at manufacture. Additionally, the source assembly is wipe tested for leakage of radioactive contamination every six months.

8.2.4 Subsystem Maintenance

The lock assembly of the gamma ray projectors is tested as described in Section 8.1.4, prior to each use of the Model 683 shipping container. Additionally, the Model 683 shipping container is inspected for tightness of fasteners, proper seal wires and general condition prior to each use.

8.2.5 Valves, Rupture Discs and Gaskets

Not applicable.

8.2.6 Shielding

Prior to each use, a radiation survey of the package is made to assure that the radiation levels do not exceed 200 milliroentgens per hour at the surface nor ten milliroentgens per hour at one meter from the surface.

8.2.7 Thermal

Not applicable.

8.2.8 Miscellaneous

Inspections and tests designed for secondary users of this package under the general license provisions of 10 CFR 71.12(b) are included in Section 7.4.