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

19 October 1990

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

Dear Mr. MacDonald:

I have enclosed the additional information you requested concerning docket number 71-9137.

Item 6c has been corrected to USA.

Item 11 refers to the DOT labels, i.e. Yellow II or Yellow III that are placed on the shipment, and are described in table 1 in the instructions. Item 6 refers to the permanent metal nameplates that are attached to the package and are designed to withstand the fire test of Part 71.
Item 14 has been revised to delete the reference to Cobalt-60.

The instructions have been revised to clarify the shipping of a package within a crate.

In Section 7.3, the instructions for shipping an empty package have been revised to require a physical verification that the container is empty prior to shipment.

The instructions have been clarified to indicate the shipping of a package or a package within an overpack.

A note has been added to clarify that the shipment is not exempt from all requirements of part 49 CFR 171-177.

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Amersham

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These changes have been submitted as revised pages. I trust this provides the necessary information to complete the review of our renewal request.

Please contact me if you require additional information.

Sincerely,

Cathleen M. Roughan

Cathleen M. Roughan
Radiation Safety Officer

CMR/bt

SECTION 7: MODEL 820 OPERATING PROCEDURES

NOTE: All the precaut ons used when making a radiographic exposure must be observed when loading or when unloading the package.

1. A calibrated and operable survey meter must be used at all times when loading or unloading this package.

2. Personnel dosimetry must be worn when loading or unloading the package.

3. For details on the operation and source changing procedures please refer to the instruction manual for the device which can be obtained from Amersham Corporation.

TECHNICAL SPECIFICATIONS

MODEL 820 SOURCE CHANGER

USNRC Type B Certificate	=	USA/9137/B(U)
Isotope	=	Ir-192
Capacity	=	1000 Curies (+20%)
Authorized source assembly	=	See Table 1
Gross Weight	=	220 lbs (100kg)
Shielding	=	Depleted Uranium 121 lbs (55 kg)

7.1 Procedure For Loading the Package

1. Assure that the package is not damaged except for superficial marks or dents.

2. Assure the source is authorized for use in this container and is secured in the locked position.

3. To properly secure the source, depress the plunger lock, so the fork is above the stop ball on the cable. Remove the key.

4. Close the source guides, install the shipping plugs securely and apply a security seal with an identification mark through the shipping plug and the drilled hole on the source changer.

5. Install the shipping cover, secure with the 8 bolts and seal were through the drilled head of two of the bolts.

6. Assure all nameplates are clear and legible and contain the following information.

   a. The words "Danger Radioactive Material" and the trefoil symbol.

   b. The proper shipping name (ie. Radioactive Material Special Form, N.O.S., UN2974)

   c. Package identification (ie. USA/9137/B(U), Type B(U))

   d. The radioactive contents.

7. If the 820 is to be packaged inside a crate or other outer packaging, the outer packaging must be strong enough to withstand the normal conditions of transport and must not reduce the safety of the package. The 820 must be placed within the outer package with sufficient blocking to prevent shifting during transportation.

NOTE: When using a crate or other outer packaging to ship the 820, steps 8-14 refer to the crate or outer packaging.

8. Survey the exterior surfaces of the package and assure that the maximum radiation level does not exceed 200 mrem/hr. Survey one meter from the exterior surfaces of the package and assure that the maximum radiation level does not exceed 10 mrem/hr. Determine the proper shipping labels to be applied to the package using the criteria of table 1.

9. Properly complete two shipping labels indicating the contents (iridium-192), the activity of the source in curies or millicuries and the transport index. The transport index is the dimensionless number (rounded up to the first decimal place) expressing the maximum radiation level (in mrem/hr) measured at one meter from the package surface.

10. Assure that any old shipping labels have been removed from the package. Apply two properly completed labels to two opposite sides of the package.

11. Mark the outside of the package with the proper shipping name and identification number (Radioactive Material, Special Form, n.o.s., UN 2974) if not already marked. Place the letters "RQ" next to the proper shipping name.

12. If the 820 is inside a crate or other outer packaging, mark the outside package "INSIDE PACKAGE COMPLIES WITH PRESCRIBED SPECIFICATIONS" and list the appropriate DOT specification number or USNRC Type B number and the words "TYPE B".

13. Assure that the levels of removable radioactive contamination on the outside surface of the outer package do not exceed 0.001 microcurie per 100 square centimeters.

14. Properly complete the shipping papers, indicating:

    a. Proper shipping name and identification number (i.e. Radioactive Material, Special Form, n.o.s., UN 2974).

    b. The letters RQ must appear next to the proper shipping name when shipping more than 10 curies of Ir-192 or Co-60.

c. Name of the radionuclide (i.e. iridium-192).

d. Activity of source in curies or millicuries.

e. Category of label applied (i.e. Radioactive Yellow II).

f. Transport Index.

g. USNRC identification number or DOT specification number (i.e. USA/9137/B(U)).

h. For export shipments, the IAEA identification number (i.e. USA/9137/B(U)).

i. Shipper's Certification:

"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."

j. The shipping papers must indicate an emergency phone number. This phone number must have 24 hour coverage in case of an emergency concerning your shipment. The phone number must be clearly visible on the shipping paper.

k. For packages containing depleted uranium as shielding material, 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 CFR173.424 for excepted radioactive material, articles manufactured from depleted uranium UN 2909."

15. Place the package onto the vehicle using slings or hooks through the eyebolts on the source changer.

16. Properly brace and secure the package against movement in the vehicle.

17. Assure that back of the vehicle is closed and secured so that it will not open during transport.

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

"I hereby certify that the contents of the consignment are fully and accurately described above by proper shipping name and are classified packaged, 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."

3. For international shipments the activity must be given in Gigabecquerels on the DOT label and the shipping papers (curies X 37 = Gigabecquerels).

7.2 Procedure for Unloading the Package

NOTES: a. A radioactive material package must be accepted from the carrier at the time it is delivered.

b. If a radioactive material package is to be held at the carrier's terminal for pickup, arrangements must be made to receive notification from the carrier of the arrival of the package at the time of arrival. The package must be picked up expeditiously upon receipt of notification (within three hours if practicable).

1. Upon receipt of a package of radioactive material, survey the exterior surfaces of the package and assure that the maximum radiation level does not exceed 200 mrem/hr. Survey three feet from the exterior surfaces of the packages and assure that the maximum radiation level does not exceed 10 mrem/hr. If either of these limits are exceeded, notify the Radiation Safety Officer immediately. Record the maximum radiation levels measured at the package surface and at three feet from the package surface on the Receiving Report.

2. If the package contains radioactive material which is not in special form make a contamination wipe test of the exterior surface of the package. Wipe a representative surface of the package, covering an area of approximately 100 square centimeters, using a cloth patch and moderate pressure. Measure the activity of the patch using the contamination monitor and assure that the activity does not exceed 0.01 microcurie. If this limit is exceeded, notify the Radiation Safety Officer immediately. Record the results of this contamination wipe test on the Receiving Report.

Note: If any of these limits are exceeded, the Radiation Safety Officer shall immediately notify the USNRC and the final delivering carrier.

3. Inspect the package for any evidence of physical damage. Record the results of this inspection on the Receiving Report. Also record on the Receiving Report the source model number, source serial number, radionuclide, activity, transport package model number and package serial number. Forward a copy of the completed Receiving Report to the Radiation Safety Officer.

4. Assure that the package is locked, or place the package into an outer locked container. Place the package into the Radioactive Material Storage Room and lock the door to the room.

5. Keep a copy of the Operations Manual for the package on file to assure you have the proper opening instructions.

6. To properly open and use the package, as a radiographic source changer refer to the detailed instruction manual for this device.

7.3 Procedure for Preparation of an Empty Package for Transport

1. For shipment of an empty Model 820 source changer, first assure the changer does not contain an unauthorized source or cropped source by performing a physical certification using the following procedure.

NOTE: Use only the gauge provided with source changer. Do not use any other tool or a gauge for another device. If you do not have the proper gauge to perform the test, contact Amersham Corporation before conducting the test.

a. Insert the proper gauge in the empty tube(s) of the source changer. Read the gauge at the top of the outlet fitting.

b. The gauge should bottom out in the empty source tube and indicate a safe condition (green signal). Verify that each empty tube indicates a safe condition and proceed to step 2.

c. If the gauge indicates an unsafe condition (red signal) there may be an obstruction in the tube. Remove the gauge slowly while observing the survey meter. If the radiation levels increase as the gauge is being removed keep the gauge within the device, secure the device and contact Amersham for further instructions. If the radiation levels remain normal as the gauge is being removed, completely remove gauge and contact Amersham Corporation for shipping instructions.

d. When you have assured the container is empty, attach empty tag to source changer, insert shipping plugs. Install the shipping cover, secure with the 8 bolts and seal wire with a securing seal through the drilled head of 2 of the bolts.

2. If the shipping package is to be placed inside a crate or other outer packaging, the outer packaging must be strong enough to withstand the normal conditions of transport and must not reduce the safety of the package. The shipping package must be placed within the outer package with sufficient blocking to prevent shifting during transportation.

NOTE: When using a crate or other outer packaging to ship the 820, steps 3-4 refer to the crate or outer packaging.

3. Assure that the levels of removable radioactive contamination on the outside surface of the outer package do not exceed 0.001 microcurie per 100 square centimeters.

4. Survey the package at the surface and at one meter from the surface to determine the proper shipping labels to be applied to package.

   a. If the surface radiation level does not exceed 0.5 mrem/hr and there is no measurable radiation level at one meter from the surface, no label is required. Mark the outside of the package with the proper shipping name and identification number (Radioactive Material, Articles Manufactured from depleted Uranium, UN 2909) and the statement:

      "EXEMPT FROM SPECIFICATION PACKAGING SHIPPING PAPER AND CERTIFICATION, MARKING AND LABELING AND EXEMPT FROM THE REQUIREMENTS OF 49CFR part 175 PER CFR173.421-1 AND 49 CFR173.424."

   NOTE: This does not exempt the shipment from the reporting requirements listed in 49 CFR parts 171-177 pertaining to the reporting of the contamination or other radiation incidents.

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

      "This package conforms to the conditions and limitations specified in 49CFR173.424 for Exempted Radioactive Material, Manufactured from Depleted Uranium, UN 2909."

   b. If the surface radiation level exceeds 0.5 mrem/hr, or if there is a measurable radiation level at one meter from the surface, use the criteria of table 1 in section 7.1 to determine the proper shipping labels to be applied to the package with the proper shipping name and identification number (Radioactive Material, LSA, n.o.s., UN 2912). If the container is packaged inside a crate or other outer packaging, mark the package with the statement "INSIDE PACKAGE COMPLIES WITH PRESCRIBED SPECIFICATIONS".

Properly complete the shipping papers, as listed in section 7.1. The isotope is U-238 and approximately 18 millicuries.

TABLE 1

Sources approved for use in the Model 820 source changer:

A424-1	A-1-A
A424-9	A-2-A
848	A-2-TG
877	B-8-T
89911	RGSA-13
89912	RG-13
89913	
89916	

These are all approved source assemblies and are registered with USNRC Sealed Source and Device Registration.

The special form number for each of these sources is USA/0335/S.

TABLE 2

	Maximum Radiation Level	
	at Surface	at One Meter
Radioactive White I 	0.5 mR/hr	None
Radioactive Yellow II 	50 mR/hr	1.0 mR/hr
Radioactive Yellow III 	200 mR/hr	10 mR/hr

SECTION 8: MODEL 820 ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

8.1 Acceptance Tests

8.1.1 Visual Inspection

The package is visually inspected to assure:

1. It was constructed properly in accordance with drawing number 82090

2. The labels are inspected to assure they contain the required information as referenced in Section 7.

3. The source assembly used in this device is visually inspected to assure proper closure of the weld, to maintain primary containment. It is also inspected for proper length to assure it locks in the required storage position.

8.1.2 Structural and Pressure Tests

The swage coupling between the source capsule and cable is subjected to a static tensile test with a load of 100 pounds. Failure of this test will prevent the source assembly from being used.

8.1.3 Leak Tests

The radioactive source capsule (the primary containment) is wipe tested for leakage of radioactive contamination. The source capsule is subjected to a vacuum bubble leak test. The capsule is then subjected to a second wipe test for leakage of radioactive contamination. The contamination must be less than 0.005 microcuries. Failure of any of these tests will prevent use of this source assembly. The package is wipe tested on the exterior surface prior to its first shipment in accordance with 10CFR71.87. (If this wipe test exceeds 0.001 microcuries/100 cm^2 it will not be shipped.)

8.1.4 Component Tests

The lock assembly of the package is tested to assure that security of the source will be maintained. Failure of this test will prevent use of the package until is corrected and retested.

8.1.5 Tests for Shielding Integrity

The radiation levels at the surface of the package and at one meter from the surface are measured using a small detector survey instrument (e.g., AN/PDR-27). 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 one meter from the surface of the package. Failure of this test will prevent use of the package.

8.1.6 Thermal Acceptance Tests

Not applicable.

8.2 Maintenance Program

8.2.1 Structural and Pressure Tests

Not applicable.

8.2.2 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.

8.2.3 Subsystem Maintenance

The lockbox assembly is tested as described in section 8.1.4 prior to each use of the package. Additionally, the package is inspected for tightness of fasteners, proper seal wires, and general condition before each use.

8.2.4 Valves, Rupture Discs, and Gaskets

Not applicable.

8.2.5 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 10 milliroentgens per hour at one meter from the surface.

8.2.6 Thermal

Not applicable.

8.2.7 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 Appendix A of section 8.

Appendix A

Maintenance

The following items must be inspected prior to each shipment:

A: Source Changer

1. Survey the entire circumference of the device to assure that the radiation levels do not exceed 200 milliroentgens per hour at the surface or 10 milliroentgens per hour at one meter from the surface.

2. Assure the nameplates are clear and legible and contain the following information:

   a. The words "Danger Radioactive Material" and the trefoil symbol.

   b. The proper shipping name:
   Radioactive Material, Special Form, NOS, UN 2974

   c. Package identification number;
   USA/9137/B(U), Type B(U)

   d. The radioactive contents

3. The locks function properly and secure the source assembly in the proper shielded position.

4. Source tube has no obstruction as evidenced by test described in section 7.

5. Threads for the shipping cap are clear of dirt or sludge and shipping cap mates properly and securely.

6. The flappers close securely around the source assembly.

7. The threads of the hat and body of the source changer are clean, free of dirt and are not stripped. Assure the bolts can be installed and secured properly.

8. Assure safety wires are present and secure on the body of the source changer.

If there are any discrepancies in any of the above inspections, do not ship the device. Contact Amersham for information on repair of the device.