

## MATERIALS LICENSE

Amendment No. 32

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee		In accordance with letter dated October 12, 1995	
1. X-R-I Testing Division of X-Ray Industries, Inc.		3. License Number 21-05472-01 is amended in its entirety to read as follows:	
2. 1961 Thunderbird Troy, MI 48084		4. Expiration Date October 31, 2004	
		5. Docket or Reference No. 030-04837	
6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License	
A. See Condition 10.	A. Sealed Sources See Condition 10.	A. See Condition 10.	
B. Cesium-137	B. Sealed Sources	B. Not to exceed 100 microcuries per source	
C. Cesium-137	C. Sealed Sources (New England Nuclear Model NER 570 or Amersham 77302)	C. Not to exceed 165 millicuries per source	
D. Cesium-137	D. Sealed Sources (3M Models 4P6E, 4F6H, 4D6L or 4F6S; U.S. Nuclear Model 375; Isotope Products Labs Model 193; Amersham Capsules X.9 and X.8; J. L. Shepherd Model 6810)	D. 600 millicuries	
E. Uranium depleted in uranium-238	E. Solid metal	E. 999 kilograms total possession limit	

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PDR ADOCK 03004837  
C PDR

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## 9. Authorized Use:

- A. For industrial radiography.
- B. For use in Isotope Products Laboratories Model SK-125 Dosimeter Calibrators for checking dosimeter response.
- C. For use in Technical Operations Model 773 calibration device for calibration of the licensee's and customers' survey instruments.
- D. For use in a J. L. Shepherd Model 28.6 Dosimeter Calibrator for checking dosimeter response or in a J. L. Shepherd Model 28.5 calibrator device for survey instrument calibration.
- E. For shielding in radiography exposure devices and source changers.

CONDITIONS

10. Sealed sources, exposure devices and source changers are authorized for use as follows:

<u>Isotope</u>	<u>Manufacturer's Name &amp; Model No. of Sealed Source</u>	<u>Maximum Activity per Source</u>	<u>Manufacturer's Name &amp; Model No. of Exposure Device</u>	<u>Manufacturer's Name &amp; Model No. of source Changer</u>
A. Cobalt-60	AMSHM A-424-3	20 curies	AMSHM 491	AMSHM 416, 488 or 771
B. Cobalt-60	AMSHM A-424-18	30 curies	AMSHM 741A or AMSHM 741B	AMSHM 771
C. Cobalt-60	SPEC G5, G6	50 curies	Gamma Industries Utility Twin 50	Gamma Industries C-8
D. Iridium-192	SPEC G1, G-1F or G3F or Amersham 89911	100 curies	SPEC 2-T	SPEC C-1 or Gamma Industries C-4

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Isotope	Manufacturer's Name & Model No. of Sealed Source	Maximum Activity per Source	Manufacturer's Name & Model No. of Exposure Device	Manufacturer's Name & Model No. of source Changer
E. Iridium-192	Gamma Industries A-1-A or SPEC G-1, G1F	35 curies	Gamma Industries 35	Gamma Industries C-4 or C-10 or SPEC C-1
F. Iridium-192	AMSHM 90003 source assemblies	200 curies	AMSHM 920	AMSHM 850
G. Iridium-192	AMSHM A-424-1	100 curies	AMSHM 533	AMSHM 414 or 650
H. Iridium-192	AMSHM Model 90003 source assemblies	100 curies	AMSHM 900	AMSHM 850
I. Iridium-192	AMSHM A-424-9, SPEC T5 or T5F, RTS Technology, Inc. 702, I.N. 7	100 curies	AMSHM 660/ 660 system	AMSHM 414 or 650 or SPEC C-1
J. Iridium-192	AMSHM 866, SPEC B-16 or B-16F or Ind. Nuclear 5	100 curies	AMSHM Iriditron 520	Gamma Industries C-10 or AMSHM 414 or SPEC C-1
K. Cobalt-60	AMSHM A-424-2	18 curies	AMSHM 402	AMSHM 416 or 771
L. Iridium-192	I.N. 32, SPEC G-40F	100 curies	I.N. IR-100	I.N. IR-50, SPEC C-1
M. Iridium-192	Ind. Nuclear 2, SPEC, G-1F or G-3F	100 curies	Gamma Industries Century S Universal	SPEC C-1 or Gamma Industries C-4
N. Iridium-192	Ind. Nuclear 8, SPEC G-3F Amersham 89912	100 curies	Gamma Industries Century SA	SPEC C-1, Gamma Industries C-4 or C-5

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<u>Isotope</u>	<u>Manufacturer's Name &amp; Model No. of Sealed Source</u>	<u>Maximum Activity per Source</u>	<u>Manufacturer's Name &amp; Model No. of Exposure Device</u>	<u>Manufacturer's Name &amp; Model No. of source Changer</u>
O. Cobalt-60	AMSHM A-453-5, 6 or A-424-7	200 curies	AMSHM 520	None
P. Iridium-192	SPEC G-60	100 curies	SPEC 150	C-1
Q. Iridium-192	AMSHM A-424-9,	140 curies	AMSHM 660 System	AMSHM 650L
R. Iridium-192	SPEC T-5 or T-5F	100 curies	AMSHM 660 System	SPEC C-1

11. A. Licensed material shall be used and stored at 1400 Old Highway 69, Mt. Vernon, Indiana, 1961 Thunderbird, Troy, Michigan, and 5403 E. Schaaf Road, Cleveland, Ohio and may be used at temporary sites anywhere in the United States where the U.S. Nuclear Regulatory Commission Maintains jurisdiction for regulating the use of licensed material. The Amersham Model 520 exposure devices may only be used within the licensee's fixed radiography cells.

B. Licensed material for calibration only shall be used and stored at 1370 Piedmont, Troy, Michigan, 1961 Thunderbird, Troy, Michigan and 5403 E. Schaaf Road, Cleveland, Ohio.

C. Licensed material may be stored at:

120 James Street  
Holland, Michigan

1370 Piedmont  
Troy, Michigan

9808 Princeton-Glendale Rd.  
Cincinnati, Ohio

12. Licensed material shall be used by, or under the supervision and in the physical presence of, Richard W. Thams, Leonard H. Schlipp, Richard A. Bourdon, Robert Shields, S. "Bud" Johnson, Kirk Thams, Bradley E. Kraai, George R. Willetts, Thomas A. Landauer, Kevin Meeks, or David A. Hamilton, or individuals who have completed the training program described application dated December 28, 1993 and letter dated October 12, 1994.

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13. A. Notwithstanding the periodic leak test required by Section 34.25(b) of 10 CFR Part 34, such requirement does not apply to radiography sources that are stored and not being used. The sources excepted from this test shall be tested for leakage before use or transfer to another person.
- B. Sealed sources authorized for a use other than radiography shall be tested as radiography sources in accordance with Section 34.25 of 10 CFR Part 34.
14. The licensee is authorized for License Conditions 10.A. through 10.O. to receive, possess, and use sealed sources of iridium-192 or cobalt-60 where the radioactivity exceeds the maximum amount of radioactivity specified in this license provided.
  - A. Such possession does not exceed the quantity per source specified in Item 8 by more than 20% for iridium-192 or 10% for cobalt-60;
  - B. Records of the licensee show that no more than the maximum amount of radioactivity per source specified in this license was ordered from the supplier or transferor of the byproduct material; and
  - C. The levels of radiation for radiographic exposure devices and storage containers do not exceed those specified in Section 34.21 of 10 CFR Part 34.
15. Sealed sources containing licensed material shall not be opened.
16. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
17. The Radiation Protection Officer for the activities authorized by this license is Kirk A. Thams.
18. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of licensed material to quantities below the minimum limit specified in 10 CFR 30.35(d) for establishing decommissioning financial assurance.
19. Notwithstanding the requirements of 34.20(a), and pursuant to 34.51, radiographic equipment authorized for use in radiographic operations under this license need not comply with the torque criteria of Section 8.9.2(c) of American National Standard N432-1980.
20. Notwithstanding the requirements of 10 CFR 34.20(a) and (c), and pursuant to 10 CFR 34.51, the licensee may use their Amersham Model 520 exposure device and their Amersham source assembly Models A453-5 and A453-6 in accordance with the statements, procedures, and representations contained in the licensee's letters dated October 12 and December 10, 1995, and January 8, June 26, 1996 and January 22, 1997.

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21. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.
- A. Application dated December 28, 1993; and
- B. Letters dated October 12, 1994, October 12, 1995, October 26, 1995 (with enclosures), December 10, 1995 (with attachments), January 8, 1996, June 26, 1996 (with attachment) and January 22, 1997.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date

*January 24 1997*

By

*Loren J. Hueter*  
Nuclear Materials Licensing Branch, Region III

COPY

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM  
AND  
REGIONAL LICENSING SECTIONS

(FOR LFMS USE)  
INFORMATION FROM LTS

PROGRAM CODE: 03320  
STATUS CODE: 0  
FEE CATEGORY: 30 2B  
EXP. DATE: 19991031  
FEE COMMENTS:  
DECOM FIN ASSUR RECD: N

LICENSE FEE TRANSMITTAL

A. REGION

1. APPLICATION ATTACHED  
APPLICANT/LICENSEE: X-R-1 TESTING  
RECEIVED DATE: 951211  
DOCKET NO: 3004837  
CONTROL NO.: 399814  
LICENSE NO.: 21-05472-01  
ACTION TYPE: AMENDMENT

MS 13  
R8

RECEIVED  
DEC 26 1995  
REGION III

2. FEE ATTACHED  
AMOUNT:  
CHECK NO.: \*

3. COMMENTS

\* Add. info  
399324-R8

SIGNED  
DATE

S. Hersey  
12-13-95

B. LICENSE FEE MANAGEMENT BRANCH CHECK WHEN MILESTONE 03 IS ENTERED

1. FEE CATEGORY AND AMOUNT: 30 2B-399324

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR  
AMENDMENT  
RENEWAL  
LICENSE

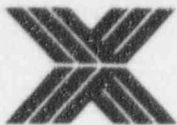
3. OTHER

SIGNED  
DATE

SC 12/18/95

RECEIVED BY LFDCB	
Date	Dec. 15, 1995
Log	Dec 17 711
By	SC
Date Completed	12/18/95

DEC 26 1995



# X-R-I TESTING

DIVISION OF X-RAY INDUSTRIES, INC.

December 10, 1995

Mr. Loren Hueter  
United States  
Nuclear Regulatory Commission  
Region III  
801 Warrenville Road  
Lisle, Illinois 60532-4351

SUBJECT: NRC License Number: 21-05472-01 Amendment 30  
REFERENCE NUMBER: 399324

Dear Loren:

Below are the answers to the questions from your letter on XRI Testings request for and extension Co 60 exposure devices. Also, I need to increase the maximum allowable curies for the new Sentinel 660 exposure device in item "Q" on page 4 of XRI Testing's license. Currently it allows a maximum activity of 100 Curies, and I need to increase that to around 117 Curies, which will permit XRI the full capability of the device.

*This already  
done in  
amend # 30*

1. With regards to 10 CFR 34.20 (Exposure Devices Not Having Safety Features Incorporated Will Be Obsolete Jan. 10, 1996)
  - XRI Testing would like to request an exemption to the 10 CFR 34.20 & 10 CFR 34.51 regulations due to the following points:
    - \* XRI has 3 Tech/Ops 520 Co60 devices which are utilized only in an approved permanent cell environment.
    - \* Although the devices themselves have not been tested under the ANSI Standards according to Amersham, the control housings, crank mechanism and drive cable used with the Model 520 device are of the same material and design as controls manufactured by Sentinel which are approved under 10 CFR Part 34.
    - \* These Devices have been operated by XRI Testing inspection personnel with a 100% safety record.

*ADD'l info - 399324*  
**FEE NOT REQUIRED**

RECEIVED  
DEC 11 1995  
REGION III

*399614*

- \* Amersham said they will continue to provide support service to the device, controls and guide tubes.
- 2. XRI Testing would like to have this exemption for the Model 520 placed on its license for a period not to exceed 7 years. This will allow the Co60 sources to be utilized until no longer effective. XRI Testing wishes to request an exemption to 10 CFR 34.51 to allow continuous use of its TECH/OPS 520 Cobalt 60 Exposure Devices and Control Systems. These devices are only utilized within the confines of the permanent exposure cells.
- 3. Safety Operation for Permanent Cells, All permanent cells have the following interlock systems: All doors to cells are equipped with interlock systems that are activated along with a loud audible alarm when door is opened.
  - The keys for both equipment and cells are strictly controlled by Radiography Department Supervisors.
  - \* The Interlock Safety Alarm and Light systems are tested on a daily basis prior to beginning operations
- 4. All permanent cells are equipped with Area Radiation Monitors which are activated when source is exposed and activates a flashing red light both inside and outside the cell. These devices are calibrated on an annual basis.
- 5. See attached section form Emergency Operating Manual.
- 6. See attached letter from Amersham (Sentinel)

If you have any question please call, (810) 244-1546

Thank You



Larry Redhage  
NRC Records Administrator

cc: K. Thams (RSO)




17 November 1995

**SENTINEL**

Amersham Corporation  
40 North Avenue  
Burlington, MA 01803  
tel (617) 272-2000  
tel (800) 225-1383  
fax (617) 273-2216

Larry Redhage  
Records Administrator  
XRI Testing, Inc.  
1961 Thunderbird  
Troy, MI 48084

 **Amersham**  
QSA

Dear Mr. Redhage,

In response to your request for information regarding Amersham-SENTINEL continuing to support the Model 520 Cobalt device, I submit the following:

SENTINEL will provide service to the device, controls and guide tubes for the model 520. We cannot guarantee that all replacement parts will be available to support repairs as the model 520 system is no longer manufactured.

With respect to 10 CFR Part 34 compliance, the model 520 system has not been tested as it was manufactured prior to January 10, 1992 (ref. 10 CFR Part 34.21(b)). However, the control housings, crank mechanism and drive cable used with the Model 520 device is of the same material and design as controls manufactured by SENTINEL which are Part 34 compliant. However, we have not demonstrated that the control system for the Model 520 device is Part 34 compliant.

Your guide tubes may or may not be Part 34 compliant. There are two types of guide tubes used with the Model 520 device which can easily be differentiated by color, one is yellow, the other black. The yellow tubes are Part 34 compliant, the black ones are not.

I cannot confirm at this time if we will continue to support sources for the model 520 device. A decision should be made in the next few weeks.

Please feel free to contact me if you require further information.

Sincerely,



Bob Thomson  
Manager, Client Services

cc: C. Roughan  
D. Thorpe

X-R-I TESTING  
Section 3.

OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES  
& RADIOGRAPHIC EXPOSURE DEVICES

1.0 HANDLING AND USE OF EXPOSURE DEVICES:

1.1 Procedure "A" covers the operation of Gamma Ray projector permanently installed in the Gamma Cell.

a. (These projectors do not meet packaging requirements for transportation outside of X-R-I facility).

b. Models covered in Procedure "A" are:

Tech/Ops 520 Co60	Model Utility Twin 50, Gamma Exposure
Cobalt 60 Devices	Device Ind. Cobalt 60 and Iridium 192

1.2 Procedure "B" covers the operation of portable Gamma Ray projector moved in and out of the gamma cell as required by the nature of our work.

a. (These projectors can be used either in-house or transported and used in the field).

b. Models covered on Procedure "B" are:

Model 741, Amersham	Model 35 or Century, Gamma
Cobalt 60 , Device	Ind. Iridium 192 Device
Model 660, Amersham	Model 520, Automation Ind.
Iridium 192 Device	Iridium 192 Device

c. Units covered have capacity as noted in license and are stored within our locked isotope storage area or cabinet.

1.3 Procedure "C" covers the operation of Gamma Ray projectors used when field work outside the gamma cell, in customers' plants or at field sites as required.

a. (These units can be used in-house or transported to field location).

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OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES  
& RADIOGRAPHIC EXPOSURE DEVICES

- b. Models covered in Procedure "C" are:
- |   |   |
|---|---|
| Model 741, Amersham<br>Cobalt 60 Device   | Model 35 or Century, Gamma<br>Ind. Iridium 192 Device |
| Model 660, Amersham<br>Iridium 192 Device | Model 520, Automation Ind.<br>Iridium 192 Device      |
- c. These units are portable and are stored in our locked isotope storage area and/or cabinet when not in use.

2.0 PROCEDURES FOR USE OF EXPOSURE DEVICES:

- 2.1 Procedures A, B and C cover the use of Gamma Ray projectors manufactured by Amersham Technical Operations, Gamma Ind. & Automation Industries Inc. Appended to Section 3 of this operating and emergency procedure are detailed operating and maintenance manuals provided by the manufacturer for each device used including devices specifically used for the loading and unloading (source changers) of Radioactive Materials.
- a. These units are portable and are stored in our locked isotope storage area and/or cabinet when not in use

**NOTE: With An Approved & Calibrated Survey Instrument On Hand, Proceed With The Procedures As Outlined In "The Daily Operating Procedures".**

- 2.2 In all instances, guide tube source stops shall be used.
- a. Following the installation of guide tubes to any projector, the Radiographer shall insure that the guide tube source stop is firmly in place on the tip of the guide tube farthest from the projector.
- 2.3 Whenever practical, collimators shall be used to restrict the beam of radiation toward the areas of the test object to be radiographed.
- a. In addition, where practical, sheet lead shielding shall be used to further restrict the beam.

X-R-I TESTING  
Section 3.

OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES  
& RADIOGRAPHIC EXPOSURE DEVICES

3.0 SEALED SOURCES AND LIMITS OF LEVELS OF RADIATION FOR EXPOSURE DEVICES:

- 3.1 The Company is licensed to use only the sealed sources and devices designated on its license.
  - a. A copy of the current license is attached to these procedures.
- 3.2 Instructions for the safe use of these devices are outlined in the following procedures and in the appendix to this section.
- 3.3 The following requirements apply to radiographic exposure devices and associated equipment:
  - a. Each radiographic exposure device must have attached to it a durable, legible, clearly visible label bearing the following:
    - (1) Chemical symbol and mass number of the radionuclide in the device;
    - (2) Activity and the date on which this activity was last measured;
    - (3) Model number and serial number of the sealed source;
    - (4) Manufacturer of the sealed source; and
    - (5) Licensee's name, address, and telephone number.
  - b. Those radiographic exposure devices used outside our plant as Type "B" transport containers, shall, in addition, be labeled and meet all applicable requirements of 10 CFR Part 71.
  - c. Each device containing a sealed source is to be clearly labeled with a radiation caution symbol and the words: "CAUTION - RADIOACTIVE MATERIAL"
    - (1) All units are portable and are stored in either our locked storage cabinets or locked storage rooms.
    - (2) The following procedures shall be performed by the gamma cell radiographer at the beginning of unit operation.
    - (3) Daily checks must be properly documented on the laboratory gamma card.
    - (4) Information recorded on the laboratory card (Section 8 & 9) constitutes the utilization log as required by Section 34.27 of 10 CFR Part 34.

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Section 3.

OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES  
& RADIOGRAPHIC EXPOSURE DEVICES

- (5) Any abnormal conditions should be immediately reported to the Laboratory Manager, the Equipment Maintenance Engineer and the Radiation Safety Officer.
  - (a) Assure film badge/wallet card is on person.
  - (b) Obtain pocket dosimeter and record reading according to instructions.
  - (c) Obtain alarm ratemeter and determine adequate operations per instructions.
  - (d) Turn survey meter on and check for proper operation.
    - 1) Set range selector on X-1 scale.
  - (e) Obtain keys from the key box for the control lock and the gamma cell door.
- 3.4 Unlock gamma cell door and main door power interrupt lever.
  - a. (Lock door hasp and interrupt lever in open/on position).
  - b. With the following personnel monitoring devices:
    - (1) operating survey meter in hand,
    - (2) issued film badge,
    - (3) dosimeter and alarm ratemeter on person,
  - c. Enter cell provided a safe radiation level is indicated by the meter reading; and gamma alarm Tech/Ops Model 492C.
  - d. Entrance area readings should not exceed 2 MR/HR on survey meter.
- 3.5 Survey the projector on entry to determine that a safe storage condition exists.
  - a. Ten (10) milliroentgens per hour at one meter from any exterior surface of this unit or less is considered acceptable.
- 3.6 If drive cable isn't connected to source, connect it at this time.

**NOTE: (Ensure Drive Cable Is Connected Prior To Removing Shipping Plug To Install Guide Tubes)**

- 3.7 Place the survey meter nearby where its reading can be observed.



X-R-I TESTING  
Section 3.

OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES

STEP "A" DAILY OPERATING PROCEDURE  
PERMANENT UNIT

- a. Remove the shipping plug with the proper tools and affix the Source Guide Tubes and Source Stop Assembly.
  - b. Position source tip in normal work area of cell.
- 3.8 Make daily inspection of exposure device IAW/ gamma card check list.
- a. Check to be sure that no one is in the gamma cell.
  - b. Exit the cell, and close door.
  - c. Unlock the crank control assembly and expose source.
  - d. Record daily checks on laboratory card.
  - e. Check the gamma alarm system for proper operation of green and red lights and audible alarm interlocks.
  - f. Survey the adjacent area around the gamma cell for excessive radiation.
    - (1) If no abnormal conditions exist, commence operations.
    - (2) All area check points should have readings below 2 MR/HR.
  - g. At the end of each exposure:
    - (1) crank the source drive control to return the source to a safe "stored" position prior to opening the gamma cell door.
  - h. Enter the cell each time with survey meter in hand to assure that safe source storage has been achieved and excessive radiation levels are not present.
  - i. Survey both the guide tubes and storage projector.
- 3.9 It is the radiographer's responsibility to maintain complete control over the exposure device and it's crank control device at all times.

X-R-I TESTING  
Section 3.

OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES  
STEP "B" DAILY OPERATING PROCEDURE  
PORTABLE UNITS USED IN GAMMA CELL

- a. Should it become necessary for the radiographer to temporarily leave the immediate area, the cell door should be locked.

3.10 At the end of the work for this unit or the work shift:

- a. lock control unit, enter the gamma cell with survey meter in hand.
- b. survey source guide tubes and projector to determine complete return to the "safe" position of the source.
- c. Remove guide tubes and replace shipping plug in unit.
- d. Survey and lock projector, record readings on laboratory card.
- e. Check to assure that no one has entered the gamma cell, exit the cell, close and lock the cell door and power interrupt lever for main door.
- f. Return keys to key box, return survey meter to storage area, record dosimeter reading.

4.0 SEALED SOURCES AND LIMITS OF LEVELS OF RADIATION FOR EXPOSURE DEVICES:

4.1 The following procedures shall be performed by the gamma cell radiographer at the beginning of unit operation.

- a. Daily checks must be properly noted on the laboratory card.
  - (1) Information recorded on the laboratory card (Section 8 & 9) constitutes the utilization log as required by Section 34.27 of 10 CFR Part 34.
    - (a) Any abnormal conditions should be reported to the Laboratory Manager, the Equipment Maintenance Engineer to the Radiation Safety Officer immediately.
  - (2) Ensure film badge is on person.
  - (3) Obtain pocket dosimeter and charge then record serial number on Gamma Card.
  - (4) Obtain alarm ratemeter and determine adequate operations per instructions.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "B" DAILY OPERATING PROCEDURE  
PORTABLE UNITS USED IN GAMMA CELL

- (5) Turn survey meter on and check for proper operation.
  - (a) Set range selector on X-1 scale.
- b. Obtain keys from the key board for the control lock and the gamma cell door.
- 4.2 Unlock gamma cell door and main door power interrupt lever.
  - a. (Lock door hasp and interrupt lever in open/on position).
  - b. With the following personnel monitoring devices:
    - (1) operating survey meter in hand,
    - (2) issued film badge,
    - (3) dosimeter and alarm ratemeter on person, enter cell provided a safe radiation level is indicated by the meter reading; and gamma alarm Tech/Ops Model 492C.
  - c. Entrance area readings should not exceed 2 MR/HR on survey meter.
- 4.3 Survey the projector to determine that a safe condition exists.
  - a. WHEN USING AN IRIDIUM 192 PROJECTOR, radiation levels in excess of 50 1 milliroentgens per hour at six (6) inches from any exterior surface of the device are considered abnormal when the source is in the "safe" or stored position.
  - b. WHEN USING A COBALT 60 PROJECTOR, ten (10) milliroentgens per hour or less, at one meter from any exterior surface of this unit is considered acceptable.
- 4.4 Follow the applicable instructions for unit assembly, check out, and operation.
  - a. See appendix to this Section for specific operating instructions for the projector to be used.
  - b. Connect drive cable to source.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "B" DAILY OPERATING PROCEDURE  
PORTABLE UNITS USED IN GAMMA CELL

**NOTE: ENSURE DRIVE CABLE IS CONNECTED PRIOR TO REMOVING SHIPPING PLUG TO INSTALL GUIDE TUBES**

- c. Locate the source shield (Projector) at the desired position near the specimen to be radiographed.
- d. Remove the shipping plug and attach one section of the source guide tube to the shield exit port.
  - (1) Two additional guide tube sections may be added if needed.
- e. Attach the source stop assembly to the end of the guide tubes crank control assembly through the maze outside the gamma cell door with the control cable housings lying as straight as possible.
  - (1) If bends are necessary, they should have a large radius.
- f. You are now ready to proceed to make an exposure.
- g. Check the setup and make any adjustments necessary.
- h. When setup is ok, unlock the projector at key lock, select operate position.
  - (1) The source is now free to move by the counter-clockwise rotation of the control crank assembly.

**NOTE: THE LOCK SELECTOR RING ALSO HAS A CONNECT POSITION. THIS POSITION WILL ALLOW FOR DISCONNECTION OF THE SOURCE AT THE SWIVEL CONNECTOR FROM THE SOURCE DRIVE CABLE. THE SELECTOR RING SHOULD ONLY BE ROTATED TO THAT POSITION WHEN THE SHIPPING PLUG IS IN THE PROJECTOR.**

**R E M E M B E R**

**NOTE: ROTATE THE SELECTOR RING ONLY FROM LOCK TO OPERATE AND BACK TO LOCK POSITION ON THE AMERSHAM 660, 741 EXPOSURE DEVICES DURING ROUTINE RADIOGRAPHIC OPERATIONS**

- 4.5 After completing the above procedures for the specific projector model in use, proceed to make daily inspection of the exposure device in accordance with laboratory card check list.
- 4.6 Check to be sure that no one is in the gamma cell. Leave the cell and close the door.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "B" DAILY OPERATING PROCEDURE  
PORTABLE UNITS USED IN GAMMA CELL

- 4.7 Record daily checks on laboratory gamma card.
- 4.9 To make a radiographic exposure after your film, source guide tip, and part to be radiographed are in proper position, at the crank control assembly, turn the handle rapidly in a counter-clockwise direction until it stops. DO NOT FORCE IT'S MOVEMENT. The source will have moved 7, 14, 21 feet depending on the number of guide tubes used. The source is now exposed.
- 4.10 Check the gamma alarm system for proper operation of green and red lights and audible alarm interlocks.
- 4.11 Survey the adjace... area around the gamma cell for excessive radiation.
  - a. All area check points should have readings below 2 MR/HR.
  - b. If no abnormal conditions exist, continue operations.
- 4.12 At the end of each exposure, crank the source drive control to return the source to a safe stored position prior to opening the gamma cell door.
  - a. Enter the cell each time with operating survey meter in hand to assure that safe source storage has been achieved and excessive radiation levels are not present.
  - b. Survey both the guide tube and storage shield of the projector.
- 4.17 It is the Radiographer's responsibility to maintain complete control over the exposure device and it's crank control device at all times.
  - a. Should it become necessary for the Radiographer to temporarily leave the immediate area, the cell door should be locked.
- 4.18 Check the reading of your pocket dosimeter at frequent intervals.
- 4.19 At the end of the work for this unit or the work shift:
  - a. lock control unit, enter the gamma cell with survey meter in hand
  - b. survey source guide tubes and projector to determine complete return to the "safe" position of the source.
  - c. Remove guide tubes and replace shipping plug in unit.
  - d. Survey and lock projector, record readings on laboratory gamma card.



X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "C" DAILY OPERATING PROCEDURE  
FOR PORTABLE COBALT 60 AND IRIIDIUM 192 PROJECTORS  
TO BE USED IN FIELD WORK OUTSIDE OF THE GAMMA CELL.

- e. Check to assure that no one has entered the gamma cell, exit the cell, close and lock the cell door and power interrupt lever for main door.
- 4.20 Return keys to key box, return survey meter to storage area, record dosimeter readings.
  - a. The following procedures shall be performed by the radiographer at the beginning of unit operation.
  - b. Daily checks must be properly noted on the laboratory gamma card.
    - (1) Information recorded on the laboratory gamma card (Section 8 & 9) constitutes the utilization log as required by Section 34.27 of 10 CFR Part 34.
    - (2) Any abnormal conditions must be reported to the Laboratory Manager, the Equipment Maintenance Engineer, and/or the Radiation Safety Officer immediately.
  - c. Assure film badge is on person.
  - d. Obtain pocket dosimeter and "0" out by charging, log serial number on gamma card.
  - e. Obtain alarm ratemeter and determine adequate operations per instructions.
  - f. Turn on survey meter and check for proper operation. Set range selector on X-1 scale.
  - g. Obtain keys from key box for gamma cell storage cabinet and for the projector that will be used.
- 6. Unlock gamma cell, enter with survey meter in hand. Unlock storage cabinet, locate and remove the proper projector to be used.
- 7. Survey the projector to determine that a safe condition exists.
  - a. WHEN USING AN IRIIDIUM 192 PROJECTOR, radiation levels in excess of 50 milliroentgens per hour at six (6) inches from any exterior surface of the device are considered abnormal when the source is in the "safe" or stored position.
  - b. WHEN USING A COBALT 60 PROJECTOR, ten (10) milliroentgens per hour or less, at one meter from any exterior surface of this unit is considered acceptable.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "C" DAILY OPERATING PROCEDURE  
FOR PORTABLE COBALT 60 AND IRIDIUM 192 PROJECTORS  
TO BE USED IN FIELD WORK OUTSIDE OF THE GAMMA CELL.

8. Check to determine that the shipping plug is securely inserted.
9. Record the results of the above inspection on the laboratory card.
10. The locked projector may now be placed in the vehicle. It must be securely fastened within the vehicle to prevent damage by movement and jarring during transportation.
11. Before leaving for job, it is required that the following information be entered on the job card:
  - a. Radiographer's name.
  - b. Model and serial number of the camera.
  - c. Source serial number and curie strength.
  - d. Customers name and location of work area.
12. If Yellow III labels are required, the following applies: Check the posting of radiation warning signs on the vehicle. If they are dirty, they must be cleaned to assure high visibility.
13. The instructions and rules covering the transportation of sources by motor vehicle are covered in Section 8.
14. At the work site, the following operating procedures must be followed precisely:
  - a. The work site should be selected with consideration for providing the maximum amount of restricted access by unauthorized personnel.
  - b. The site must be conspicuously marked with rope barricades which prevent entrance to the area by unauthorized personnel.
  - c. Post "RADIATION AREA" signs conspicuously at several points along the 2 MR/HR barrier line to alert personnel of potential hazard. Post "HIGH RADIATION AREA" signs conspicuously at the calculated 100 MR/HR distance from the source location. Refer to suggested layout in Charts A and B.
  - d. Before proceeding with the next steps, determine that your film badge, charged pocket dosimeter and alarm ratemeter are on your person. Turn on the radiation survey meter and when the meter indicates that stable operation has taken place, proceed with the next step.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "C" DAILY OPERATING PROCEDURE  
FOR PORTABLE COBALT 60 AND IRIIDIUM 192 PROJECTORS  
TO BE USED IN FIELD WORK OUTSIDE OF THE GAMMA CELL.

- e. Survey the projector in the vehicle to determine that a safe condition exists.
  - (1) WHEN USING AN IRIIDIUM 192 SOURCE, radiation levels in excess of 50 milliroentgens per hour at six (6) inches from any exterior surface of the projector is considered abnormal when the source is in the "safe" or stored position.
  - (2) WHEN USING A COBALT 60 SOURCE, ten milliroentgens per hour or less, at one meter from any exterior surface of the projector is considered acceptable.
- f. Check to determine that the shipping plug is securely inserted.
- g. Record the results of the above inspection on the vehicle survey sheet.
- h. The projector may not be removed from the vehicle. It should be moved to the site that will be used during radiography.
- i. Follow the applicable instructions for unit assembly, check out and operation. Model 660, Amersham, Model 35 or Century, Gamma Industries, Model 520, Automation Industries for Iridium Radiography and Model 741, Amersham for Cobalt Radiography. For each of these, the setup instructions will be the same as previously given in the Daily Operating Procedures A, B, C and, the Appendixes of this Section.
  - (1) Locate the source shield at the desired position near the specimen to be radiographed.
  - (2) Securely connect drive cable to source cable connector.

**NOTE: (Ensure Drive Cable Is Connected Prior To Removing Shipping Plug To Install Guide Tubes)**

- (3) Remove shipping plug with the proper tools.
- (4) Attach one section of the source guide tube in place of the plug.
  - (a) Two additional guide tubes may be added if necessary.
- (5) Attach the source stop assembly to the end of the guide tube farthest from the projector.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "C" DAILY OPERATING PROCEDURE  
FOR PORTABLE COBALT 60 AND IRIIDIUM 192 PROJECTORS  
TO BE USED IN FIELD WORK OUTSIDE OF THE GAMMA CELL.

- (a) The control tubes should lie as straight as possible.
  - (b) If bends are necessary, they should have as large a radius as possible.
- (6) Use a collimator on a setup where possible, to limit scattered radiation.
- j. After completing the above procedure for the camera and model used, proceed to make daily inspection of the exposure device in accordance with the laboratory card.
- k. Check to be sure that no one is in the barricaded area. Leave the area and return to the projector control.
- l. Record the daily checks on the laboratory card.
  - (1) With the operating survey meter on its most sensitive scale, (X-1) operate the crank to move the source to the exposed position.
  - (2) With the survey meter, promptly check all points along the perimeter of the controlled area to determine the radiation dose rate level.
    - (a) If any region is found which exceeds the level of 2 MR/HR, it will be necessary to reduce the level by either:
      - 1) moving the barrier further out or
      - 2) by providing additional shielding in the vicinity of the source.
    - (b) If the radiation levels are found to be adequately low, then proceed with the next step.
    - (c) To determine where to post high radiation areas, 100 mr/hr Radiographers "SHALL" use the inverse square law to calculate these locations versus using a survey meter.
- m. Return the source to the storage position. Confirm this by surveying the projector and the guide tube with the survey meter.
- n. Prepare for radiography of the test object by making any final adjustment of the source guide tube and mounting the film in the appropriate regions.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "C" DAILY OPERATING PROCEDURE  
FOR PORTABLE COBALT 60 AND IRIDIUM 192 PROJECTORS  
TO BE USED IN FIELD WORK OUTSIDE OF THE GAMMA CELL.

- o. After checking to be sure that no one is in the radiation area, proceed with the radiographic exposure.
  - (1) During exposure period, it is necessary to be alert to the possibility of personnel accidentally entering the controlled area.
  - (2) Never leave the site of the projector unattended.
    - (a) It is the Radiographer's responsibility to maintain complete control over the exposure device and it's crank control device at all times.
    - (b) Should it become necessary for the Radiographer to leave the immediate area, the exposure device or it's crank control device must be locked to prevent unauthorized use or accidental exposure.
    - (c) If both the Radiographer and Assistant Radiographer must temporarily leave the area, the exposure device must be returned to the transporting vehicle and secured.
- p. At the end of the exposure, crank the source drive control clockwise to return the source to the stored position.
  - (1) Confirm this with the radiation survey meter.
  - (2) Survey both the guide tube and projector.
- q. When the work requirements for the unit have been completed, survey the source guide tubes and the projector to determine that the source is in the stored position.
  - (1) Remove the guide tubes and replace the shipping plug.
    - (a) Lock the unit.
    - (b) Record the survey readings on the laboratory card.
    - (c) Reel up the control on the control cables on the unit.
    - (d) Return the projector to the vehicle and stow it to assure safe transportation.
- r. Record the reading of your pocket dosimeter on the laboratory card.
- s. For temporary storage of the projector at the job site, it should be placed in the vehicle and the vehicle locked.

**NOTE: (ALL PORTABLE PROJECTORS NOT IN USE, ARE TO BE STORED IN THE LOCKED SOURCE STORAGE PROVIDED**



NOV 21 1995

X-R-I Testing  
Division of X-Ray Industries, Inc.  
ATTN: Larry Redhage  
NRC Records Administrator  
1961 Thunderbird  
Troy, MI 48084

Dear Mr. Redhage:

This references your amendment request in the form of a letter dated October 12, 1995 requesting a variance/waiver from the equipment criteria specified in 10 CFR 34.20 due to go into effect January 10, 1996. We will forward your request to our Division of Industrial and Medical Nuclear Safety, NMSS, in Washington, D.C. for their evaluation.

Before we forward your request, you need to clarify your request and to demonstrate that XRI testing has acceptable engineered safety features and/or procedures in place to compensate for the required safety provisions. To accomplish this, please address the following:

1. If XRI testing wishes to request authorization to use exposure devices after January 10, 1996, which do not meet all requirements of the regulations in 10 CFR 34.20, then XRI Testing needs to apply for exemptions to specific sections of the regulations pursuant to the provisions of 10 CFR 34.51. For example, you should determine (from the device registration sheet) whether the device was prototype tested in accordance with American National Standards Institute N432-1980 (ANSI-N432). If not, an exemption from 10 CFR 34.20(a) for the devices would be necessary. You should also consider other associated equipment used with the device, i.e., device cables, guide tubes, exposure heads, etc. For example, it may be appropriate to request an exemption to the requirements of 10 CFR 34.20(a), (c)(2) and (e), pursuant to 10 CFR 34.51, effective January 10, 1996, to use Model \_\_\_\_ exposure device and Model \_\_\_\_ control system.
2. Specify the date when the Co-60 will have decayed sufficiently that you will discontinue use of the Gamma Industries Utility Twin 50 and the AMSHM-Tech Ops 520.
3. A complete description and discussion of the door interlock system for each fixed facility and how this system operates to keep the source from being exposed.

4. A complete description and discussion of any other radiation alarm systems installed in each facility, and how these alarms might help to prevent the source from being inadvertently exposed.
5. A copy of XRI Testing facility operating procedures which include provisions for ensuring that the source is not inadvertently exposed.
6. Contact the manufacturers of both exposures devices and confirm to us that they will continue to support the devices, i.e., provide replacement parts.

If you have any questions or require clarification on any of the information stated above, you may contact us at (708) 829-9887.

We will continue our review of your application upon receipt of this information. Please reply in duplicate, within 30 days, and refer to Control Number 99324.

Sincerely,

Original Signed By  
Loren Hueter  
Nuclear Materials Licensing Branch

License No. 21-05472-01  
Docket No. 030-04837

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JAN 28 1997

Larry Redhage  
NRC Records Administrator  
X-R-I Testing  
Division of X-Ray Industries, Inc.  
1961 Thunderbird  
Troy, MI 48094

Dear Mr. Redhage:

Enclosed is Amendment No. 32 to your NRC Material License No. 21-05472-01 in accordance with your request.

Please review the enclosed document carefully and be sure that you understand all conditions. If there are any errors or questions, please notify the U.S. Nuclear Regulatory Commission, Region III office at (630) 829-98P7 so that we can provide appropriate corrections and answers.

Please note: we have added five years to the expiration date listed on your license. You have received official notification from our headquarters office explaining the cause for the five-year extension. In the meantime, if you have any questions, please call me.

Please be advised that your license expires at the end of the day, in the month, and year stated in the license. Unless your license has been terminated, you must conduct your program involving byproduct materials in accordance with the conditions of your NRC license, representations made in your license application, and NRC regulations. In particular, note that you must:

1. Operate in accordance with NRC regulations 10 CFR Part 19, "Notices, Instructions and Reports to Workers; Inspections," 10 CFR Part 20, "Standards for Protection Against Radiation," and other applicable regulations.
2. Notify NRC, in writing, within 30 days:
  - a. When the Radiation Safety Officer permanently discontinues performance of duties under the license or has a name change; or
  - b. When the licensee's mailing address changes (no fee is required if the location of byproduct material remains the same).
3. In accordance with 10 CFR 30.36(b) and/or license condition, notify NRC, promptly, in writing, and request termination of the license when you decide to terminate all activities involving materials authorized under the license.
4. Request and obtain a license amendment before you:
  - a. Change Radiation Safety Officers;

399614

- b. Order byproduct material in excess of the amount, or radionuclide, or form different than authorized on the license;
  - c. Add or change the areas of use or address or addresses of use identified in the license application or on the license; or
  - d. Change ownership of your organization.
5. Submit a complete renewal application with proper fee or termination request at least 30 days before the expiration date of your license. You will receive a reminder notice approximately 90 days before the expiration date. Possession of byproduct material after your license expires is a violation of NRC regulations. A license will not normally be renewed, except on a case-by-case basis, in instances where licensed material has never been possessed or used.

In addition, please note that NRC Form 313 requires the applicant, by his/her signature, to verify that the applicant understands that all statements contained in the application are true and correct to the best of the applicant's knowledge. The signatory for the application should be the licensee or certifying official rather than a consultant.

You will be periodically inspected by NRC. Failure to conduct your program in accordance with NRC regulations, license conditions, and representations made in your license application and supplemental correspondence with NRC will result in enforcement action against you. This could include issuance of a notice of violation, or imposition of a civil penalty, or an order suspending, modifying or revoking your license as specified in the General Policy and Procedures for NRC Enforcement Actions. Since serious consequences to employees and the public can result from failure to comply with NRC requirements, prompt and vigorous enforcement action will be taken when dealing with licensees who do not achieve the necessary meticulous attention to detail and the high standard of compliance which NRC expects of its licensees.

Sincerely,  
Original Signed By  
Loren J. Hueter  
Nuclear Materials Licensing Branch

License No.: 21-05472-01  
Docket No.: 030-04837

Enclosures: 1. Amendment No. 32  
2. NRC Form 313

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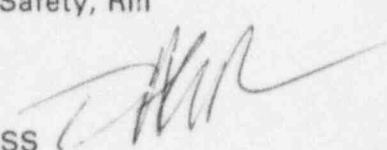


UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

96-58

January 10, 1997

MEMORANDUM TO: Brenda J. Holt, Chief  
Materials Licensing Branch  
Division of Nuclear Materials Safety, RIII

FROM: Donald A. Cool, Director  
Division of Industrial and  
Medical Nuclear Safety, NMSS 

SUBJECT: TECHNICAL ASSISTANCE REQUEST; XRI TESTING;  
LICENSE NUMBER 21-05472-01; CONTROL NO. 399614

BACKGROUND

I am responding to your technical assistance request (TAR) dated August 16, 1996 (Attachment 1), transmitting letter dated June 26, 1996, from XRI Testing (XRI), requesting an exemption from certain provisions specified in 10 CFR 34.20.

XRI Testing requests exemption from the provisions of: 10 CFR 34.20(a) requiring that radiography exposure devices meet the requirements specified in American National Standard Institute N432-1980 (ANSI-N432); 10 CFR 34.20(c)(2), which provides that a radiography exposure device must automatically secure the source assembly when it is cranked back into the fully shielded position within the device; and 10 CFR 34.20(c)(4) which requires that each sealed source assembly must be labeled.

STAFF ANALYSIS

A. BASIS FOR EXEMPTION

1. Limited Special or Unique Cases

Information Notice 95-58 (IN 95-58): "10 CFR 34.20; FINAL EFFECTIVE DATE," indicates that the NRC staff will consider exemptions from 10 CFR 34.20 for limited special or unique cases. The staff believes that the Amersham Model 520 exposure device, used as described by XRI, meets these criteria in two ways:

- a. The Amersham Model 520 is a large, cobalt-60 camera in a fixed location.

CONTACT: Anthony S. Kirkwood, NMSS  
(301) 415-6140

JAN 15 1997

- b. The device is used in the special case of radiography of "heavy walled" material that cannot be penetrated without the use of this device (currently there are no approved devices capable of utilizing up to 1000 curies of cobalt-60, as can the Model 520). XRI indicates that the device is needed on a consistent basis.

## 2. Engineered Safety Features, Use Limitations, and Procedures

IN 95-58 considers exemptions to 10 CFR 34.20 . . . where the licensee can demonstrate that the "engineered safety features, use limitations, and procedures would compensate for not meeting the requirements, and afford similar or increased radiation safety protection." The staff believes that the Amersham Model 520 exposure device, as described by XRI, meets these criteria and compensates for not meeting 10 CFR 34.20(a) (design and construction of radiography apparatus), and (c)(2) (not having an automatic locking device) by:

### a. Engineered Safety Features

- 1). The device is large and located in a fixed installation with the required safety interlocks and radiation alarms required by 10 CFR 34.29.
- 2). The device crank handle is equipped with a lock that secures the cobalt-60 source in the safe, stored position.

NOTE: The staff believes that the crank handle locking device is less preferable to a locking device on the exposure device itself. Additional safety measures are recommended such as: a procedure to audit the radiographer while using the Model 520, observing the locking of the crank handle; the use of two operators; and an engineered safety feature that would prevent the crank handle locking device from being unlocked, except by the radiographer using the device.

### b. Use Limitations

- 1). The device can only be used in the permanent radiography facility.
- 2). The device will be replaced by an approved device on or before December 10, 2002.

### c. Procedures

- 1). XRI would re-emphasize a safety procedure that requires the radiographer to lock the device crank handle, after returning the cobalt source to its housing.
- 2). XRI will require radiographers to wear personal radiation alarm ratemeters while working in the permanent cell.



### 3. Source Assemblies

XRI is licensed to use Amersham Models A453-5 and A453-6 source assemblies with their Model 520 exposure device. These source assemblies are not listed in IN 95-58 as meeting 10 CFR 34.20 requirements, however the source assemblies do use a connector which meets 10 CFR 34.20(c)(1). The staff believes that with the approved connectors, these source assemblies do not need an exemption from 10 CFR 34.20(c)(1) (fail safe connectors). In addition, in view of the requirement limiting use of the Model 520 to a permanent cell, and that the sources were purchased before labeling was required (1991), the source assemblies can be exempted from the provision of 10 CFR 34.20(c)(4) (labeling).

### 4. Associated Equipment

XRI Testing indicates in their December 10, 1995, letter that the control housings, crank mechanisms, and drive cables are of the same design and material as Amersham components which are approved under 10 CFR Part 34. In its January 8, 1996, letter, XRI Testing confirmed that its guide tubes comply with 10 CFR 34.20 requirements.

## B. RECOMMENDED CONDITIONS OF USE

1. Region III should "tie-down" in the licensee commitments, that the Model 520 continues to be located in a fixed installation, with the safety interlocks and radiation alarms required by 10 CFR 34.29.
2. The region should "tie-down" in the licensee commitments, the safety procedure that requires the radiographer to lock the device crank handle, after returning the cobalt source to its housing. XRI should commit to a procedure, or describe an engineered safety feature that would prevent the crank handle locking device from being unlocked, except by the radiographer using the device.

NOTE: The intent of 10 CFR 34.20(c)(2) is to reduce the likelihood of the source being inadvertently and unexpectedly exposed. Inadvertent or unexpected source exposure may occur because of moving the device, inadvertent movement of the drive cable or drive crank, other human error, or mechanical failure.

3. The region should "tie-down" in the licensee commitments, a procedure to perform quarterly audits of the radiographer, to include locking the device crank handle every time the source is retracted to the fully shielded position.
4. The region should "tie-down" in the licensee commitments, the procedure to require two radiographers during the use of the Model 520.
5. The region should "tie-down" in the licensee commitments, the procedure to require radiographers to wear personal radiation alarm ratemeters while working in the permanent cell.

6. The region should "tie-down" in the license, a commitment from XRI that they will terminate the use of their Model 520 device when parts and/or service are no longer available from Amersham.

NOTE: The registration sheet for the Model 520 is classified as "inactive" indicating that Amersham does not intend to distribute any new Model 520 devices. However, Amersham has indicated that it intends to continue to provide support for the device for as long as parts last.

Section 34.51 of 10 CFR Part 34, authorizes the Commission to grant such exemptions from the requirements of the regulations in this part, as it determines are authorized by law, and will not result in undue hazards to life or property. We conclude that XRI's exemption request meets the requirements of 10 CFR 34.51, provided that the use of the Amersham Model 520 exposure device and the Models A453-5 and A453-6 source assemblies are as described by XRI in their letters dated October 12, and December 10, 1995, and January 8, and June 26, 1996, and that the procedures and commitments described in Item B are "tied-down" in the license. With these provisions, we concur with the region's recommendation that the exemption request be granted. Attachment 2 is a suggested license condition authorizing the exemption.

Attachments:

1. TAR dtd August 16, 1996
2. Suggested License Condition



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
801 WARRENVILLE ROAD  
LISLE, ILLINOIS 60532-4351  
AUG 20 1996

96-58

REGIONAL TECHNICAL ASSISTANCE REQUEST FORM

Date: August 16, 1996

Mail or E-Mail to: Don Cool (DAC), Mail Stop: 8F5 TWFN, If E-mail, cc:CLE  
Division of Industrial and Medical Nuclear Safety, NMSS

From: for Kevin G. Mader  
John R. Madera (JRM4) (Name and E-mail initials) Region III  
Chief, Nuclear Materials Safety and Safeguards Branch

Licensee: X-R-I Testing License No.: 21-05472-01

☐ Control No. 399614 (if applicable)

☐ Letter Dated: June 26, 1996 (if applicable)

☐ Suggested change in licensing procedure (enclosed):

☐ Problem/Issue: This is a follow-up TAR which encloses the licensee's response via their letter dated June 26, 1996, to the remaining issues identified in your initial TAR response letter dated April 1, 1996.

☐ Action Required: Evaluate licensee's submittal to determine if it adequately addresses the remaining issues and provide suggested wording for the exemptions to be granted.

Recommended Action (with revisions): ☒ Approve or ☐ Reject

Remarks: Licensee request expeditious review.

Headquarter Reviewer:

Regional Reviewer: Loren J. Hueter

Reviewer Code: R8

Reviewer Phone No.: (630) 829-9829

FAX No.: (630) 515-1259

Request Needed by: 09/15/96

cc: C. Pederson



# X-RAY INDUSTRIES, INC.

June 26, 1996

Mr. Bruce Carrico  
Division Of Nuclear Materials Safety  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

A

030-04837

**RE: Technical Assistance Request For Equipment Exemption:  
License Number: 21-05472-01**

Dear Mr. Carrico:

I am responding to your letter of April 1, 1996 in order to restate XRI Testing's position and re-address the outstanding issues.

The first issue to address is the source model numbers supported by Amersham. XRI Testing currently has the following Source Model Number types: (1)- A424-7, which is an approved model number, (1) - A453-6 & (1) -A453-5. For source models A-453-6 and A-453-5 which may not meet the requirements as stated in your letter, XRI would like to submit a request at this time for an exemption from 10 CFR 34.20(c)(4).

The second issue is to establish the purpose for XRI Testings request for an exemption from 10 CFR 34.20, allowing for the continued use of the TECH/OPS 520 cobalt 60 exposure device. The necessity for this exemption request is due to the Heavy Walled material consistently being radiographed. Co60 is the only practical solution for this problem as IR 192 has approximately an effective range of only about 3 inches penetration. Much of the gamma type work received at XRI for testing is in excess of 4 inches.

The third issue was the concern about operational safety with the TECH/OPS 520 devices. The units are used in a controlled environment within the approved, permanent cells. After returning cobalt source to its housing, the device crank handle is locked prior to radiographer entering the cell, thus preventing any accidental exposures. As requested, this safety procedure (which has always been standard operating procedure with these units) has been included in Section 3 of XRI Testing's Emergency Operating Manual ( See Attachment 1).

If you have any questions or need further clarifications please contact Kirk Thams (RSO) or myself at (810) 244-1542 or 244-1546.

Thank you,

*Larry Redhage*

Larry Redhage  
X-Ray Industries, Inc.  
Quality Systems Director  
NRC Records Administrator

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JUL 19 1996

REGION III

JUL 19 1996

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PM, 7-19-96

## XRI TESTING

## Section 3.

## ATTACHMENT 1

OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES

STEP "A" DAILY OPERATING PROCEDURE  
PERMANENT UNIT

4.0 PERMANENT CELL OPERATION:

- 4.0 Unlock gamma cell door and main door power interrupt lever.
- a. (Lock door hasp and interrupt lever in open/on position).
  - b. With the following personnel monitoring devices:
    - (1) operating survey meter in hand,
    - (2) issued film badge,
    - (3) dosimeter and alarm ratemeter on person,
  - c. Enter cell provided a safe radiation level is indicated by the meter reading; and gamma alarm Tech/Op: ~~1~~ 492C.
  - d. Entrance area readings should not exceed 2 MR/HR on survey meter.
- 4.2 Survey the projector on entry to determine that a safe storage condition exists.
- a. Ten (10) milliroentgen per hour at one meter from any exterior surface of this unit or less is considered acceptable.
- 4.3 If drive cable isn't connected to source, connect it at this time.

*Note: Ensure Drive Cable Is Connected Prior To Removing Shipping Plug To Install Guide Tubes)*

- 4.4 Place the survey meter nearby where its reading can be observed.
- a. Remove the shipping plug with the proper tools and affix the Source Guide Tubes and Source Stop Assembly.
  - b. Position source tip in normal work area of cell.

## XRI TESTING

## Section 3.

OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCESSTEP "A" DAILY OPERATING PROCEDURE  
PERMANENT UNIT

4.5 Make daily inspection of exposure device IAW/ gamma card check list.

- a. Check to be sure that no one is in the gamma cell.
- b. Exit the cell, and close door.
- c. Unlock the crank control assembly and expose source.
- d. Record daily checks on laboratory card.
- e. Check the gamma alarm system for proper operation of green and red lights and audible alarm interlocks.
- f. Survey the adjacent area around the gamma cell for excessive radiation.

- (1) If no abnormal conditions exist, commence operations.
- (2) All area check points should have readings below 2 MR/HR.

g. At the end of each exposure:

- (1) crank the source drive control to return the source to a safe "stored" position prior to opening the gamma cell door.

*Note: When Using Tech/Ops 520 Cobalt Exposure Device, Radiographer Shall Lock Drive Cable Crank Prior To Entering Exposure Cell. This Drive Cable Operating Procedure Is Mandatory Because It Forms Is An Integral Part Of Our License Agreement With The NRC Which Allows XRI An Exemption For Continuous Utilization Of These Exposure Devices.*

- h. Enter the cell each time with survey meter in hand to assure that safe source storage has been achieved and excessive radiation levels are not present.
- i. Survey both the guide tubes and storage projector.

4.6 It is the radiographer's responsibility to maintain complete control over the exposure device and it's crank control device at all times.



SUGGESTED LICENSE CONDITION

- XX. Notwithstanding the requirements of 10 CFR 34.20(a) and (c), and pursuant to 10 CFR 34.51, the licensee may use their Amersham Model 520 exposure device and their Amersham source assembly Models A453-5 and A453-6 in accordance with the statements, procedures, and representations contained in the licensee's letters dated October 12, and December 10, 1995; January 8, and June 26, 1996; and [type(s) and date(s) of document(s)].

AUG 20 1996

96-58

REGIONAL TECHNICAL ASSISTANCE REQUEST FORM

Date: August 16, 1996

Mail or E-Mail to: Don Cool (DAC), Mail Stop: 8F5 TWFN. If E-mail, cc:CLE  
Division of Industrial and Medical Nuclear Safety, NMSS

From: John R. Madera (JRM4) (Name and E-mail initials) Region III  
Chief, Nuclear Materials Safety and Safeguards Branch

Licensee: X-R-I Testing License No.: 21-05472-01

- ☐ Control No. 399614 (if applicable)
- ☐ Letter Dated: June 26, 1996 (if applicable)
- ☐ Suggested change in licensing procedure (enclosed):
- ☐ Problem/Issue: This is a follow-up TAR which encloses the licensee's response via their letter dated June 26, 1996, to the remaining issues identified in your initial TAR response letter dated April 1, 1996.
- ☐ Action Required: Evaluate licensee's submittal to determine if it adequately addresses the remaining issues and provide suggested wording for the exemptions to be granted.

Recommended Action (with revisions): ☒ Approve or ☐ Reject

Remarks: Licensee request expeditious review.

Headquarter Reviewer:

Regional Reviewer: Loren J. Hueter

Reviewer Code: R8

Reviewer Phone No.: (630) 829-9829

FAX No.: (630) 515-1259

Request Needed by: 09/15/96

DOCUMENT NAME: M:\03004837.TA6

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	DNMS/RIII	<input checked="" type="checkbox"/> E	DNMS/RIII	<input checked="" type="checkbox"/> IV					
NAME	LJHueter:bri	<i>LJH</i>	JRMadera	<i>JRM</i>	<i>W</i>				
DATE	08/19/96		08/19/96						

OFFICIAL RECORD COPY



# X-RAY INDUSTRIES, INC.

June 26, 1996

Mr. Bruce Carrico  
Division Of Nuclear Materials Safety  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

X

030-04837

**RE: Technical Assistance Request For Equipment Exemption:  
License Number: 21-05472-01**

Dear Mr. Carrico:

I am responding to your letter of April 1, 1996 in order to restate XRI Testing's position and re-address the outstanding issues.

The first issue to address is the source model numbers supported by Amersham. XRI Testing currently has the following Source Model Number types: (1)- A424-7, which is an approved model number, (1) - A453-6 & (1) -A453-5. For source models A-453-6 and A-453-5 which may not meet the requirements as stated in your letter, XRI would like to submit a request at this time for an exemption from 10 CFR 34.26(c)(4).

The second issue is to establish the purpose for XRI Testings request for an exemption from 10 CFR 34.20, allowing for the continued use of the TECH/OPS 520 cobalt 60 exposure device. The necessity for this exemption request is due to the Heavy Walled material consistently being radiographed. Co60 is the only practical solution for this problem as IR 192 has approximately an effective range of only about 3 inches penetration. Much of the gamma type work received at XRI for testing is in excess of 4 inches.

The third issue was the concern about operational safety with the TECH/OPS 520 devices. The units are used in a controlled environment within the approved, permanent cells. After returning cobalt source to its housing, the device crank handle is locked prior to radiographer entering the cell, thus preventing any accidental exposures. As requested, this safety procedure (which has always been standard operating procedure with these units) has been included in Section 3 of XRI Testing's Emergency Operating Manual ( See Attachment 1).

If you have any questions or need further clarifications please contact Kirk Thams (RSO) or myself at (810) 244-1542 or 244-1546.

Thank you,

*Larry Redhage*

Larry Redhage  
X-Ray Industries, Inc.  
Quality Systems Director  
NRC Records Administrator

RECEIVED

JUL 19 1996

REGION III

JUL 19 1996

301616

DM: 7-19-96

## XRI TESTING

### Section 3.

ATTACHMENT 1

## OPERATING AND EMERGENCY PROCEDURES HANDLING AND USE OF LICENSED SEALED SOURCES

### STEP "A" DAILY OPERATING PROCEDURE PERMANENT UNIT

#### 4.0 PERMANENT CELL OPERATION:

- 4.0 Unlock gamma cell door and main door power interrupt lever.
  - a. (Lock door hasp and interrupt lever in open/on position).
  - b. With the following personnel monitoring devices:
    - (1) operating survey meter in hand,
    - (2) issued film badge,
    - (3) dosimeter and alarm ratemeter on person,
  - c. Enter cell provided a safe radiation level is indicated by the meter reading; and gamma alarm Tech/Ops Model 492C.
  - d. Entrance area readings should not exceed 2 MR/HR on survey meter.
- 4.2 Survey the projector on entry to determine that a safe storage condition exists.
  - a. Ten (10) milliroentgen per hour at one meter from any exterior surface of this unit or less is considered acceptable.
- 4.3 If drive cable isn't connected to source, connect it at this time.

*Note: Ensure Drive Cable Is Connected Prior To Removing Shipping Plug To Install Guide Tubes)*

- 4.4 Place the survey meter nearby where its reading can be observed.
  - a. Remove the shipping plug with the proper tools and affix the Source Guide Tubes and Source Stop Assembly.
  - b. Position source tip in normal work area of cell.

**XRI TESTING****Section 3.****OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES****STEP "A" DAILY OPERATING PROCEDURE  
PERMANENT UNIT**

4.5 Make daily inspection of exposure device IAW/ gamma card check list.

- a. Check to be sure that no one is in the gamma cell.
- b. Exit the cell, and close door.
- c. Unlock the crank control assembly and expose source.
- d. Record daily checks on laboratory card.
- e. Check the gamma alarm system for proper operation of green and red lights and audible alarm interlocks.
- f. Survey the adjacent area around the gamma cell for excessive radiation.

- (1) If no abnormal conditions exist, commence operations.
- (2) All area check points should have readings below 2 MR/HR.

g. At the end of each exposure:

- (1) crank the source drive control to return the source to a safe "stored" position prior to opening the gamma cell door.

*Note: When Using Tech/Ops 520 Cobalt Exposure Device, Radiographer Shall Lock Drive Cable Crank Prior To Entering Exposure Cell. This Drive Cable Operating Procedure Is Mandatory Because It Forms Is An Integral Part Of Our License Agreement With The NRC Which Allows XRI An Exemption For Continuous Utilization Of These Exposure Devices.*

- h. Enter the cell each time with survey meter in hand to assure that safe source storage has been achieved and excessive radiation levels are not present.
- i. Survey both the guide tubes and storage projector.

4.6 It is the radiographer's responsibility to maintain complete control over the exposure device and it's crank control device at all times.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

John,

XRI sent this directly to  
HQ. I assume you still  
have a licensing action  
on this. It needs to  
come to us on another TAE

Bruce





# X-R-I TESTING

DIVISION OF X-RAY INDUSTRIES, INC.

January 08, 1996

Mr. Loren Hueter  
United States  
Nuclear Regulatory Commission  
Region III  
801 Warrenville Road  
Lisle, Illinois 60532-4351

SUBJECT: NRC License Number: 21-05472-01

REFERENCE NUMBER: ~~399641~~

399614

Dear Loren:

Referenced below is the additional information and clarification requested during our phone conversation on Friday, 1/5/96.

- \* Pursuant to 10 CFR 34.51, XRI Testing would like to request an exemption from performance requirements for radiographic equipment specified in 10 CFR 34.20 (a),(c)(2) & (e) for Sentinel/Amersham 520 CO60 Exposure Devices. These exposure devices shall only be utilized within the confines of an approved permanent cell as previously stated in my letter to the NRC dated December 10, 1995.
- \* XRI withdraws its request for an exemption from 10 CFR 34.20 for the Gamma Industries Utility Twin 50 Cobalt 60 Exposure Device as it will no longer be utilized after January 10, 1996.
- \* XRI Confirms it has available and will only use the "Yellow" guide tubes compliant with 10 CFR 34.20 for the Sentinel/Amersham 520 CO60 Exposure Devices.
- \* XRI Confirms it will not use the Sentinel/Amersham 520 CO60 Exposure Devices when needed replacement parts are no longer available from Sentinel/Amersham.

If I can be of any further help please call (810) 244-1546

Thank You

Larry Redhage

NRC Records Administrator

RECEIVED

JAN 12 1996

REGION III

JAN 12 1996

## CONVERSATION RECORD

TIME

DATE

1-8-96

TYPE

☐ VISIT☐ CONFERENCE☒ TELEPHONE☐ INCOMING☒ OUTGOING

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU

Larry Redhage

ORGANIZATION (Office, dept., bureau, etc.)

X-R-I  
Testing

TELEPHONE NO.

810-244  
-1546

ROUTING

NAME/SYMBOL

INT

SUBJECT

CN 399614

SUMMARY

1. Clarify <sup>that</sup> exemption request is pursuant to 10 CFR 34.51 ~~and~~ for exemption to the performance requirements for radiography equipment specified in 10 CFR 34.20 (a), (c)(2) and (e).
2. Confirm they no longer wish to request an exemption to 10 CFR 34.20 criteria for the ~~Diamond~~ <sup>Industries</sup> Utility Train 5?
3. Confirm that licensee will no longer use a Sentinel/Amersham model 520 exposure device when needed replacement parts are not available from Sentinel/Amersham.
4. Confirm they will only use Part 34 compliant yellow guide tubes with the model 520 exposure device.

5. Will ref. CN 399614, FAX response today followed by hard copy.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION

SIGNATURE

DATE

Loren Hunter

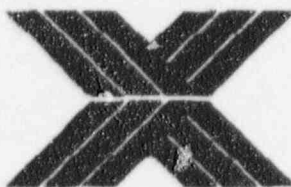
1-8-96

ACTION TAKEN

SIGNATURE

TITLE

DATE

**X-R-I TESTING**

DIVISION OF X-RAY INDUSTRIES, INC.

## Fax Cover Sheet

DATE: July 25, 1996 TIME: 2:13 PM

TO: James Mullauer Phone: (708) 829-8873  
NRC Fax: (708) 515-1259

FROM: Larry Redhage Phone: (810) 244-1546  
XRI Testing Fax: (810) 362-4422

RE: Equipment Exemption Request For Tech/Ops 520 Cobalt Exposure Device

CC: K. Thams - RSO

Number of pages including cover sheet: 4 Pages

Mr. Mullauer:

I'm sending the letter XRI received on April 1, 1996 for your review. XRI first applied for exemption from 10 CFR 34.20, in October 1995. It is our understanding the equipment exemption request had to be reviewed by a technical review board. XRI didn't receive any information about the request until receipt of the April 1, 1996 letter. As requested, XRI Testing re-submitted the equipment exemption with justification for continued utilization in the June 1996 letter.

After reading the letter please call me so we can discuss any open issues.

Sincerely,

Larry Redhage  
Radiation Records

Administrator

X-Ray Industries, Inc.

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555-0001

April 1, 1996

MEMORANDUM TO: John R. Madera, Chief  
Materials Licensing Branch  
Division of Nuclear Materials Safety, RIII

FROM: Larry W. Camper, Chief  
Medical, Academic, and Commercial  
Use Safety Branch  
Division of Industrial and  
Medical Nuclear Safety, NMSS

SUBJECT: TECHNICAL ASSISTANCE REQUEST; XRI TESTING;  
LICENSE NUMBER 21-05472-01

I am responding to your technical assistance request (TAR) dated January 8, 1996, transmitting letters dated October 12, 1995, December 10, 1995, and January 8, 1996 (Attachment 1), from XRI Testing, requesting an exemption from certain provisions specified in Section 34.20 of 10 CFR Part 34.

XRI Testing requests an exemption from the provisions of 10 CFR 34.20(a) that radiography exposure devices must meet the requirements specified in American National Standard Institute N432-1980 (ANSI-N432) and 10 CFR 34.20(c)(2), which provides that a radiography exposure device must automatically secure the source assembly when it is cranked back into the fully shielded position within the device. XRI Testing seeks authorization for continued use of its Amersham Model 520 exposure devices within XRI Testing's permanent facility radiography cells. Without the exemption, XRI Testing would have to discontinue using the device as required by 10 CFR 34.20(e). In its October 12, 1995, letter, XRI Testing states, "these devices have been utilized on a daily basis without incident." In its December 10, 1995, letter, XRI Testing indicates that it only intends to continue to use the devices for a period not to exceed 7 years after which the cobalt-60 would no longer be effective. XRI Testing also indicates in the December 10th letter that the control housings, crank mechanisms, and drive cables are of the same design and material as Amersham components which are approved under 10 CFR Part 34. In its January 8, 1996 letter, XRI Testing confirmed that its guide tubes comply with 10 CFR 34.20 requirements. While XRI Testing's submission initially included Gamma Industries Utility Twin 50 devices, the licensee withdrew this portion of its request.

CONTACT: J. Bruce Carrico, NMSS  
(301) 415-7826

OPTIONAL FORM 10 (7-90)

## FAX TRANSMITTAL

3 of pages 3

To: <i>Larry Redhage</i>	From: <i>Larry Redhage</i>
Date/Agent: <i>4/1/96</i>	Phone #:
Fax # <i>810-362-4422</i>	Fax #:
NRC 100-0-317-1306 5000-101 GENERAL SERVICES ADMINISTRATION	

2-286

J. R. Madera

2

The Amersham Model 520 is a large, fixed location, cobalt-60 camera. The registration sheet for the Model 520 is classified as "inactive" indicating that Amersham does not intend to distribute any new Model 520 devices. However, Amersham has indicated that it intends to continue to provide support for the device. In reviewing the registration sheet for the device, we noted that there is no information in the registration sheet to indicate that the device was prototype tested in accordance with ANSI-N432, which is required by 10 CFR 34.20(a). On-the-other-hand, the registration sheets for the sealed source assemblies used with the exposure device are classified as "active." However, while the registration sheet and the RADXREF program for two of the source models (A424-7 and A453-2) indicate that the assemblies meet applicable 10 CFR 34.20 requirements, RADXREF shows that the other two assemblies (Models A453-5 and A453-6) may not meet 10 CFR 34.20 criteria. In a conversation with an Amersham representative, we understand that although the registration sheet for these sources was maintained active, Amersham may have initially only planned to transfer Models A424-7 or A453-2 as replacement sources. The registration sheet for Models A453-5 and A453-6 shows that the source assemblies use a connector which meets 10 CFR 34.20(c)(1); however, we will need information to show that the sources will comply with the ANSI-N432 criteria for source assemblies. Amersham also indicated that if the sources were manufactured prior to 1991, it is unlikely that the sources would be labeled in accordance with 10 CFR 34.20(c)(4). If this applies in this case, XRI Testing also needs to request an exemption from this provision.

XRI Testing does not identify any special or unique reason why it needs this exemption; rather, XRI Testing's submission appears to indicate that because the devices have been safely utilized on a daily basis without incident, "a 100% safety record," continued use of the equipment does not present a radiological hazard. XRI Testing seems to further justify its exemption request on the basis that its use of the devices would not exceed 7 years and states, "This regulation (10 CFR 34.20) has unintentionally created a monopoly for one supplier for the short term and placing users at a disadvantage." Other than limiting use in fixed radiography cells complying with 10 CFR 34.29, and use of alarm ratemeters by workers, XRI Testing does not propose any limitations be imposed for its continued use of the devices.

The Commission directed the NRC staff to publish Information Notice 95-58, "10 CFR 34.20; FINAL EFFECTIVE DATE," (Attachment 2), dated December 18, 1995. The IN states, "Exemptions to 10 CFR 34.20 may be considered only for limited special or unique cases, where the licensee can demonstrate that the engineered safety features, use limitations, and procedures would compensate for not meeting the requirements and afford similar or increased radiation safety protection." The intent of the 10 CFR 34.20(c)(2) requirement is to reduce the likelihood of the source being inadvertently and unexpectedly exposed. This problem may occur because of moving the device, inadvertently moving the drive cable, the drive crank, or perhaps due to some other human carelessness.

Because XRI Testing's request involves radiographic devices and certain sources assemblies that do not comply with 10 CFR 34.20, the request does not identify any special or unique reason to warrant an exemption, and because XRI Testing fails to propose engineered safety features, use limitations, or



J. R. Madera

3

April 1, 1996

procedures to compensate for not meeting the requirements which afford similar or increased radiation safety protection, the exemption request cannot not be approved. The region should inform XRI Testing that in accordance with the guidance provided in IN 95-58, the NRC will not approve an exemption request under the conditions proposed by XRI Testing. XRI Testing could resubmit a request provided it addresses the previously noted issues. For example, XRI Testing's operating procedures could include specific provisions such as the use of a lock to secure the drive mechanism after an exposure and instructions to personnel, for ensuring that the source is not inadvertently exposed. Another alternative would be use of an electrical drive system similar to what GM Powertrain (Region III TAR dated March 8, 1995) described for use with its Amersham Model 520 device. Again, the licensee should clarify any special or unique reason to warrant an exemption, e.g., the need for a high energy, high activity source due to a special application, etc., and should provide additional information as described previously for the source assemblies.

## Attachments:

1. TAR dtd 1/8/96
2. In 95-58



...	CONTROL #	LICENSEE NAME	LICENSE #	SENDER/RECIPIENT	DATE SENT	RESP. REC'D
96-01	399740	WAUKESHA FOUNDRY	47-13776- 01	MULLAVER COOL	1-6-96	
96-02	399614	X-R-I TESTING	21-25472- 01	HUEYER COOL	1-10-96	4-1-96
96-03	399764	Dep. Army	13-18235- 01	MULLAVER COOL	1-10-96	FEB 16 1996
96-04	399761	WII Centrifugal	48-11641- 01	MULLAVER COOL	1-10-96	5-31-96
96-05	399601	St. Vincent County Hosp	34-01856- 01	CASEY COOL	JAN 17 1996	
96-06	300207	WIDENELL DOUGLAS	24-02261- 03	MATSON BYKOSKI	1-13-96	MAY 09 1996
96-07	399500	LOWELAND	13-26398- 01	COOL NULL	1-23-96	5-3-96
96-08	399766	TWA	24-05151- 05	COOL MULLAVER	JAN 25 1996	FEB 15 1996
96-09	399759	UNIV OF CINN	34-06903- 05	COOL MULLAVER	JAN 26 1996	3-19-96
96-10	399856	NORTHWEST AIRLINES	22-12080- -01	COOL MULLAVER	JAN 29 1996	5-1-96
96-11	300212	WANTERPA	24-24817- 01	BYKOSKI FRATIER	JAN 31 1996	MAY 09 1996
96-12	399582	Sigma Chemical	24-16273- 01	COOL MULLAVER	FEB 05 1996	3-28-96
96-13	N/A	IN 89-25 OWNERSHIP	N/A	COOL MADERA	FEB 14 1996	
96-14	399706	BATTELLE	SNM-7	MCCORMICK-BARBER NULL	FEB 20 1996	1-22-96
96-15	N/A	AMS	34-19089- 01	WEBER COOL	FEB 23 1996	5-13-96
96-16	N/A	STATE OF MI) CANNON MUSKOGEE	21-17674- 03	NULL COOL	FEB 27 1996	
96-17	399723	William fowell Corp	34-02263- 01	MULLAVER COOL	MAR 01 1996	7-1-96
96-18	399918	SMITHS INDUSTRIES	SUB-1557	HUEYER meb	3-1-96	5-10-96
96-19	396604	St. ELIZABETH	48-10219- 01	WATSON COOL	MAR 06 1996	



# X-RAY INDUSTRIES, INC.

June 26, 1996

Mr. Bruce Carrico  
Division Of Nuclear Materials Safety  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

A

030-04837

**RE: Technical Assistance Request For Equipment Exemption:  
License Number: 21-05472-01**

Dear Mr. Carrico:

I am responding to your letter of April 1, 1996 in order to restate XRI Testing's position and re-address the outstanding issues.

The first issue to address is the source model numbers supported by Amersham. XRI Testing currently has the following Source Model Number types: (1)- A424-7, which is an approved model number, (1) - A453-6 & (1) -A453-5. For source models A-453-6 and A-453-5 which may not meet the requirements as stated in your letter, XRI would like to submit a request at this time for an exemption from 10 CFR 34.20(c)(4).

The second issue is to establish the purpose for XRI Testings request for an exemption from 10 CFR 34.20, allowing for the continued use of the TECH/OPS 520 cobalt 60 exposure device. The necessity for this exemption request is due to the Heavy Walled material consistently being radiographed. Co60 is the only practical solution for this problem as IR 192 has approximately an effective range of only about 3 inches penetration. Much of the gamma type work received at XRI for testing is in excess of 4 inches.

The third issue was the concern about operational safety with the TECH/OPS 520 devices. The units are used in a controlled environment within the approved, permanent cells. After returning cobalt source to its housing, the device crank handle is locked prior to radiographer entering the cell, thus preventing any accidental exposures. As requested, this safety procedure (which has always been standard operating procedure with these units) has been included in Section 3 of XRI Testing's Emergency Operating Manual ( See Attachment 1).

If you have any questions or need further clarifications please contact Kirk Thams (RSO) or myself at (810) 244-1542 or 244-1546.

Thank you,

Larry Redhage  
X-Ray Industries, Inc.

Quality Systems Director  
NRC Records Administrator

RECEIVED

JUL 19 1996

REGION III

JUL 19 1996

301616

DM: 7-19-96

**XRI TESTING**  
**Section 3.**

ATTACHMENT 1

**OPERATING AND EMERGENCY PROCEDURES**  
**HANDLING AND USE OF LICENSED SEALED SOURCES**

**STEP "A" DAILY OPERATING PROCEDURE**  
**PERMANENT UNIT**

**4.0 PERMANENT CELL OPERATION:**

- 4.0 Unlock gamma cell door and main door power interrupt lever.
  - a. (Lock door hasp and interrupt lever in open/on position).
  - b. With the following personnel monitoring devices:
    - (1) operating survey meter in hand,
    - (2) issued film badge,
    - (3) dosimeter and alarm ratemeter on person,
  - c. Enter cell provided a safe radiation level is indicated by the meter reading; and gamma alarm Tech/Ops Model 492C.
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*Note: Ensure Drive Cable Is Connected Prior To Removing Shipping Plug To Install Guide Tubes)*

- 4.4 Place the survey meter nearby where its reading can be observed.
  - a. Remove the shipping plug with the proper tools and affix the Source Guide Tubes and Source Stop Assembly.
  - b. Position source tip in normal work area of cell.

**XRI TESTING****Section 3.****OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES****STEP "A" DAILY OPERATING PROCEDURE  
PERMANENT UNIT**

4.5 Make daily inspection of exposure device IAW/ gamma card check list.

- a. Check to be sure that no one is in the gamma cell.
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- (1) If no abnormal conditions exist, commence operations.
- (2) All area check points should have readings below 2 MR/HR.

g. At the end of each exposure:

- (1) crank the source drive control to return the source to a safe "stored" position prior to opening the gamma cell door.

*Note: When Using Tech/Ops 520 Cobalt Exposure Device, Radiographer Shall Lock Drive Cable Crank Prior To Entering Exposure Cell. This Drive Cable Operating Procedure Is Mandatory Because It Forms Is An Integral Part Of Our License Agreement With The NRC Which Allows XRI An Exemption For Continuous Utilization Of These Exposure Devices.*

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4.6 It is the radiographer's responsibility to maintain complete control over the exposure device and it's crank control device at all times.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

John,

XRI sent this directly to  
H.G. I assume you still  
have a licensing action  
on this. It needs to  
come to us on another TAE

Bruce



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

April 1, 1996

96-02

MEMORANDUM TO: John R. Madera, Chief  
Materials Licensing Branch  
Division of Nuclear Materials Safety, RIII

FROM: Larry W. Camper, Chief *Larry W. Camper*  
Medical, Academic, and Commercial  
Use Safety Branch  
Division of Industrial and  
Medical Nuclear Safety, NMSS

SUBJECT: TECHNICAL ASSISTANCE REQUEST; XRI TESTING;  
LICENSE NUMBER 21-05472-01

I am responding to your technical assistance request (TAR) dated January 8, 1996, transmitting letters dated October 12, 1995, December 10, 1995, and January 8, 1996 (Attachment 1), from XRI Testing, requesting an exemption from certain provisions specified in Section 34.20 of 10 CFR Part 34.

XRI Testing requests an exemption from the provisions of 10 CFR 34.20(a) that radiography exposure devices must meet the requirements specified in American National Standard Institute N432-1980 (ANSI-N432) and 10 CFR 34.20(c)(2), which provides that a radiography exposure device must automatically secure the source assembly when it is cranked back into the fully shielded position within the device. XRI Testing seeks authorization for continued use of its Amersham Model 520 exposure devices within XRI Testing's permanent facility radiography cells. Without the exemption, XRI Testing would have to discontinue using the device as required by 10 CFR 34.20(e). In its October 12, 1995, letter, XRI Testing states, "these devices have been utilized on a daily basis without incident." In its December 10, 1995, letter, XRI Testing indicates that it only intends to continue to use the devices for a period not to exceed 7 years after which the cobalt 60 would no longer be effective. XRI Testing also indicates in the December 10th letter that the control housings, crank mechanisms, and drive cables are of the same design and material as Amersham components which are approved under 10 CFR Part 34. In its January 8, 1996 letter, XRI Testing confirmed that its guide tubes comply with 10 CFR 34.20 requirements. While XRI Testing's submission initially included Gamma Industries Utility Twin 50 devices, the licensee withdrew this portion of its request.

CONTACT: J. Bruce Carrico, NMSS  
(301) 415-7826

APR 4 1996



The Amersham Model 520 is a large, fixed location, cobalt-60 camera. The registration sheet for the Model 520 is classified as "inactive" indicating that Amersham does not intend to distribute any new Model 520 devices. However, Amersham has indicated that it intends to continue to provide support for the device. In reviewing the registration sheet for the device, we noted that there is no information in the registration sheet to indicate that the device was prototype tested in accordance with ANSI-N432, which is required by 10 CFR 34.20(a). On-the-other-hand, the registration sheets for the sealed source assemblies used with the exposure device are classified as "active." However, while the registration sheet and the RADXREF program for two of the source models (A424-7 and A453-2) indicate that the assemblies meet applicable 10 CFR 34.20 requirements, RADXREF shows that the other two assemblies (Models A453-5 and A453-6) may not meet 10 CFR 34.20 criteria. In a conversation with an Amersham representative, we understand that although the registration sheet for these sources was maintained active, Amersham may have initially only planned to transfer Models A424-7 or A453-2 as replacement sources. The registration sheet for Models A453-5 and A453-6 shows that the source assemblies use a connector which meets 10 CFR 34.20(c)(1); however, we will need information to show that the sources will comply with the ANSI-N432 criteria for source assemblies. Amersham also indicated that if the sources were manufactured prior to 1991, it is unlikely that the sources would be labeled in accordance with 10 CFR 34.20(c)(4). If this applies in this case, XRI Testing also needs to request an exemption from this provision.

XRI Testing does not identify any special or unique reason why it needs this exemption; rather, XRI Testing's submission appears to indicate that because the devices have been safely utilized on a daily basis without incident, "a 100% safety record," continued use of the equipment does not present a radiological hazard. XRI Testing seems to further justify its exemption request on the basis that its use of the devices would not exceed 7 years and states, "This regulation (10 CFR 34.20) has unintentionally created a monopoly for one supplier for the short term and placing users at a disadvantage." Other than limiting use in fixed radiography cells complying with 10 CFR 34.29, and use of alarm ratemeters by workers, XRI Testing does not propose any limitations be imposed for its continued use of the devices.

The Commission directed the NRC staff to publish Information Notice 95-58, "10 CFR 34.20; FINAL EFFECTIVE DATE," (Attachment 2), dated December 18, 1995. The IN states, "Exemptions to 10 CFR 34.20 may be considered only for limited special or unique cases, where the licensee can demonstrate that the engineered safety features, use limitations, and procedures would compensate for not meeting the requirements and afford similar or increased radiation safety protection." The intent of the 10 CFR 34.20(c)(2) requirement is to reduce the likelihood of the source being inadvertently and unexpectedly exposed. This problem may occur because of moving the device, inadvertently moving the drive cable, the drive crank, or perhaps due to some other human carelessness.

Because XRI Testing's request involves radiographic devices and certain sources assemblies that do not comply with 10 CFR 34.20, the request does not identify any special or unique reason to warrant an exemption, and because XRI Testing fails to propose engineered safety features, use limitations, or

April 1, 1996

procedures to compensate for not meeting the requirements which afford similar or increased radiation safety protection, the exemption request cannot not be approved. The region should inform XRI Testing that in accordance with the guidance provided in IN 95-58, the NRC will not approve an exemption request under the conditions proposed by XRI Testing. XRI Testing could resubmit a request provided it addresses the previously noted issues. For example, XRI Testing's operating procedures could include specific provisions such as the use of a lock to secure the drive mechanism after an exposure and instructions to personnel, for ensuring that the source is not inadvertently exposed. Another alternative would be use of an electrical drive system similar to what GM Powertrain (Region III TAR dated March 8, 1995) described for use with its Amersham Model 520 device. Again, the licensee should clarify any special or unique reason to warrant an exemption, e.g., the need for a high energy, high activity source due to a special application, etc., and should provide additional information as described previously for the source assemblies.

## Attachments:

1. TAR dtd 1/8/96
2. In 95-58



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION III  
801 WARRENVILLE ROAD  
LISLE, ILLINOIS 60532-4351

96-02  
IMAB

REQUEST FOR TECHNICAL ASSISTANCE

DATE: January 8, 1996

TO: Don A. Cool (DAC), Mail Stop: 6H3-OWFN,  
Division of Industrial and Medical Nuclear Safety, NMSS

FROM: John R. Madera (JRM4), Chief *JRM*  
Nuclear Materials Licensing Branch, Region III

LICENSEE: X-R-I Testing LICENSE NO. 21-05472-01

CONTROL NO. 399614

LETTERS DATED: October 12, 1995, November 21, 1995, December 10, 1995, and  
January 8, 1996

PROBLEM/ISSUE: Pursuant to 10 CFR 34.51, the licensee requests an exemption  
to the performance criteria specified in 10 CFR 34.20(a),  
(c)(2) and (e), required by January 10, 1996, for  
radiography equipment. The relief is sought for 3 Tech Ops  
(amersham) 520 exposure devices housing Co-60 sources and  
used only in fixed facility radiography cells. The request  
is for a period not to exceed 7 years when the current  
sources will no longer be effective. They have dropped  
their original similar request for the Gamma Industries  
Utility Twin 50.

ACTION REQUIRED: Evaluate licensee submittal to determine if their particular  
equipment, facilities and procedures provide adequate safety  
to justify the requested exemptions.

RECOMMENDED ACTION: Approve

Recommend approval of exemption if your evaluation concludes that safety of  
their particular operation would not be materially improved by enforcement of  
the performance criteria specified in 10 CFR 34.20(a) and (c)(2).

REMARKS: Licensee requests expeditious review.

Headquarter Reviewer:  
Regional Reviewer: Loren Hueter  
Reviewer Code: R8  
Reviewer Phone No. (708) 829-9829 Fax No. (708) 515-1259  
Request Needed by: January 31, 1996

Attachment 1



# X-RAY INDUSTRIES, INC.

October 12, 1995

Ms. Debbie Piskura  
United States  
Nuclear Regulatory Commission  
Region III  
801 Warrenville Road  
Lisle, Illinois 60532-4351

SUBJECT: NRC License Number: 21-05472-01 Amendment 30

Dear Debbie:

The reason for this letter is twofold. First, XRI Testing would like to request a variance/waiver to be placed on its license to allow the continued utilization of its Utility Twin 50 and Amersham/TecOps 520 Co 60 exposure devices until the cobalt sources themselves are no longer useful. These units are utilized within the confines of XRI Testings Laboratory cells and are never transported for field operations. Due to 10 CFR requirements which take effect in January 1996, all devices not having the capability of being retrofitted with the safety changes will be obsolete. This regulation has unintentionally created a monopoly for one supplier for the short term and placing users at a disadvantage. XRI Testing has four devices which are safely being utilized on a daily basis without incident.

Below are exposure devices that XRI would like to have re-classified as "In House Operation Only" on its license:

<u>EXPOSURE DEVICE</u>	<u>SOURCE TYPE</u>	<u>SOURCE MODEL NUMBER</u>
* Gamma Industries (CO 60) Utility Twin 50		SPEC G5 & G6 (NOTE: IR92 will not be utilized in this exposure device)
* Amrsham/TechOps 520 (CO 60)		A-453-2,5,6 or A-424-7

The second request is to make an Amendment to XRI Testing's License. The following are changes that need to be made, but not take effect until after January 1996.

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Remove the following equipment:

<u>EXPOSURE DEVICE</u>	<u>SOURCE TYPE</u>	<u>SOURCE MODEL NUMBER</u>
* Amersham 491	(CO60)	AMSHM/A-424-3
* Amersham 920	(IR192)	AMSHM/90003 ASSY
* Amersham 533	(IR192)	AMSHM/A-424-1
* Amersham 900	(IR192)	AMSHM/90003 ASSY
* SPEC Model 2T	(IR192)	SPEC/G1,G1F,G3F AMSHM/89911,
* TechOps 660 Systems	(IR192)	SPEC/T5, T5F; AMSHM A-424-9 Industrial Nuclear 7

Add the following equipment and permanent cell to license:

<u>EXPOSURE DEVICE</u>	<u>SOURCE TYPE/ACTIVITY</u>	<u>SOURCE MODEL NUMBER</u>	<u>SOURCE</u>	<u>CHANGER</u>
* SPEC Model 150	(IR192) 150 Ci	SPEC/G-60	C-1	
* AMERSHAM 660 SERIES	(IR192) 100 Ci	AMSHM/A-424-9 or SPEC/T-5 & T-5F	AMSHM 650 & 414 / C-1	

Add to item 11. on license the following permanent exposure cell address:  
(See Attachment #1, Cell Design/Configuration and Radiation Measurements)

XRI Testing  
1400 Old Highway 69  
Mt. Vernon, IN

Please add Robert Shields (See Attachment #2, Qualifications ) as site R.S.O. for Mt. Vernon Operation to item 12 on license and remove the following names as they are no longer in the employment of XRI Testing:

- \* Dallas Sammons
- \* Steve Binning

If you have any question please call, (810) 244-1546

Thank You

Larry Redhage  
NRC Records Administrator



NOV 21 1995

X-R-<sup>T</sup> Testing  
Division of X-Ray Industries, Inc.  
ATTN: Larry Redhage  
NRC Records Administrator  
1961 Thunderbird  
Troy, MI 48084

Dear Mr. Redhage:

This references your amendment request in the form of a letter dated October 12, 1995 requesting a variance/waiver from the equipment criteria specified in 10 CFR 34.20 due to go into effect January 10, 1996. We will forward your request to our Division of Industrial and Medical Nuclear Safety, NMSS, in Washington, D.C. for their evaluation.

Before we forward your request, you need to clarify your request and to demonstrate that XRI testing has acceptable engineered safety features and/or procedures in place to compensate for the required safety provisions. To accomplish this, please address the following:

1. If XRI testing wishes to request authorization to use exposure devices after January 10, 1996, which do not meet all requirements of the regulations in 10 CFR 34.20, then XRI Testing needs to apply for exemptions to specific sections of the regulations pursuant to the provisions of 10 CFR 34.51. For example, you should determine (from the device registration sheet) whether the device was prototype tested in accordance with American National Standards Institute N432-1980 (ANSI-N432). If not, an exemption from 10 CFR 34.20(a) for the devices would be necessary. You should also consider other associated equipment used with the device, i.e., device cables, guide tubes, exposure heads, etc. For example, it may be appropriate to request an exemption to the requirements of 10 CFR 34.20(a), (c)(2) and (e), pursuant to 10 CFR 34.51, effective January 10, 1996, to use Model \_\_\_\_ exposure device and Model \_\_\_\_ control system.
2. Specify the date when the Co-60 will have decayed sufficiently that you will discontinue use of the Gamma Industries Utility Twin 50 and the AMSHM-Tech Ops 520.
3. A complete description and discussion of the door interlock system for each fixed facility and how this system operates to keep the source from being exposed.



4. A complete description and discussion of any other radiation alarm systems installed in each facility, and how these alarms might help to prevent the source from being inadvertently exposed.
5. A copy of XRI Testing facility operating procedures which include provisions for ensuring that the source is not inadvertently exposed.
6. Contact the manufacturers of both exposures devices and confirm to us that they will continue to support the devices, i.e., provide replacement parts.

If you have any questions or require clarification on any of the information stated above, you may contact us at (708) 829-9887.

We will continue our review of your application upon receipt of this information. Please reply in duplicate, within 30 days, and refer to Control Number 99324.

Sincerely,

Original Signed By  
Loren Hueter  
Nuclear Materials Licensing Branch

License No. 21-05472-01  
Docket No. 030-04837

DOCUMENT NAME: M:\03004837.DF5

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NAME	LJHueter:brt								
DATE	11/20/95								

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# X-R-I TESTING

DIVISION OF X-RAY INDUSTRIES, INC.

December 10, 1995

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(R8)

ADDL.  
INFO.

Mr. Loren Hueter  
United States  
Nuclear Regulatory Commission  
Region III  
801 Warrenville Road  
Lisle, Illinois 60532-4351

SUBJECT: NRC License Number: 21-05472-01 Amendment 30  
REFERENCE NUMBER: 399324

Dear Loren:

Below are the answers to the questions from your letter on XRI Testings request for and extension Co 60 exposure devices. Also, I need to increase the maximum allowable curies for the new Sentinel 660 exposure device in item "Q" on page 4 of XRI Testing's license. Currently it allows a maximum activity of 100 Curies, and I need to increase that to around 117 Curies, which will permit XRI the full capability of the device.

1. With regards to 10 CFR 34.20 (Exposure Devices Not Having Safety Features Incorporated Will Be Obsolete Jan. 10, 1996)
  - XRI Testing would like to request an exemption to the 10 CFR 34.20 & 10 CFR 34.51 regulations due to the following points:
    - \* XRI has 3 Tech/Ops 520 Co60 devices which are utilized only in an approved permanent cell environment.
    - \* Although the devices themselves have not been tested under the ANSI Standards according to Amersham, the control housings, crank mechanism and drive cable used with the Model 520 device are of the same material and design as controls manufactured by Sentinel which are approved under 10 CFR Part 34.
    - \* These Devices have been operated by XRI Testing inspection personnel with a 100% safety record.

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- \* Amersham said they will continue to provide support service to the device, controls and guide tubes.

2. XRI Testing would like to have this exemption for the Model 520 placed on its license for a period not to exceed 7 years. This will allow the Co60 sources to be utilized until no longer effective. XRI Testing wishes to request an exemption to 10 CFR 34.51 to allow continuous use of its TECH/OPS 520 Cobalt 60 Exposure Devices and Control Systems. These devices are only utilized within the confines of the permanent exposure cells.
3. Safety Operation for Permanent Cells, All permanent cells have the following interlock systems: All doors to cells are equipped with interlock systems that are activated along with a loud audible alarm when door is opened.
  - The keys for both equipment and cells are strictly controlled by Radiography Department Supervisors.
  - \* The Interlock Safety Alarm and Light systems are tested on a daily basis prior to beginning operations
4. All permanent cells are equipped with Area Radiation Monitors which are activated when source is exposed and activates a flashing red light both inside and outside the cell. These devices are calibrated on an annual basis:
5. See attached section form Emergency Operating Manual.
6. See attached letter from Amersham (Sentinel)

If you have any question please call, (810) 244-1546

Thank You



Larry Redhage  
NRC Records Administrator

cc: K. Thams (RSO)

17 November 1995

## SENTINEL

Amersham Corporation  
40 North Avenue  
Burlington, MA 01803  
tel (617) 272-2000  
tel (800) 225-1383  
fax (617) 273-2216

Larry Redhage  
Records Administrator  
XRI Testing, Inc.  
1961 Thunderbird  
Troy, MI 48084

**Amersham**  
USA

Dear Mr. Redhage,

In response to your request for information regarding Amersham-SENTINEL continuing to support the Model 520 Cobalt device, I submit the following:

SENTINEL will provide service to the device, controls and guide tubes for the model 520. We cannot guarantee that all replacement parts will be available to support repairs as the model 520 system is no longer manufactured.

With respect to 10 CFR Part 34 compliance, the model 520 system has not been tested as it was manufactured prior to January 10, 1992 (ref. 10 CFR Part 34.21(b)). However, the control housings, crank mechanism and drive cable used with the Model 520 device is of the same material and design as controls manufactured by SENTINEL which are Part 34 compliant. However, we have not demonstrated that the control system for the Model 520 device is Part 34 compliant.

Your guide tubes may or may not be Part 34 compliant. There are two types of guide tubes used with the Model 520 device which can easily be differentiated by color, one is yellow, the other black. The yellow tubes are Part 34 compliant, the black ones are not.

I cannot confirm at this time if we will continue to support sources for the model 520 device. A decision should be made in the next few weeks.

Please feel free to contact me if you require further information.

Sincerely,



Bob Thomson  
Manager, Client Services

cc: C. Roughan  
D. Thorpe

X-R-I TESTING  
Section 3.

OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES  
& RADIOGRAPHIC EXPOSURE DEVICES

1.0 HANDLING AND USE OF EXPOSURE DEVICES:

1.1 Procedure "A" covers the operation of Gamma Ray projector permanently installed in the Gamma Cell.

a. (These projectors do not meet packaging requirements for transportation outside of X-R-I facility).

b. Models covered in Procedure "A" are:

Tech/Ops 520 Co60  
Cobalt 60 Devices

Model Utility Twin 50, Gamma Exposure  
Device Ind. Cobalt 60 and Iridium 192

1.2 Procedure "B" covers the operation of portable Gamma Ray projector moved in and out of the gamma cell as required by the nature of our work.

a. (These projectors can be used either in-house or transported and used in the field).

b. Models covered on Procedure "B" are:

Model 741, Amersham  
Cobalt 60 , Device

Model 35 or Century, Gamma  
Ind. Iridium 192 Device

Model 660, Amersham  
Iridium 192 Device

Model 520, Automation Ind.  
Iridium 192 Device

c. Units covered have capacity as noted in license and are stored within our locked isotope storage area or cabinet.

1.3 Procedure "C" covers the operation of Gamma Ray projectors used when field work outside the gamma cell, in customers' plants or at field sites as required.

a. (These units can be used in-house or transported to field location).

X-R-I TESTING  
Section 3.

OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES  
& RADIOGRAPHIC EXPOSURE DEVICES

- b. Models covered in Procedure "C" are:

Model 741, Amersham  
Cobalt 60 Device

Model 35 or Century, Gamma  
Ind. Iridium 192 Device

Model 660, Amersham  
Iridium 192 Device

Model 520, Automation Ind.  
Iridium 192 Device

- c. These units are portable and are stored in our locked isotope storage area and/or cabinet when not in use.

2.0 PROCEDURES FOR USE OF EXPOSURE DEVICES:

- 2.1 Procedures A, B and C cover the use of Gamma Ray projectors manufactured by Amersham Technical Operations, Gamma Ind. & Automation Industries inc. Appended to Section 3 of this operating and emergency procedure are detailed operating and maintenance manuals provided by the manufacturer for each device used-including devices specifically used for the loading and unloading (source changers) of Radioactive Materials.

- a. These units are portable and are stored in our locked isotope storage area and/or cabinet when not in use

*NOTE: With An Approved & Calibrated Survey Instrument On Hand, Proceed With The Procedures As Outlined In "The Daily Operating Procedures".*

- 2.2 In all instances, guide tube source stops shall be used.

- a. Following the installation of guide tubes to any projector, the Radiographer shall insure that the guide tube source stop is firmly in place on the tip of the guide tube farthest from the projector.

- 2.3 Whenever practical, collimators shall be used to restrict the beam of radiation toward the areas of the test object to be radiographed.

- a. In addition, where practical, sheet lead shielding shall be used to further restrict the beam.



X-R-I TESTING  
Section 3.

OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES  
& RADIOGRAPHIC EXPOSURE DEVICES

3.0 SEALED SOURCES AND LIMITS OF LEVELS OF RADIATION FOR EXPOSURE DEVICES:

3.1 The Company is licensed to use only the sealed sources and devices designated on its license.

a. A copy of the current license is attached to these procedures.

3.2 Instructions for the safe use of these devices are outlined in the following procedures and in the appendix to this section.

3.3 The following requirements apply to radiographic exposure devices and associated equipment:

a. Each radiographic exposure device must have attached to it a durable, legible, clearly visible label bearing the following:

- (1) Chemical symbol and mass number of the radionuclide in the device;
- (2) Activity and the date on which this activity was last measured;
- (3) Model number and serial number of the sealed source;
- (4) Manufacturer of the sealed source; and
- (5) Licensee's name, address, and telephone number.

b. Those radiographic exposure devices used outside our plant as Type "B" transport containers, shall, in addition, be labeled and meet all applicable requirements of 10 CFR Part 71.

c. Each device containing a sealed source is to be clearly labeled with a radiation caution symbol and the words: "CAUTION - RADIOACTIVE MATERIAL"

- (1) All units are portable and are stored in either our locked storage cabinets or locked storage rooms.
- (2) The following procedures shall be performed by the gamma cell radiographer at the beginning of unit operation.
- (3) Daily checks must be properly documented on the laboratory gamma card.
- (4) Information recorded on the laboratory card (Section 8 & 9) constitutes the utilization log as required by Section 34.27 of 10 CFR Part 34.

X-R-I TESTING  
Section 3.

OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES  
& RADIOGRAPHIC EXPOSURE DEVICES

- (5) Any abnormal conditions should be immediately reported to the Laboratory Manager, the Equipment Maintenance Engineer and the Radiation Safety Officer.
  - (a) Assure film badge/wallet card is on person.
  - (b) Obtain pocket dosimeter and record reading according to instructions.
  - (c) Obtain alarm ratemeter and determine adequate operations per instructions.
  - (d) Turn survey meter on and check for proper operation.
    - 1) Set range selector on X-1 scale.
  - (e) Obtain keys from the key box for the control lock and the gamma cell door.
- 3.4 Unlock gamma cell door and main door power interrupt lever.
  - a. (Lock door hasp and interrupt lever in open/on position).
  - b. With the following personnel monitoring devices:
    - (1) operating survey meter in hand,
    - (2) issued film badge,
    - (3) dosimeter and alarm ratemeter on person,
  - c. Enter cell provided a safe radiation level is indicated by the meter reading; and gamma alarm Tech/Ops Model 492C.
  - d. Entrance area readings should not exceed 2 MR/HR on survey meter.
- 3.5 Survey the projector on entry to determine that a safe storage condition exists.
  - a. Ten (10) milliroentgens per hour at one meter from any exterior surface of this unit or less is considered acceptable.
- 3.6 If drive cable isn't connected to source, connect it at this time.

*NOTE: (Ensure Drive Cable Is Connected Prior To Removing Shipping Plug To Install Guide Tubes)*

- 3.7 Place the survey meter nearby where its reading can be observed.

X-R-I TESTING  
Section 3.

OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES

STEP "A" DAILY OPERATING PROCEDURE  
PERMANENT UNIT

- a. Remove the shipping plug with the proper tools and affix the Source Guide Tubes and Source Stop Assembly.
  - b. Position source tip in normal work area of cell.
- 3.8 Make daily inspection of exposure device IAW/ gamma card check list.
- a. Check to be sure that no one is in the gamma cell.
  - b. Exit the cell, and close door.
  - c. Unlock the crank control assembly and expose source.
  - d. Record daily checks on laboratory card.
  - e. Check the gamma alarm system for proper operation of green and red lights and audible alarm interlocks.
  - f. Survey the adjacent area around the gamma cell for excessive radiation.
    - (1) If no abnormal conditions exist, commence operations.
    - (2) All area check points should have readings below 2 MR/HR.
  - g. At the end of each exposure:
    - (1) crank the source drive control to return the source to a safe "stored" position prior to opening the gamma cell door.
  - h. Enter the cell each time with survey meter in hand to assure that safe source storage has been achieved and excessive radiation levels are not present.
  - i. Survey both the guide tubes and storage projector.
- 3.9 It is the radiographer's responsibility to maintain complete control over the exposure device and it's crank control device at all times.

X-R-I TESTING  
Section 3.

OPERATING AND EMERGENCY PROCEDURES  
HANDLING AND USE OF LICENSED SEALED SOURCES  
STEP "B" DAILY OPERATING PROCEDURE  
PORTABLE UNITS USED IN GAMMA CELL

- a. Should it become necessary for the radiographer to temporarily leave the immediate area, the cell door should be locked.

3.10 At the end of the work for this unit or the work shift:

- a. lock control unit, enter the gamma cell with survey meter in hand.
- b. survey source guide tubes and projector to determine complete return to the "safe" position of the source.
- c. Remove guide tubes and replace shipping plug in unit.
- d. Survey and lock projector, record readings on laboratory card.
- e. Check to assure that no one has entered the gamma cell, exit the cell, close and lock the cell door and power interrupt lever for main door.
- f. Return keys to key box, return survey meter to storage area, record dosimeter reading.

4.0 SEALED SOURCES AND LIMITS OF LEVELS OF RADIATION FOR EXPOSURE DEVICES:

- 4.1 The following procedures shall be performed by the gamma cell radiographer at the beginning of unit operation.

- a. Daily checks must be properly noted on the laboratory card.
  - (1) Information recorded on the laboratory card (Section 8 & 9) constitutes the utilization log as required by Section 34.27 of 10 CFR Part 34.
    - (a) Any abnormal conditions should be reported to the Laboratory Manager, the Equipment Maintenance Engineer to the Radiation Safety Officer immediately.
  - (2) Ensure film badge is on person.
  - (3) Obtain pocket dosimeter and charge then record serial number on Gamma Card.
  - (4) Obtain alarm ratemeter and determine adequate operations per instructions.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "B" DAILY OPERATING PROCEDURE  
PORTABLE UNITS USED IN GAMMA CELL

- (5) Turn survey meter on and check for proper operation.
  - (a) Set range selector on X-1 scale.
  - b. Obtain keys from the key board for the control lock and the gamma cell door.
- 4.2 Unlock gamma cell door and main door power interrupt lever.
  - a. (Lock door hasp and interrupt lever in open/on position).
  - b. With the following personnel monitoring devices:
    - (1) operating survey meter in hand,
    - (2) issued film badge,
    - (3) dosimeter and alarm ratemeter on person, enter cell provided a safe radiation level is indicated by the meter reading; and gamma alarm Tech/Ops Model 492C.
  - c. Entrance area readings should not exceed 2 MR/HR on survey meter.
- 4.3 Survey the projector to determine that a safe condition exists.
  - a. WHEN USING AN IRIDIUM 192 PROJECTOR, radiation levels in excess of 50 mR/hr at six (6) inches from any exterior surface of the device are considered abnormal when the source is in the "safe" or stored position.
  - b. WHEN USING A COBALT 60 PROJECTOR, ten (10) mR/hr or less, at one meter from any exterior surface of this unit is considered acceptable.
- 4.4 Follow the applicable instructions for unit assembly, check out, and operation.
  - a. See appendix to this Section for specific operating instructions for the projector to be used.
  - b. Connect drive cable to source.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "B" DAILY OPERATING PROCEDURE  
PORTABLE UNITS USED IN GAMMA CELL

*NOTE: ENSURE DRIVE CABLE IS CONNECTED PRIOR TO REMOVING SHIPPING PLUG TO INSTALL GUIDE TUBES*

- c. Locate the source shield (Projector) at the desired position near the specimen to be radiographed.
- d. Remove the shipping plug and attach one section of the source guide tube to the shield exit port.
  - (1) Two additional guide tube sections may be added if needed.
- e. Attach the source stop assembly to the end of the guide tubes crank control assembly through the maze outside the gamma cell door with the control cable housings lying as straight as possible.
  - (1) If bends are necessary, they should have a large radius.
- f. You are now ready to proceed to make an exposure.
- g. Check the setup and make any adjustments necessary.
- h. When setup is ok, unlock the projector at key lock, select operate position.
  - (1) The source is now free to move by the counter-clockwise rotation of the control crank assembly.

*NOTE: THE LOCK SELECTOR RING ALSO HAS A CONNECT POSITION. THIS POSITION WILL ALLOW FOR DISCONNECTION OF THE SOURCE AT THE SWIVEL CONNECTOR FROM THE SOURCE DRIVE CABLE. THE SELECTOR RING SHOULD ONLY BE ROTATED TO THAT POSITION WHEN THE SHIPPING PLUG IS IN THE PROJECTOR.*

R E M E M B E R

*NOTE: ROTATE THE SELECTOR RING ONLY FROM LOCK TO OPERATE AND BACK TO LOCK POSITION ON THE AMERSHAM 660, 741 EXPOSURE DEVICES DURING ROUTINE RADIOGRAPHIC OPERATIONS*

- 4.5 After completing the above procedures for the specific projector model in use, proceed to make daily inspection of the exposure device in accordance with laboratory card check list.
- 4.6 Check to be sure that no one is in the gamma cell. Leave the cell and close the door.



X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "E" DAILY OPERATING PROCEDURE  
PORTABLE UNITS USED IN GAMMA CELL

- 4.7 Record daily checks on laboratory gamma card.
- 4.9 To make a radiographic exposure after your film, source guide tip, and part to be radiographed are in proper position, at the crank control assembly, turn the handle rapidly in a counter-clockwise direction until it stops. DO NOT FORCE IT'S MOVEMENT. The source will have moved 7, 14, 21 feet depending on the number of guide tubes used. The source is now exposed.
- 4.10 Check the gamma alarm system for proper operation of green and red lights and audible alarm interlocks.
- 4.11 Survey the adjacent area around the gamma cell for excessive radiation.
  - a. All area check points should have readings below 2 MR/HR.
  - b. If no abnormal conditions exist, continue operations.
- 4.12 At the end of each exposure, crank the source drive control to return the source to a safe stored position prior to opening the gamma cell door.
  - a. Enter the cell each time with operating survey meter in hand to assure that safe source storage has been achieved and excessive radiation levels are not present.
  - b. Survey both the guide tube and storage shield of the projector.
- 4.17 It is the Radiographer's responsibility to maintain complete control over the exposure device and it's crank control device at all times.
  - a. Should it become necessary for the Radiographer to temporarily leave the immediate area, the cell door should be locked.
- 4.18 Check the reading of your pocket dosimeter at frequent intervals.
- 4.19 At the end of the work for this unit or the work shift:
  - a. lock control unit, enter the gamma cell with survey meter in hand
  - b. survey source guide tubes and projector to determine complete return to the "safe" position of the source.
  - c. Remove guide tubes and replace shipping plug in unit.
  - d. Survey and lock projector, record readings on laboratory gamma card.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "C" DAILY OPERATING PROCEDURE  
FOR PORTABLE COBALT 60 AND IRIDIUM 192 PROJECTORS  
TO BE USED IN FIELD WORK OUTSIDE OF THE GAMMA CELL.

- e. Check to assure that no one has entered the gamma cell, exit the cell, close and lock the cell door and power interrupt lever for main door.
- 4.20 Return keys to key box, return survey meter to storage area, record dosimeter readings.
- a. The following procedures shall be performed by the radiographer at the beginning of unit operation.
  - b. Daily checks must be properly noted on the laboratory gamma card.
    - (1) Information recorded on the laboratory gamma card (Section 8 & 9) constitutes the utilization log as required by Section 34.27 of 10 CFR Part 34.
    - (2) Any abnormal conditions must be reported to the Laboratory Manager, the Equipment Maintenance Engineer, and/or the Radiation Safety Officer immediately.
  - c. Assure film badge is on person.
  - d. Obtain pocket dosimeter and "0" out by charging, log serial number on gamma card.
  - e. Obtain alarm ratemeter and determine adequate operations per instructions.
  - f. Turn on survey meter and check for proper operation. Set range selector on X-1 scale.
  - g. Obtain keys from key box for gamma cell storage cabinet and for the projector that will be used.
6. Unlock gamma cell, enter with survey meter in hand. Unlock storage cabinet, locate and remove the proper projector to be used.
7. Survey the projector to determine that a safe condition exists.
- a. WHEN USING AN IRIDIUM 192 PROJECTOR, radiation levels in excess of 50 milliroentgens per hour at six (6) inches from any exterior surface of the device are considered abnormal when the source is in the "safe" or stored position.
  - b. WHEN USING A COBALT 60 PROJECTOR, ten (10) milliroentgens per hour or less, at one meter from any exterior surface of this unit is considered acceptable.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "C" DAILY OPERATING PROCEDURE  
FOR PORTABLE COBALT 60 AND IRIDIUM 192 PROJECTORS  
TO BE USED IN FIELD WORK OUTSIDE OF THE GAMMA CELL.

8. Check to determine that the shipping plug is securely inserted.
9. Record the results of the above inspection on the laboratory card.
10. The locked projector may now be placed in the vehicle. It must be securely fastened within the vehicle to prevent damage by movement and jarring during transportation.
11. Before leaving for job, it is required that the following information be entered on the job card:
  - a. Radiographer's name.
  - b. Model and serial number of the camera.
  - c. Source serial number and curie strength.
  - d. Customers name and location of work area.
12. If Yellow III labels are required, the following applies: Check the posting of radiation warning signs on the vehicle. If they are dirty, they must be cleaned to assure high visibility.
13. The instructions and rules covering the transportation of sources by motor vehicle are covered in Section 8.
14. At the work site, the following operating procedures must be followed precisely:
  - a. The work site should be selected with consideration for providing the maximum amount of restricted access by unauthorized personnel.
  - b. The site must be conspicuously marked with rope barricades which prevent entrance to the area by unauthorized personnel.
  - c. Post "RADIATION AREA" signs conspicuously at several points along the 2 MR/HR barrier line to alert personnel of potential hazard. Post "HIGH RADIATION AREA" signs conspicuously at the calculated 100 MR/HR distance from the source location. Refer to suggested layout in Charts A and B.
  - d. Before proceeding with the next steps, determine that your film badge, charged pocket dosimeter and alarm ratemeter are on your person. Turn on the radiation survey meter and when the meter indicates that stable operation has taken place, proceed with the next step.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "C" DAILY OPERATING PROCEDURE  
FOR PORTABLE COBALT 60 AND IRIIDIUM 192 PROJECTORS  
TO BE USED IN FIELD WORK OUTSIDE OF THE GAMMA CELL.

- e. Survey the projector in the vehicle to determine that a safe condition exists.
  - (1) WHEN USING AN IRIIDIUM 192 SOURCE, radiation levels in excess of 50 milliroentgens per hour at six (6) inches from any exterior surface of the projector is considered abnormal when the source is in the "safe" or stored position.
  - (2) WHEN USING A COBALT 60 SOURCE, ten milliroentgens per hour or less, at one meter from any exterior surface of the projector is considered acceptable.
- f. Check to determine that the shipping plug is securely inserted.
- g. Record the results of the above inspection on the vehicle survey sheet.
- h. The projector may not be removed from the vehicle. It should be moved to the site that will be used during radiography.
- i. Follow the applicable instructions for unit assembly, check out and operation. Model 660, Amersham, Model 35 or Century, Gamma Industries, Model 520, Automation Industries for Iridium Radiography and Model 741, Amersham for Cobalt Radiography. For each of these, the setup instructions will be the same as previously given in the Daily Operating Procedures A, B, C and, the Appendixes of this section.
  - (1) Locate the source shield at the desired position near the specimen to be radiographed.
  - (2) Securely connect drive cable to source cable connector.

*NOTE: (Ensure Drive Cable Is Connected Prior To Removing Shipping Plug To Install Guide Tubes)*

- (3) Remove shipping plug with the proper tools.
- (4) Attach one section of the source guide tube in place of the plug.
  - (a) Two additional guide tubes may be added if necessary.
- (5) Attach the source stop assembly to the end of the guide tube farthest from the projector.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "C" DAILY OPERATING PROCEDURE  
FOR PORTABLE COBALT 60 AND IRIIDIUM 192 PROJECTORS  
TO BE USED IN FIELD WORK OUTSIDE OF THE GAMMA CELL.

- (a) The control tubes should lie as straight as possible.
  - (b) If bends are necessary, they should have as large a radius as possible.
- (6) Use a collimator on a setup where possible, to limit scattered radiation.
- j. After completing the above procedure for the camera and model used, proceed to make daily inspection of the exposure device in accordance with the laboratory card.
- k. Check to be sure that no one is in the barricaded area. Leave the area and return to the projector control.
- l. Record the daily checks on the laboratory card.
  - (1) With the operating survey meter on its most sensitive scale, (X-1) operate the crank to move the source to the exposed position.
  - (2) With the survey meter, promptly check all points along the perimeter of the controlled area to determine the radiation dose rate level.
    - (a) If any region is found which exceeds the level of 2 MR/HR. it will be necessary to reduce the level by either:
      - 1) moving the barrier further out or
      - 2) by providing additional shielding in the vicinity of the source.
    - (b) If the radiation levels are found to be adequately low, then proceed with the next step.
    - (c) To determine where to post high radiation areas, 100 mr/hr Radiographers "SHALL" use the inverse square law to calculate these locations versus using a survey meter.
- m. Return the source to the storage position. Confirm this by surveying the projector and the guide tube with the survey meter.
- n. Prepare for radiography of the test object by making any final adjustment of the source guide tube and mounting the film in the appropriate regions.

X-R-I TESTING  
SECTION 3

OPERATING AND EMERGENCY PROCEDURES  
STEP "C" DAILY OPERATING PROCEDURE  
FOR PORTABLE COBALT 60 AND IRIDIUM 192 PROJECTORS  
TO BE USED IN FIELD WORK OUTSIDE OF THE GAMMA CELL.

- o. After checking to be sure that no one is in the radiation area, proceed with the radiographic exposure.
  - (1) During exposure period, it is necessary to be alert to the possibility of personnel accidentally entering the controlled area.
  - (2) Never leave the site of the projector unattended.
    - (a) It is the Radiographer's responsibility to maintain complete control over the exposure device and it's crank control device at all times.
    - (b) Should it become necessary for the Radiographer to leave the immediate area, the exposure device's crank control device must be locked to prevent unauthorized use or accidental exposure.
    - (c) If both the Radiographer and Assistant Radiographer must temporarily leave the area, the exposure device must be returned to the transporting vehicle and secured.
- p. At the end of the exposure, crank the source drive control clockwise to return the source to the stored position.
  - (1) Confirm this with the radiation survey meter.
  - (2) Survey both the guide tube and projector.
- q. When the work requirements for the unit have been completed, survey the source guide tubes and the projector to determine that the source is in the stored position.
  - (1) Remove the guide tubes and replace the shipping plug.
    - (a) Lock the unit.
    - (b) Record the survey readings on the laboratory card.
    - (c) Reel up the control on the control cables on the unit.
    - (d) Return the projector to the vehicle and stow it to assure safe transportation.
- r. Record the reading of your pocket dosimeter on the laboratory card.
- s. For temporary storage of the projector at the job site, it should be placed in the vehicle and the vehicle locked.

**NOTE: (ALL PORTABLE PROJECTORS NOT IN USE, ARE TO BE STORED IN THE LOCKED SOURCE STORAGE PROVIDED**



**X-R-I TESTING**

DIVISION OF X-RAY INDUSTRIES, INC.

January 08, 1996

Mr. Loren Hueter  
United States  
Nuclear Regulatory Commission  
Region III  
801 Warrenville Road  
Lisle, Illinois 60532-4351

SUBJECT: NRC License Number: 21-05472-01  
REFERENCE NUMBER: ~~399641~~

319014

Dear Loren:

Referenced below is the additional information and clarification requested during our phone conversation on Friday, 1/5/96.

- \* Pursuant to 10 CFR 34.51, XRI Testing would like to request an exemption from performance requirements for radiographic equipment specified in 10 CFR 34.20 (a),(c)(2) & (e) for Sentinel/Amersham 520 CO60 Exposure Devices. These exposure devices shall only be utilized within the confines of an approved permanent cell as previously stated in my letter to the NRC dated December 10, 1995.
- \* XRI withdraws its request for an exemption from 10 CFR 34.20 for the Gamma Industries Utility Twin 50 Cobalt 60 Exposure Device as it will no longer be utilized after January 10, 1996.
- \* XRI Confirms it has available and will only use the "Yellow" guide tubes compliant with 10 CFR 34.20 for the Sentinel/Amersham 520 CO60 Exposure Devices.
- \* XRI Confirms it will not use the Sentinel/Amersham 520 CO60 Exposure Devices when needed replacement parts are no longer available from Sentinel/Amersham.

If I can be of any further help please call (810) 244-1546

Thank You

Larry Redhage  
NRC Records Administrator

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS  
WASHINGTON, D.C. 20555

December 18, 1995

NRC INFORMATION NOTICE 95-58: 10 CFR 34.20; FINAL EFFECTIVE DATE

Addressees:

Industrial Radiography Licensees

Purpose:

The U.S. Nuclear Regulatory Commission is issuing this information notice (IN) to remind addressees of the effective date implementing a final provision of the regulations in 10 CFR 34.20. It is expected that recipients will review the information for applicability to their facilities and consider appropriate actions. This notice also advises recipients of the Commission's plans for enforcement action to address failures to meet 10 CFR 34.20. However, this IN does not contain any new requirements; therefore, no specific action or written response is required.

Background:

Paragraph (e) of 10 CFR 34.20 provides that all radiographic exposure devices and associated equipment in use by NRC licensees after January 10, 1996, must comply with the requirements specified in Section 34.20 of 10 CFR Part 34. Section 34.20, and other changes to 10 CFR Part 34, were published in the Federal Register (55 FR 843) as a final rule on January 10, 1990. As stated in the Federal Register notice, the effective date of the final rule was January 10, 1991. Paragraph (d) of 10 CFR 34.20 provided that all newly-manufactured radiographic exposure devices and associated equipment (manufactured after January 10, 1992) acquired by NRC licensees must meet 10 CFR 34.20 requirements. The statement of considerations for the final rule provided notice that failure to implement the requirements for equipment by the required date may be considered a Severity Level III Violation. Such violations are considered for civil penalty assessments.

After publication of the final rule, NRC transmitted copies of the notice to each of its radiography licensees at that time. Copies of the notice were also provided to each of the Agreement States so that they might share the information with their radiography licensees. Further information identifying and explaining the effective dates of the various provisions of the rule was also provided in the March-June 1990 (NUREG/BR-0117 Nos. 90-1 and -2) issues of the NMSS Licensee Newsletter.

9512180076

Attachment 2

Discussion:

The NRC reminds its industrial radiography licensees that after January 10, 1996, only radiographic exposure devices and associated equipment which complies with the requirements specified in 10 CFR 34.20 and is authorized by the license, shall be used in industrial radiography operations conducted within NRC's jurisdiction. NRC also reminds Agreement State licensees working in areas of NRC jurisdiction under reciprocity (10 CFR 150.20) that they are also subject to these requirements. The regulations in 10 CFR 34.20 apply to all radiography equipment. This includes portable, mobile, and fixed radiography cameras (both pipeliner and "crank-out" type devices), source changers, and other associated equipment used with radiography cameras, i.e., source assemblies, drive cables, guide tubes, control tubes, source stops, etc. Some provisions of 10 CFR 34.20 only apply to certain types of equipment. For example, 10 CFR 34.20(c) only applies to "crank-out" cameras, while 10 CFR 34.20(a) and (b) apply to all radiography cameras and all associated equipment. As another example, the criteria specified in 10 CFR 34.20(c)(9) only applies to the source changer used in conjunction with a "crank-out" device.

The requirements in 10 CFR 34.20 require licensees to ensure that all equipment they will use in radiographic operations after January 10, 1996, complies with the applicable requirements. Since publication of NRC's final rule, the radiography equipment manufacturers have worked to develop radiography devices and associated equipment that complies with 10 CFR 34.20 criteria. In some instances, existing equipment already complies with the regulatory requirements. Attachment 1 lists the radiography cameras, radiography systems, and sealed sources that have been recognized by NRC as meeting 10 CFR 34.20 requirements.

Traditionally, certain associated equipment has not been independently registered and/or evaluated by the NRC or the Agreement States. This includes drive cables, guide tubes, or source stops. With the new camera models introduced, the manufacturers and NRC have taken the system approach as denoted in the American National Standard N432-1980, "Radiological Safety for the Design and Construction of Apparatus for Gamma Radiography," now required by regulations. Therefore, information concerning the drive cables to be used with the devices was included as part of the overall system evaluation. However, older "associated equipment" items may not have been evaluated as part of a device registration process. Licensees are reminded that 10 CFR 34.20 makes the licensee responsible for ensuring that the equipment meets regulatory requirements. The licensee should obtain information from the equipment manufacturer which shows the equipment complies with 10 CFR 34.20 criteria, including any required testing. Equipment that has not been registered will, at minimum, require prototype testing to meet the requirements of 10 CFR 34.20. If a similar piece of equipment has already met the test requirements, then an engineering analysis may be used in lieu of actual testing. The engineering analysis can be performed by the user or the manufacturer and submitted to the appropriate regulatory authority for evaluation and approval.

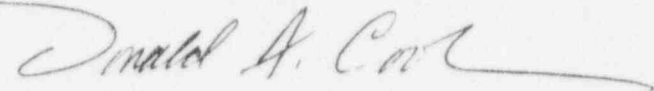
Your present license may include equipment whose use must be discontinued after January 10, 1996. In this instance, the NRC regulations effective January 10, 1996, take precedent over authorizations previously provided in a license. For example, if your license contains an Amersham Model 900, you are not authorized to continue using this device after January 10, 1996. Please also note that you may need to amend your license to include additional equipment that complies with 10 CFR 34.20.

Exemptions will not normally be considered for portable radiographic devices that do not comply with 10 CFR 34.20. If uninterrupted use of a device which does not comply with 10 CFR 34.20 is intended, then an exemption request should be submitted prior to January 1, 1996, to allow the staff adequate time to process the request. Exemptions to 10 CFR 34.20 may be considered only for limited special or unique cases, where the licensee can demonstrate that the engineered safety features, use limitations, and procedures would compensate for not meeting the requirements and afford similar or increased radiation safety protection. An example of a limited special or unique case would include a nonportable device used in a fixed radiographic facility.

Performance of radiography after January 10, 1996, with equipment which does not comply with the requirements of 10 CFR 34.20 is a violation of Commission requirements. In accordance with example C.8 of Supplement VI of the Commission's Enforcement Policy, such violations are considered violations of significant regulatory concern and may be categorized at Severity Level III and subject to civil penalties. In light of the notice that has been given licensees to meet this regulation, the time that has been provided licensees to achieve compliance, and the importance of meeting the requirements of 10 CFR 34.20, the NRC intends to levy a civil penalty without considering the normal civil penalty assessment process pursuant to Section VII.A.1 of the Enforcement Policy. Accordingly, a civil penalty of \$5,000, the base Severity Level III civil penalty, may be assessed for each camera a licensee uses after January 10, 1996, that does not meet the requirements of 10 CFR 34.20. If during an inspection, the NRC identifies that a licensee is not meeting the regulation, the licensee will need to suspend any operation with nonconforming cameras. Failure to do so may be considered deliberate violations and may subject the licensee to significant civil action, including license revocation, and to criminal sanctions. Individuals responsible for such violations may be subject to sanctions for violating 10 CFR 30.10, rule on "Deliberate Misconduct."

However, the Commission intends to exercise its enforcement discretion for licensees who make a good faith effort to comply with 10 CFR 34.20 before the effective date of the rule. Therefore, a licensee who performs radiography after January 10, 1996, with equipment that does not meet 10 CFR 34.20 will not be subject to civil penalties or suspension of operations for such violations if the licensee has evidence that on or before January 10, 1996, it in good faith ordered equipment for prompt replacement that meets the requirements of 10 CFR 34.20. It should be noted that Agreement State licensees conducting radiography under reciprocity will be subject to these regulatory requirements and enforcement policy.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate regional office.



Donald A. Cool, Director  
Division of Industrial and  
Medical Nuclear Safety  
Office of Nuclear Material  
Safety and Safeguards

Contacts: J. Bruce Carrico, NMSS (For general information)  
(301) 415-7826

Thomas W. Rich, NMSS (For device information)  
(301) 415-7893

Attachments: 1. List of Approved Equipment  
2. List of Recently Issued NMSS Information Notices  
3. List of Recently Issued NRC Information Notices



11/21/95

List of Models That Meet 10 CFR Part 34 Requirements

----- CAMERA(S) -----			
<u>Model</u>	<u>Manufacturer</u>	<u>Status</u>	<u>Description</u>
660 A	AMERSHAM	ACTIVE	Co-60 110mCi, Cs-137 10.8Ci, Yb-169 20Ci, Tm-170 200Ci, Ir-192 120Ci
660 AE	AMERSHAM	ACTIVE	Co-60 110mCi, Cs-137 10.8Ci, Yb-169 20Ci, Tm-170 200Ci, Ir-169 120Ci
660 B	AMERSHAM	ACTIVE	Co-60 110mCi, Cs-137 10.8Ci, Yb-169 20Ci, Tm-170 200Ci, Ir-192 140Ci
660 BE	AMERSHAM	ACTIVE	Co-60 110mCi, Cs-137 10.8Ci, Yb-169 20Ci, Tm-170 200Ci, Ir-192 140Ci
660 SYSTEM	AMERSHAM	ACTIVE	Co-60 110mCi, Cs-137 10.8Ci, Yb-169 20Ci, Tm-170 200Ci, Ir-192 140Ci
676 A	AMERSHAM	ACTIVE	Co-60 330Ci, DU 168 kg
676 AE	AMERSHAM	ACTIVE	Co-60 330Ci, DU 168 kg
676 B	AMERSHAM	ACTIVE	Co-60 330Ci, DU 168 kg
676 BE	AMERSHAM	ACTIVE	Co-60 330Ci, DU 168 kg
680 A	AMERSHAM	ACTIVE	Co-60 110Ci, DU 129 kg
680 AE	AMERSHAM	ACTIVE	Co-60 110Ci, DU 129 kg



11/21/95

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List of Models That Meet 10 CFR Part 34 Requirements

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CAMERA(S) (continued)  
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<u>Model</u>	<u>Manufacturer</u>	<u>Status</u>	<u>Description</u>
680 B	AMERSHAM	ACTIVE	Co-60 110Ci, DU 129 kg
680 BE	AMERSHAM	ACTIVE	Co-60 110Ci, DU 129 kg
684 A	AMERSHAM	ACTIVE	Co-60 11Ci, Ir-192 240Ci, DU 68 kg
684 AE	AMERSHAM	ACTIVE	Co-60 11Ci, Ir-192 240Ci, DU 68 kg
684 B	AMERSHAM	ACTIVE	Co-60 11Ci, Ir-192 240Ci, DU 68 kg
684 BE	AMERSHAM	ACTIVE	Co-60 11Ci, Ir-192 240Ci, DU 68 kg
741 A	AMERSHAM	ACTIVE	Co-60 33Ci, Ir-192 240Ci, DU 90 kg
741 AE	AMERSHAM	ACTIVE	Co-60 33Ci, Ir-192 240Ci, DU 90 kg
741 B	AMERSHAM	ACTIVE	Co-60 33Ci, Ir-192 240Ci, DU 90 kg
741 BE	AMERSHAM	ACTIVE	Co-60 33Ci, Ir-192 240Ci, DU 90 kg
865	AMERSHAM	ACTIVE	Ir-192 240Ci, DU 18 kg
IR-100	INDUSTRIAL NUCLEAR	ACTIVE	Ir-192 120Ci, DU 14.5 kg
SPEC 150	SPEC	ACTIVE	Ir-192 150Ci, DU 17 kg
TITAN	NORDION	ACTIVE	Ir-192 140Ci

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List of Models That Meet 10 CFR Part 34 Requirements

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SOURCE(S) (continued)  
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<u>Model</u>	<u>Manufacturer</u>	<u>Status</u>	<u>Description</u>
32	INDUSTRIAL NUCLEAR	ACTIVE	Ir-192 120Ci
33	INDUSTRIAL NUCLEAR	ACTIVE	Ir-192 120Ci
702	RTS	ACTIVE	Ir-192 120Ci
848	AMERSHAM	INACTIVE	Cs-137 30Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci
866	AMERSHAM	ACTIVE	Cs-137 30 Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci
87702	AMERSHAM	INACTIVE	Ir-192 120Ci
87703	AMERSHAM	ACTIVE	Ir-192 120Ci
87704	AMERSHAM	INACTIVE	Ir-192 120Ci
88	INDUSTRIAL NUCLEAR	ACTIVE	IR-192 120CI
89911	AMERSHAM	ACTIVE	IR-192 240CI
89912	AMERSHAM	ACTIVE	IR-192 240CI
89913	AMERSHAM	ACTIVE	IR-192 240CI
89914	AMERSHAM	ACTIVE	IR-192 240CI
89916	AMERSHAM	ACTIVE	IR-192 240CI
89921	AMERSHAM	ACTIVE	IR-192 240CI
89922	AMERSHAM	ACTIVE	IR-192 240CI
89923	AMERSHAM	ACTIVE	IR-192 240CI
89924	AMERSHAM	ACTIVE	IR-192 240CI
90003	AMERSHAM	ACTIVE	Ir-192 240Ci

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List of Models That Meet 10 CFR Part 34 Requirements

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SOURCE(S) (continued)  
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<u>Model</u>	<u>Manufacturer</u>	<u>Status</u>	<u>Description</u>
91810	AMERSHAM	ACTIVE	Yb-169 20Ci
91811	AMERSHAM	ACTIVE	Co-60 20Ci
91812	AMERSHAM	ACTIVE	Tm-170 20Ci
91813	AMERSHAM	ACTIVE	Ir-192 20Ci
943	AMERSHAM	ACTIVE	Co-60 110Ci
A424-1	AMERSHAM	ACTIVE	Co-60 220Ci, Yb-169 200Ci, Tm-170 50 Ci, Ir-192 240Ci
A424-10	AMERSHAM	ACTIVE	Co-60 5Ci
A424-11	AMERSHAM	ACTIVE	Co-60 50Ci
A424-12	AMERSHAM	ACTIVE	Co-60 100Ci
A424-13	AMERSHAM	ACTIVE	Co-60 330Ci
A424-14	AMERSHAM	ACTIVE	Co-60 110Ci
A424-15	AMERSHAM	ACTIVE	Co-60 11Ci
A424-16	AMERSHAM	ACTIVE	Co-60 50Ci
A424-17	AMERSHAM	ACTIVE	Co-60 50Ci
A424-18	AMERSHAM	ACTIVE	Co-60 33Ci
A424-19	AMERSHAM	ACTIVE	Co-60 120mCi
A424-2	AMERSHAM	ACTIVE	Co-60 220Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci
A424-20	AMERSHAM	ACTIVE	Cs-137 30Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci

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List of Models That Meet 10 CFR Part 34 Requirements

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SOURCE(S) (continued)  
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<u>Model</u>	<u>Manufacturer</u>	<u>Status</u>	<u>Description</u>
A424-22	AMERSHAM	ACTIVE	Co-60 220Ci, Cs-137 10.8Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci
A424-3	AMERSHAM	ACTIVE	Co-60 220Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci
A424-4	AMERSHAM	ACTIVE	Co-60 220Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci
A424-5	AMERSHAM	ACTIVE	Co-60 220Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci
A424-6	AMERSHAM	ACTIVE	Co-60 220Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci
A424-7	AMERSHAM	ACTIVE	Co-60 220Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci
A424-8	AMERSHAM	ACTIVE	Co-60 220Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci
A424-9	AMERSHAM	ACTIVE	Co-60 220Ci, Cs-137 30Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci
A453-1	AMERSHAM	ACTIVE	Co-60 220Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci
A453-2	AMERSHAM	ACTIVE	Co-60 220Ci, Yb-169 200Ci, Tm-170 50Ci, Ir-192 240Ci

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List of Models That Meet 10 CFR Part 34 Requirements

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SOURCE(S) (continued)  
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<u>Model</u>	<u>Manufacturer</u>	<u>Status</u>	<u>Description</u>
A58101-8	AMERSHAM	ACTIVE	Ir-192 240Ci
B-16F	SPEC	ACTIVE	Ir-192 100Ci
B-16T	SPEC	ACTIVE	Ir-192 100Ci
C-990	NORDION	ACTIVE	Ir-192 140Ci
G-11F	SPEC	UNKNOWN	
G-13F	SPEC	UNKNOWN	
G-15F	SPEC	UNKNOWN	
G-17F	SPEC	UNKNOWN	
G-19F	SPEC	ACTIVE	Co-60 110Ci
G-1F	SPEC	ACTIVE	Ir-192 240Ci
G-1T	SPEC	UNKNOWN	
G-21F	SPEC	ACTIVE	Co-60 110Ci
G-23	SPEC	ACTIVE	Ir-192 240Ci
G-36	SPEC	ACTIVE	Ir-192 240Ci
G-37F	SPEC	ACTIVE	Co-60 110Ci
G-38	SPEC	ACTIVE	Ir-192 240Ci
G-3F	SPEC	ACTIVE	Ir-192 240Ci
G-40F	SPEC	ACTIVE	Ir-192 240Ci
G-40T	SPEC	ACTIVE	Ir-192 240Ci
G-41F	SPEC	ACTIVE	Ir-192 240Ci
G-41T	SPEC	ACTIVE	Ir-192 240Ci
G-42	SPEC	UNKNOWN	
G-50F	SPEC	UNKNOWN	
G-50T	SPEC	UNKNOWN	
G-60	SPEC	ACTIVE	Ir-192 240Ci

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List of Models That Meet 10 CFR Part 34 Requirements

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SOURCE(S) (continued)  
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<u>Model</u>	<u>Manufacturer</u>	<u>Status</u>	<u>Description</u>
G-9F	SPEC	UNKNOWN	
N-23	SPEC	INACTIVE	Ir-192 100Ci
T-1	SPEC	ACTIVE	Ir-192 140Ci
T-1F	SPEC	ACTIVE	Ir-192 140Ci
T-2F	SPEC	INACTIVE	Ir-192 140Ci
T-5	SPEC	ACTIVE	Ir-192 140Ci
T-5F	SPEC	ACTIVE	Ir-192 140Ci
T-6	SPEC	ACTIVE	Ir-192 140Ci
T-7F	SPEC	INACTIVE	Ir-192 140Ci

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CHANGER(S)  
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<u>Model</u>	<u>Manufacturer</u>	<u>Status</u>	<u>Description</u>
500-SU	AMERSHAM	INACTIVE	IR-192 120CI, DU 18 KG
650L	AMERSHAM	ACTIVE	IR192 240CI, CO60 120mCI, CS137 10.8CI, YB169 40CI, TM170 400CI, DU 42 LBS
770	AMERSHAM	ACTIVE	CO-60 550CI, DU 161 KG
771	AMERSHAM	ACTIVE	CO-60 110CI, DU 97 KG
820	AMERSHAM	ACTIVE	Ir-192 1000Ci, DU 100 kg



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List of Models That Meet 10 CFR Part 34 Requirements

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CHANGER(S) (continued)  
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<u>Model</u>	<u>Manufacturer</u>	<u>Status</u>	<u>Description</u>
850	AMERSHAM	ACTIVE	IR-192 240CI, DU 22 KG
855	AMERSHAM	ACTIVE	IR-192 960CI, DU 57 KG
C-1	SPEC	ACTIVE	IR-192 100CI, DU 17KG

LIST OF RECENTLY ISSUED  
NMSS INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
95-55	Handling Uncontained Yellowcake Outside of a Facility Processing Circuit	12/6/95	All Uranium Recovery Licensees.
95-51	Recent Incidents Involving Potential Loss of Control of Licensed Material	10/27/95	All material and fuel cycle licensees.
95-50	Safety Defect in Gammamed 12i Bronchial Catheter Clamping Adapters	10/30/95	All High Dose Rate Afterloader (HDR) Licensees.
95-44	Ensuring Combatible Use of Drive Cables Incorporating Industrial Nuclear Company Ball-type Male Connectors	09/26/95	All Radiography Licensees.
95-39	Brachytherapy Incidents Involving Treatment Planning Errors	09/19/95	All U.S. Nuclear Regulatory Commission Medical Licensees.
95-29	Oversight of Design and and Fabrication Activities for Metal Components Used in Spent Fuel Dry Storage Systems	06/07/95	All holders of OLs or CPs for nuclear power reactors.  Independent spent fuel storage installation designers and fabricators.
95-28	Emplacement of Support Pads for Spent Fuel Dry Storage Installations at Reactor Sites	06/05/95	All holders of OLs or CPs for nuclear power reactors
95-25	Valve Failure during Patient Treatment with Gamma Stereotactic Radiosurgery Unit	05/11/95	All U.S. Nuclear Regulatory Commission Medical Licensees.

LIST OF RECENTLY ISSUED  
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of issuance	Issued to
95-57	Risk Impact Study Regarding Maintenance During Low-Power Operation and Shutdown	12/18/95	All holders of OLs or CPs for nuclear power reactors.
95-56	Shielding Deficiency in Spent Fuel Transfer Canal at a Boiling-Water Reactor	12/11/95	All holders of OLs or CPs for nuclear power reactors.
95-55	Handling Uncontained Yellowcake Outside of a Facility Processing Circuit	12/06/95	All Uranium Recovery Licensees.
95-54	Decay Heat Management Practices during Refueling Outages	12/01/95	All holders of OLs or CPs for nuclear power reactors.
95-53	Failures of Main Steam Isolation Valves as a Result of Sticking Solenoid Pilot Valves	12/01/95	All holders of OLs or CPs for nuclear power reactors.
95-47, Rev. 1	Unexpected Opening of a Safety/Relief Valve and Complications Involving Suppression Pool Cooling Strainer Blockage	11/30/95	All holders of OLs or CPs for nuclear power reactors.
94-13, Supp. 2	Control and Oversight of Contractors during Re- fueling Activities and Clarification of Applica- bility of Section 50.120 of Title 10 of The Code of Federal Regulations to Contractor Personnel	11/28/95	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License  
CP = Construction Permit