

## 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.

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## Licensee

1. Department of Health & Human Services  
National Institutes of Health

2. 31 Center Drive, MSC 2260  
Bethesda, Maryland 20892-2260

In accordance with the letters dated  
September 5, 1996,

3. License Number 19-00296-17 is amended in  
its entirety to read as follows:

4. Expiration Date July 31, 2003

5. Docket or  
Reference No. 030-08478

6. Byproduct, Source, and/or  
Special Nuclear Material7. Chemical and/or Physical  
Form8. Maximum Amount that Licensee  
May Possess at Any One Time  
Under This License

A. Cesium 137

A. Sealed source  
(ORNL-50-RAMCO)A. Not to exceed 2,400  
curies per irradiator and  
4,800 curies total

B. Cesium 137

B. Sealed source (AECL  
Model C-161, Type 8  
or C-440)B. Not to exceed 4,200  
curies per irradiator and  
21,000 curies total

C. Cesium 137

C. Sealed source (ORNL  
SK-342-B or JLS-6810)

C. 1,555 curies total

D. Cesium 137

D. Sealed source (ORNL  
SK-342-B or JLS-6810)

D. 6,600 curies total

E. Cesium 137

E. Sealed source  
(Nordion C-3000 or  
C-3001)E. Not to exceed 3,048  
curies per irradiator and  
6,096 curies total

F. Cesium 137

F. Sealed source  
(ORNL-50-RAMCO or  
ISO-1000)

F. 1,440 curies total

G. Cesium 137

G. Sealed sources  
(JLS-6810)

G. 6,600 curies total

H. Cesium 137

H. Sealed source  
(CSL-15)

H. 6,120 curies total

I. Cesium 137

I. Sealed sources  
(Nordion C-3000 or  
C-3001)

I. 3,048 curies total

J. Cesium 137

J. Sealed sources (Nordion  
C-440)

J. 4000 curies total

## 9. Authorized use

A. For use in Isomedix Gammator Model M (Series M38) self-contained irradiators for irradiation of biological specimens.

B. For use in AECL Gammacell 40 self-contained irradiator for irradiation of biological specimens.

C. For use in J. L. Shepherd Model 143-45 self-contained irradiator for irradiation of biological specimens.

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- D. For use in J. L. Shepherd Model 68 self-contained irradiator for irradiation of biological specimens.
- E. For use in a Nordion International, Inc. Gammacell 1000 Elite-Type II self-contained irradiator for irradiation of biological specimens or blood.
- F. For use in an AECL Gammacell 1000 Model B self-contained irradiator for irradiation of biological specimens.
- G. For use in J. L. Shepherd Model 68-A-1 self-contained irradiator for irradiation of biological specimens.
- H. For use in CIS-US, Inc., Model IBL 437C self-contained irradiator for irradiation of biological specimens.
- I. For use in a Nordion International, Inc. Gammacell 3000 Elan-Type II self-contained irradiator for irradiation of biological specimens or blood.
- J. For use in Nordion Model Gammacell 40 self-contained irradiator for irradiation of biological specimens.

## CONDITIONS

10. Licensed material in item 9.A. through 9.F., 9.H., and 9.I. shall be used only at the Department of Health and Human Services, National Institutes of Health, 9000 Rockville Pike, Bethesda, Maryland. Licensed material in item 9.A. shall also be used at 5 Research Court, Rockville, Maryland. Licensed material in item 9.E. shall also be used at the Center for Biologics Evaluation and Research, Food and Drug Administration, 8800 Rockville Pike, Bethesda, Maryland. Licensed material in item 9.G. shall be used only at the licensee's facility at the Department of Health and Human Services, 12441 Parklawn Drive, Rockville, Maryland. Licensed material in item 9.J. shall be used only at the Department of Health and Human Services, Gerontology Research Center, 4940 Eastern Avenue, Baltimore, Maryland.
11. A. Licensed material shall be used by, or under the supervision of, individuals designated in writing by the Radiation Safety Committee. The licensee shall maintain records of individuals designated as users for three years after the last use of licensed material by the individual.
- B. The Radiation Safety Officer for this license is Robert A. Zoon.
12. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
13. A. Sealed sources and detector cells containing licensed material shall be tested for leakage and/or contamination at intervals not to exceed six months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed three years.
- B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed three months.
- C. In the absence of a certificate from a transferor indicating that a leak test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.

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- D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.
- E. Sealed sources and detector cells need not be leak tested if:
- (i) they contain only hydrogen-3; or
  - (ii) they contain only a radioactive gas; or
  - (iii) the half-life of the isotope is 30 days or less; or
  - (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
  - (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.
- F. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source or detector cell shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within five days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source or detector cell involved, the test results, and corrective action taken. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. Records may be disposed of following Commission inspection.
- G. The licensee is authorized to collect leak test samples for analysis by the licensee. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
14. The licensee shall not perform repairs or alterations of the irradiator involving removal of shielding or access to the licensed material. Removal, replacement, and disposal of sealed sources in the irradiator shall be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
15. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR 71, "Packaging and Transportation of Radioactive Material."

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16. The licensee shall conduct a physical inventory every six months to account for all sealed sources and devices containing licensed material received and possessed under the license. Records of inventories shall be maintained for five years from the date of each inventory, and shall include the quantities and kinds of byproduct material, manufacturer name and model numbers, location of sources and/or devices, and the date of the inventory.
17. For each J. L. Shepherd and Associates, Mark I Cesium-137 Irradiator installed and used, the licensee shall:
- A. permit the use of the irradiator only when a calibrated and operable radiation survey meter or room monitor is available; and
  - B. permit the irradiator door to be opened only after the operator has checked visual indicators to verify that the source has returned to its safe storage position; and
  - C. have room monitors installed that will:
    - (i) operate at all times when the irradiator is in use; and
    - (ii) activate a visible and audible alarm when radiation exceeds 2 millirems per hour; and
    - (iii) detect any radiation leaking from the irradiator door; and
    - (iv) be visible to the irradiator user when he is next to the irradiator; or
  - D. if a room monitor is not installed, have available a calibrated and operable survey meter which will be used to:
    - (i) determine the radiation level at the irradiation door when the door is closed; and
    - (ii) check for any increase in radiation levels each time the irradiator door is opened.
  - E. immediately stop the use of the irradiator and notify the Commission by telephone as described in 10 CFR 20.403(d) if abnormal levels of radiation or any malfunction of the irradiator is detected;
  - F. not repair or authorize repairs of the irradiator except by the manufacturer or other persons specifically authorized by the Commission or an Agreement State to perform such services.
18. The procedures contained in the manufacturer's instruction manual for the irradiator authorized by this license shall be followed and copies of these manuals shall be made available to each person using or having responsibility for the use of the device.

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19. 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 August 26, 1992
- B. Letter dated June 21, 1993
- C. Application dated October 20, 1993 and letter dated November 12, 1993
- D. Letters dated March 17, 1994 and April 5, 1994
- E. Letter dated November 16, 1994
- F. Letter dated September 5, 1996



Date OCT 13 1996

For the U.S. Nuclear Regulatory Commission

**Original Signed By:**

**Eric H. Reber**

By

Nuclear Materials Safety Branch  
Region I

King of Prussia, Pennsylvania 19406



OCT 13 1996

Robert W. McKinney, Ph.D.  
Director, Division of Safety  
Department of Health and Human Services  
National Institutes of Health  
31 Center Drive MSC 2260  
Bethesda, MD 20892-2260

Dear Dr. McKinney:

This refers to your license amendment request. Enclosed with this letter is the amended license. Please note that as part of this amendment, in accordance with 10 CFR 30.36, effective February 15, 1996, the expiration date of your license has been extended by a period of five years. Your new expiration date is stated in Item 4 of the license.

Please review the enclosed document carefully and be sure that you understand and fully implement all the conditions incorporated into the amended license. If there are any errors or questions, please notify the U.S. Nuclear Regulatory Commission, Region I Office, Licensing Assistance Team, (610) 337-5093 or 5239, so that we can provide appropriate corrections and answers.

Thank you for your cooperation.

Sincerely,

**Original Signed By:**  
**Eric H. Reber**

Eric H. Reber  
Division of Nuclear Materials Safety

License No. 19-00296-17  
Docket No. 030-08478  
Control No. 123643

Enclosure:  
Amendment No. 32

DOCUMENT NAME: R:\WPS\MLTR\L1900296.17

To receive a copy of this document, indicate in the box: "C" = Copy w/o attach/encl "E" = Copy w/ attach/encl "N" = No copy

OFFICE	DNMS/RI	N	DNMS/RI				
NAME	Reber/ehf						
DATE	10/11/96	10/	/96	10/	/96	10/	/96

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DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

SEP 5 1996

National Institutes of Health  
Bethesda, Maryland 20892

U.S. Nuclear Regulatory Commission  
Nuclear Materials Safety Section B  
Division of Radiation Safety and Safeguards  
Region I  
475 Allendale Road  
King of Prussia, PA 19406

030-08478

Ref: License #19-00296-17

Dear Sir;

The purpose of this letter is to request an amendment of the above referenced license to include an additional self-contained irradiator as described below:

Manufacturer - Nordion International, Inc.

Model - Gammacell 40 Exactor

Source - Two Cesium-137 Pencil Sources Model C-440

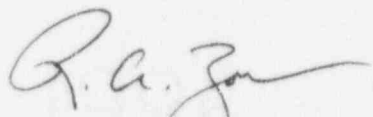
Activity - Not to exceed 4000 Curies

Location - Gerontology Research Center  
4940 Eastern Avenue  
Baltimore Md, 21224

The Gammacell 40 Exactor will be located in a secured room that can only be accessed by a key. The room where the irradiator will be located has been evaluated by the National Institutes of Health Engineering Services and found to be acceptable to support the weight of the irradiator.

The irradiator will be operated according to the conditions of License #19-00296-17.

If you have any questions concerning this amendment, please contact me at 301-496-2254.

  
Robert A. Zoon, M.E., M.S.  
Radiation Safety Officer, NIH

Attachment

cc: Dr. Lance Liotta, Chairman, NIH Radiation Safety Committee  
Dr. Robert McKinney, Director, Division of Safety

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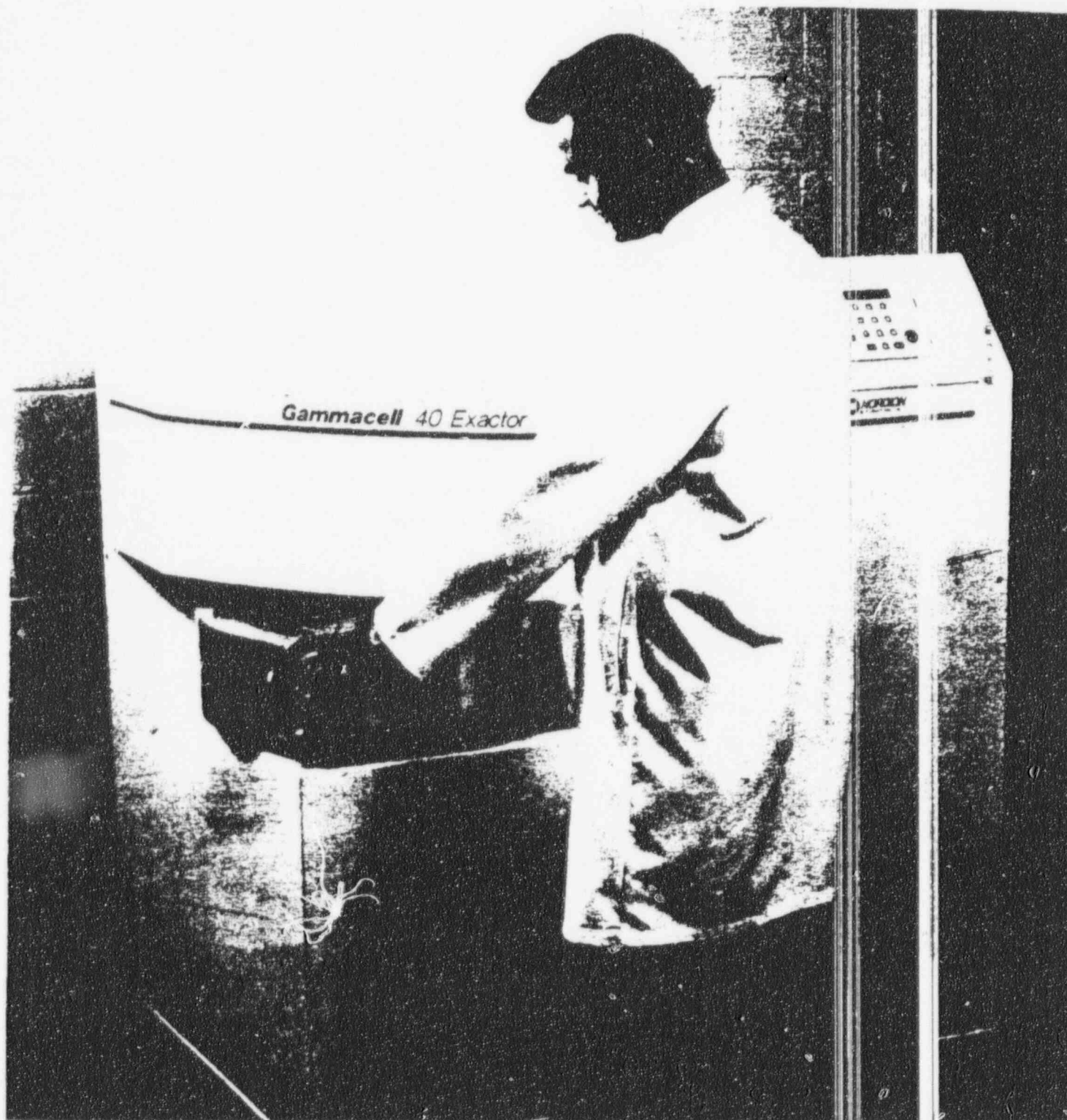
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PRODUCT  
INFORMATION

# GAMMACELL 40 Exactor

LOW DOSE RATE RESEARCH IRRADIATOR





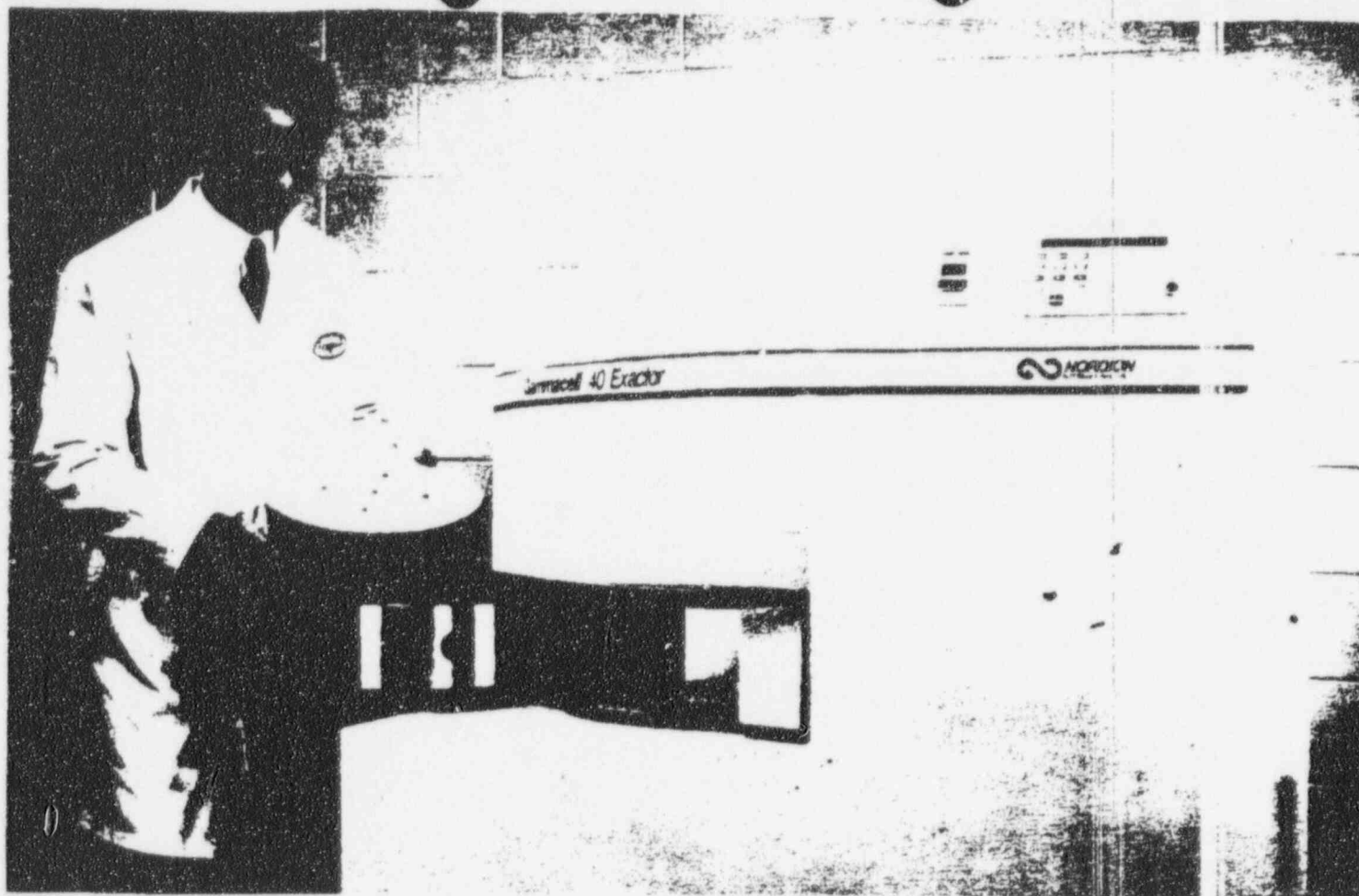


Figure 1  
Sample Loading and Unloading

## INTRODUCTION

The Gammacell® 40 Exactor research irradiator is designed to meet the demanding needs of medical and life science researchers. Reproducible dose rate, a high degree of dose uniformity, and a large sample container are vital for this group of investigators. The Gammacell 40 Exactor meets these requirements and more, providing safe operation in a conventional laboratory environment.

Two caesium-137 sources provide a central dose rate of approximately 1.30 Gy/min (130 rad/min). External radiation levels are below the requirements outlined in International Commission on Radiological Protection (ICRP) Publication No.15 and 33 and facilitate compliance with ICRP Publication No.26. Typical Nordion measurements indicate 3  $\mu$ Sv/h (0.3 mrem/h) at 1 metre from the source and 50  $\mu$ Sv/h (5 mrem/h) at 5 cm from any surface of the unit.

The Gammacell 40 Exactor's modern microprocessor control and reliable electric drive system extend the functionality, versatility and field proven reliability of its predecessor, the Gammacell 40. A form-fitted fibreglass cabinet gives the Exactor a clean, contemporary appearance consistent with a modern laboratory environment.

## APPLICATIONS

The Gammacell 40 Exactor research irradiator has found great success as a small animal irradiator for the development of murine models for cancer therapy. The Gammacell 40 Exactor continues to be an excellent research tool for this application with its large ventilated sample container, ideal dose rate and excellent dose uniformity. Researchers can place specimens anywhere within the sample container and be assured of accurate and reproducible results.

The Gammacell 40 Exactor is a versatile research irradiator with many other medical and life science applications covering the whole spectrum of investigations in radioimmunology, radiosensitivity and cell biology. In addition, the unit is suitable for the irradiation of mitotically inactive cell culture media, mixed lymphocyte cultures and cellular blood components.

## DESIGN FEATURES

The Gammacell 40 Exactor design complies with American National Standards Institute ANSI N433.1 Requirements for Safe Design and Use of Self Contained, Dry Source Storage Gamma Irradiators (Category I), and meets CSA (Canadian Standards Association) and UL (Underwriter Laboratories) electrical requirements.

The Gammacell 40 Exactor offers:

- excellent dose uniformity
- industry specific dose rate
- large sample container
- multiple safety interlocks
- easy one-touch operation
- independent back-up timer
- smooth, quiet operation

The uniform dose distribution, and reliable control of the irradiation parameters allow researchers to conduct experiments that are accurate and reproducible. Multiple safety interlocks and low external radiation levels provide maximum safety for the researchers. Optional accessories such as collimators and attenuators are available to enhance the performance of the Exactor for special applications.

## EASY TO USE

The Gammacell 40 Exactor is easy and convenient to operate. The operator is guided by user friendly menu style instructions. A two-line liquid crystal display indicates the current status of the irradiator, and assists in the initial device set-up.

To perform an irradiation the operator swings the chamber out from the body of the unit, allowing for safe and convenient loading and unloading of samples, as shown in Figure 1. Once the chamber is rotated back into the body of the unit, the operator enters the desired timer setting and presses "Cycle Start". The sources automatically move to the irradiate position, the timer counts down to zero, and an audible chime announces the end of the cycle when the sources return to the safe storage position.

The main control panel is illustrated in Figure 2. A key switch controls power to the unit and a colour-coded key pad allows the user to enter the irradiation parameters. With only one touch of the desired green keys, the user can select various irradiator functions including automatic or manual mode, ventilation on/off, irradiation timer setting and cycle start. Blue keys provide numerical data entry.

For example, the irradiation time may be set in increments of one second up to 99 hours, 59 minutes, 59 seconds.

The Gammacell 40 Exactor can be connected via an RS-232 port to a serial printer providing an automatic record of relevant irradiation data after the completion of each cycle.

## SAFETY CONTROLS

The red stop key can be used in the manual mode of operation and also serves as an emergency stop while in automatic mode. In either case, the sources automatically return to the safe storage position before the chamber door can be opened.

The sealed sources are contained in shielded drawers. These are driven by a sturdy electric ball screw system which moves the sources to and from the irradiate position quietly, with speed and precision. Photoelectric sensors combine with fail safe mechanical interlocks to ensure that the sources are in the safe storage position before the chamber door can be opened.

The Gammacell 40 Exactor is controlled by a reliable microprocessor

system which is powered by a 12V DC battery. The battery is the main power source and is continuously charged when the unit is connected to the AC power. In the event of a power failure the system allows completion of the irradiation cycle in progress, plus an additional three cycles, before AC power must be restored.

## PHYSICAL DATA

The Gammacell 40 Exactor consists of a form-fitted fibre glass cabinet, totally enclosing the main source shields and drive system. The front section of the cabinet is easily removable for convenient servicing.

### Irradiator

Width	934 mm	(36.4 in)
Length	1239 mm	(48.4 in)
Height	1456 mm	(58.9 in)
Installed weight	2954 kg	(6600 lb)
Floor loading	2637 kg/m <sup>2</sup>	(540 lb/ft <sup>2</sup> )

Floor loading area	1.13 m <sup>2</sup>	(12.2 ft <sup>2</sup> )
Power with ground/earth	110/120 VAC	(unless otherwise specified)

### Sample Container

Height	115 mm	(4.1 in)
Diameter	312 mm	(12.3 in)
Volume	11.0 litre	(486 in <sup>3</sup> )

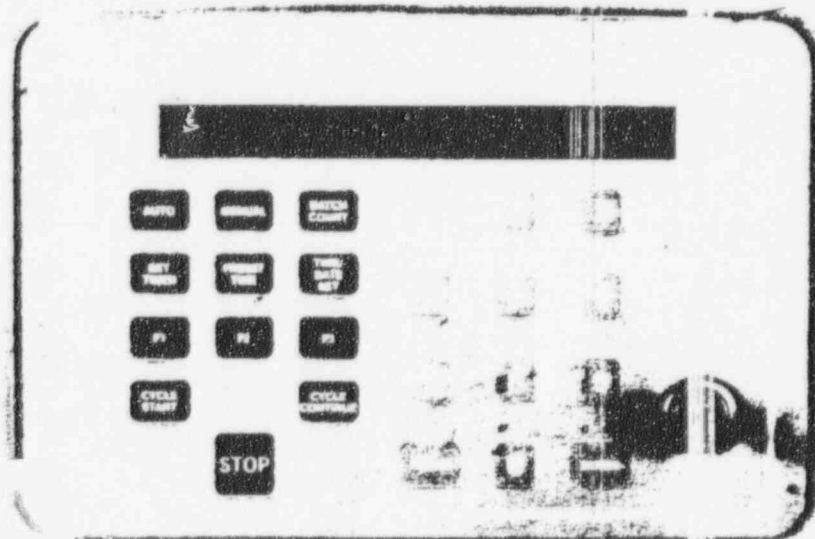


Figure 2  
Control Panel

## SHIPPING

The Gammacell 40 Exactor is shipped in three packages. The two radioactive materials (RAM) packages meet the requirements of the Atomic Energy Control Board of Canada and are endorsed by the U.S. Department of Transportation. The packages also comply with the IAEA Safety Series No.6, Regulations for the Safe Transport of Radioactive Material 1985 Edition (as amended 1990) for international transportation.

The two RAM packages contain the radiation shield assembly complete with caesium-137 sources.

The shipping dimensions for each RAM package is as follows:

Weight	1737 kg	(3830 lb)
Height	1041 mm	(41 in)
Diameter	1306 mm	(51.4 in)

Japanese shipments require one RAM package resulting in the following weight and dimensions:

Weight	2912 kg	(6420 lb)
Height	1219 mm	(48 in)
Width	1334 mm	(52.5 in)
Length	1924 mm	(75.75 in)

The non-RAM package contains the cabinet, fixed and sample shields, electronics and miscellaneous parts. The shipping weight and dimensions are as follows:

Weight	828 kg	(1840 lb)
Height	1524 mm	(60 in)
Width	1397 mm	(55 in)
Length	2134 mm	(84 in)
Volume	4.5 m <sup>3</sup>	(160 ft <sup>3</sup> )

## RADIATION SPECIFICATIONS

The Gammacell 40 Exactor contains two caesium-137 sealed sources, each double-encapsulated in stainless steel and secured in a source drawer. Each source has a nominal activity of 66.6 TBq (1800 Ci). Together they produce a central dose rate of 1.30 Gy/min (130 rad/min)  $\pm$  15% in the sample container. Typically the dose uniformity is  $\pm$  7% over a 260 mm diameter and 100 mm height (see Figure 3). Due to manufacturing tolerances and slight variations in the source activity, this will vary from unit to unit. Nordion offers a comprehensive dose mapping of the sample container if specified by the customer.

## CERTIFICATION AND DOCUMENTATION

Each caesium-137 source meets the requirements for Special Form radioactive materials as outlined in the IAEA Safety Series No.6, Regulations for the Safe Transport of Radioactive Material 1985 Edition (as amended 1990). A measurement certificate confirming source activity and central dose rate as well as an Operator's Manual are provided with each Gammacell 40 Exactor.

Source activities are nominal values only, therefore customers should use 148 TBq (4000 Ci) when applying for a radioactive materials possession licence. Nordion will assist customers in attaining such a licence.

## SUPPORT AND SERVICE

As the world's leading supplier of gamma radiation systems for use in medical and industrial applications, Nordion International Inc. provides after-sales service for the Gammacell 40 Exactor worldwide. A standard warranty of one year for parts and labour supports each unit.

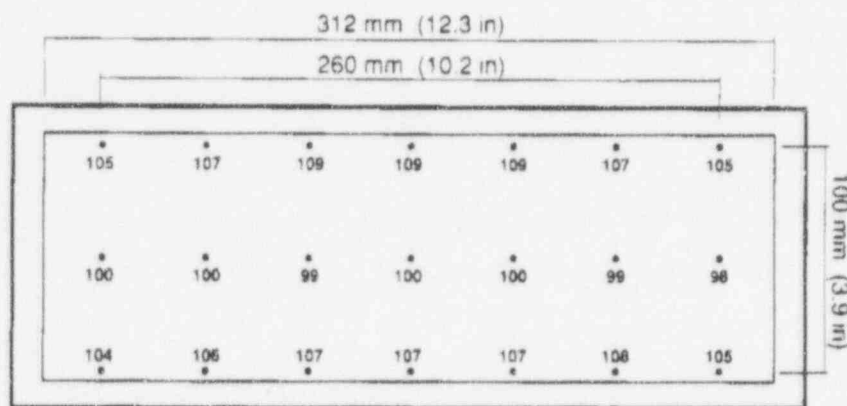


Figure 3  
Relative Absorbed-dose Distribution  
(All values, in percent are relative to the Central Dose)

The specifications contained herein were in effect at the time of printing. Nordion International Inc. is committed to continuing development and reserves the right to discontinue models at any time or change specifications or designs without notice and without incurring obligation.



**CORPORATE OFFICE/  
KANATA OPERATIONS**  
447 March Road, Kanata  
Ontario, Canada K2K 1X8  
Tel: (613) 592-2790  
Fax: (613) 592-6937  
Tlx: 053-4162

**NORDION EUROPE S.A.**  
Zoning Industriel  
Avenue de l'Espérance  
B-6220, Fleurus, Belgium  
Tel: 32-71 82.92.11  
Fax: 32-71 82.94.01  
Tlx: 51.539 ireb

**ASIA PACIFIC OFFICE**  
237 Lockhart Road  
Wanchai, Hong Kong  
Tel: (852) 282-9328  
Fax: (852) 282-9376  
Tlx: 70938 JVD HX

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**NOTES:**

a) When applying for this license, the customer should apply for 4000 curies of caesium 137 (licensed capacity of the unit). Please contact your Nordion Sales Representative when applying for the radioactive materials site license.

b) Application to your relevant competent authority for the radioactive materials license should be made at the same time as placing your order with Nordion International Inc., or sooner if possible, to ensure no shipping delays.

c) The customer acknowledges that Nordion International Inc. cannot release the loaded unit for shipment to the customer's site until the current radioactive materials license has been received at Nordion, Kanata.

4. **SPECIAL NOTE:**

Should you decide to return your unit to Canada or to move it to a location other than that specified on your Radioactive Materials License, you must register your identity, in writing to the Office of Hazardous Materials Regulation, Research and Special Programs Administration, U.S. Department of Transportation, Washington, D.C. 20590.

5. **RIGGING NOTES:**

a) All rigging costs and arrangements for moving and handling the unit from the customer's delivery point to the actual installation site, are the customer's responsibility

**INSTALLATION NOTES:**

a) Nordion personnel must be present when the unit is uncrated and also during any movement of any uncrated unit.

b) A lifting device capable of lifting the crated unit - Radioactive Material crates 1680 kg (3700 lb.) each, Non-Radioactive Material crate 835 kg (1840 lb.) and lifting the upper source head - 1170 kg (2580 lb.) approximately 2540 (100 in.) is required. A suitable fork lift and operator will normally be adequate to perform all lifting and rigging requirements. To facilitate the lifting procedure, both the upper source head and lower source head are fitted with eye bolts. For further details refer to the Nordion International Inc. Unit Specification.

**INSTALLATION NOTES:**

a) Nordion personnel must be present when the unit is uncrated and also during any movement of any uncrated unit.

b) The customer shall provide one technician to assist with the installation.



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## c) Physical Data

*Main Unit*

Floor loading: 2637 kg/sq.m (540 lb/sq.ft)  
Installed weight: 2994 kg (6600 lb)  
Height: 1496 mm (58.9 in.)  
Width: 924 mm (36.4 in.)  
Length: 1229 mm (48.4 in.)

*Sample Drawer Tray (approximate dimensions)*

Depth: 105 mm (4.1 in.)  
Diameter: 312 mm (12.3 in.)  
Volume: 8.0 litre (486 in<sup>3</sup>)

*Wall Clearances (for servicing and to allow door to fully swing)*

Rear: 152 mm (6.0 in.)  
Right Side: 305 mm (12.0 in.)  
Left Side: 800 mm (31.5 in.)

d) The Gammacell 40 Exactor requires a 110/120 V, 60 Hz standard three-prong wall receptacle, including ground. **Customer to specify if different.** A 2 metre (6 ft) power cable is supplied with the unit.

e) Rigging services, technical assistance and electrical service should be prepared and available upon the arrival of the Nordion installation personnel.

f) Upon receipt of the crated unit, the customer should immediately contact the Nordion Industrial Customer Service Department at (613) 592-2790 Extension 2514 or Toll Free 1-800-465-3066 to arrange for a mutually satisfactory installation date.

g) The customer is responsible for ensuring that all required personnel who are to receive instruction on the operation and maintenance of the unit are present during the installation period at a time prescribed by the Nordion International Inc. installation personnel.

h) Any delays incurred by Nordion before or during the installation of the Gammacell 40 unit are caused by the customer, will be charged to the customer's account on an "As Incurred" basis at the rate of \$735.00/day or \$92.00/hour (regular day) or at the rate of \$1,045.00/day or \$130.00/hour (weekend or holiday), plus living expenses. (These rates apply until October 31, 1996.)

## 6. INDEMNITY CLAUSE

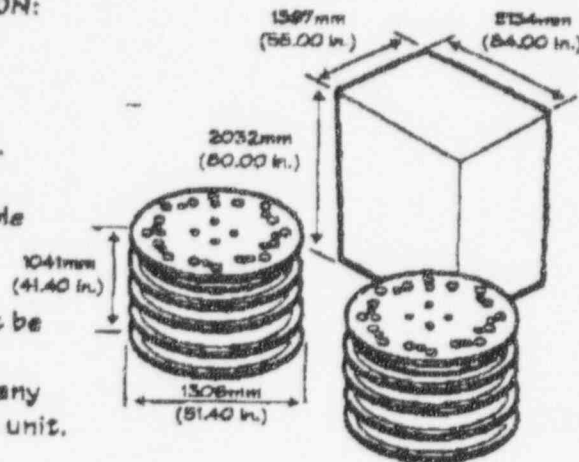
The customer shall indemnify and hold Nordion harmless from and against any and all claims, demands, actions, suits or proceedings of whatever nature (hereinafter "claims"), including, without limitation, all costs and expenses incurred in connection therewith, including attorneys' fees, brought or instituted by a third party and based on or arising out of the use by the customer of the Gammacell 40 Research Irradiator supplied by Nordion, except for those claims based on defective or improper manufacture of such research irradiator by Nordion. Each party shall promptly notify the other of any claims that it believes to be



# GAMMACELL 40 RIGGING REQUIREMENTS (Sheet 1 of 2)

## 1 NEEDED FOR INSTALLATION:

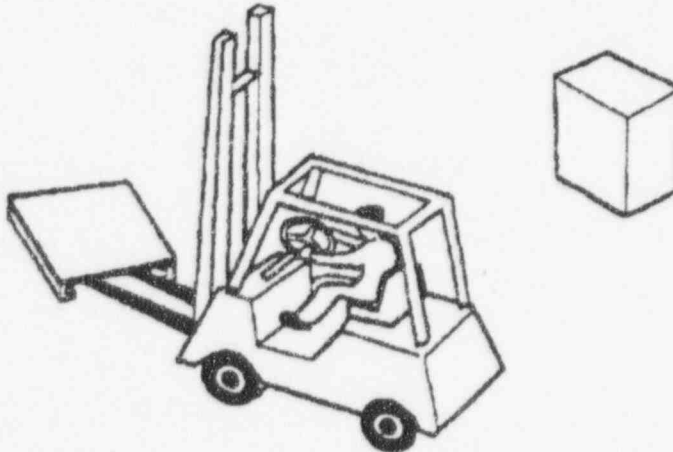
- 1- Forklift with minimum 7,000 lbs. capacity, or equivalent arrangement.
- 2- Minimum 2 knowledgeable heavy equipment handlers.
- 3- Nordion personnel must be present when the unit is uncrated and also during any movement of any uncrated unit.



The GC40 Extractor as it arrives on site. It comprises of 3 main components:  
 2 wooden cases each containing 1 source head and source, (each approx. 3300 lbs.)

1 plywood crate containing assembly materials, controls, covers, base and sample container shield. (approx. 1500 lbs.)

2



The plywood crate is opened. The sample container shield (approx. 700 lbs.) is lifted out with the forklift and set aside.

The base skid is removed and placed in the area where the unit will be assembled.

3



After removing the shipping retaining nuts, the top cover is removed from the lower shipping overpack.

The lower source shield (approx. 3300 lbs.) is lifted out of the shipping overpack with the (supplied) and the forklift provided by the riggers.

# GAMMACELL 40 RIGGING REQUIREMENTS (Sheet 2 of 2)

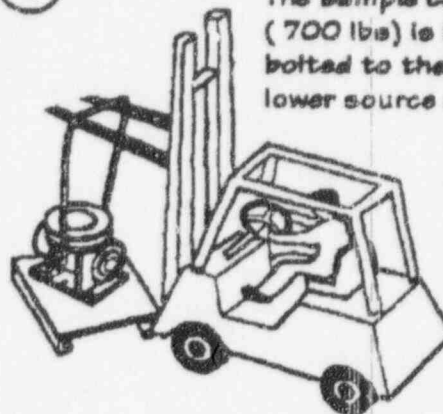
3

The lower source shield is lowered and bolted onto the base skid.



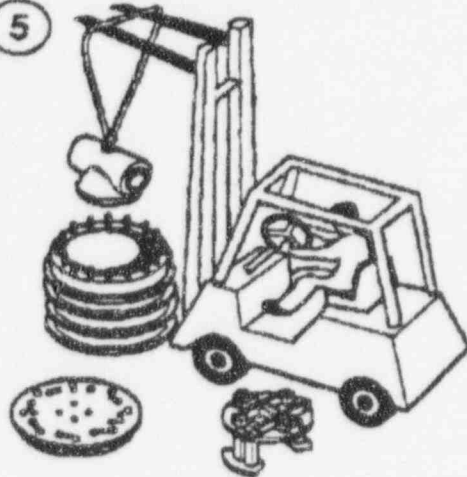
4

The sample container shield (700 lbs) is lowered and bolted to the top of the lower source shield.



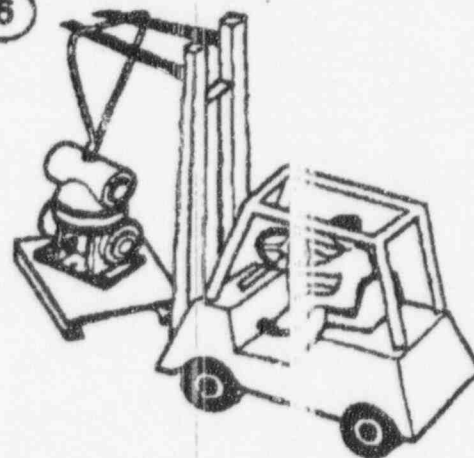
5

After removing the shipping retaining nuts, the top cover and wooden spacer are removed from the upper shipping overpack. The upper source shield (approx. 3200 lbs.) is lifted out of the shipping overpack with the eyebolt (supplied) and the forklift provided by the riggers.

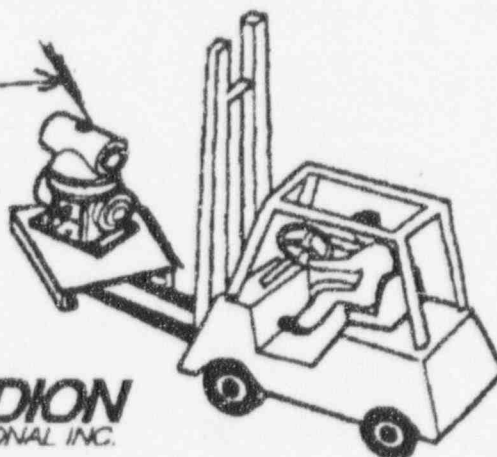


6

The upper source shield is then lowered and bolted to the sample container shield.



7

 $35 \frac{3}{4}$ 


When all the above components are assembled and secured, the assembly can be moved to its final location for the completion of the assembly and testing procedure.

**NORDION**  
INTERNATIONAL INC.

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM  
AND  
REGIONAL LICENSING SECTIONS

(FOR LFMS USE)  
INFORMATION FROM LTS

PROGRAM CODE: 03510  
STATUS CODE: 0  
FEE CATEGORY: EX 3E  
EXP. DATE: 20030731  
FEE COMMENTS: V  
DECOM FIN ASSUR REQD: N

LICENSE FEE TRANSMITTAL

1. REGION *I*

1. APPLICATION ATTACHED

APPLICANT/LICENSEE: HEALTH & HUMAN SERVICES, DEPT. OF  
RECEIVED DATE: 960906  
DOCKET NO: 3008478  
CONTROL NO.: 123643  
LICENSE NO.: 19-00296-17  
ACTION TYPE: AMENDMENT

2. FEE ATTACHED

AMOUNT: -----

CHECK NO.: -----

3. COMMENTS

SIGNED  
DATE

*M.A. Pershing*  
*9/6/96*

4. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED / \_\_/)

1. FEE CATEGORY AND AMOUNT: -----

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:

AMENDMENT

RENEWAL

LICENSE

3. OTHER

SIGNED  
DATE

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