

PLEASE USE THE ADDRESS BELOW FOR  
FUTURE CORRESPONDENCE AND IN RESPONSE  
TO THIS APPLICATION:

EXHIBIT A

Wagih M. Shehata, M.D.  
6525 Shawnee Ridge  
Cincinnati, Ohio 45243

NRC Form 313T 10 CFR 25		U.S. NUCLEAR REGULATORY COMMISSION		Approved by GWS 3150-0081 Expires 1-31-85							
APPLICATION FOR MATERIALS LICENSE - TELETHERAPY											
<b>INSTRUCTIONS</b> - Complete Items 1 through 22 if this is an initial application or an application for renewal of a license. Use supplemental sheets where necessary. Item 22 must be completed on all applications and signed. Retain one copy. Submit original and one copy of entire application to: Director, Office of Nuclear Materials Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Upon approval of this application, the applicant will receive a Materials License. An NRC Materials License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30, and the Licensee is subject to Title 10, Code of Federal Regulations, Parts 19, 20, 21, and 35 and the license fee provision of Title 10, Code of Federal Regulations, Part 170. The license fee category should be stated in item 22 and the appropriate fee enclosed.											
<b>1. NAME AND MAILING ADDRESS OF APPLICANT</b> (Institution, firm, clinic, physician, etc.) INCLUDE ZIP CODE Suite 4 Medical Arts Building 4966 Glenway Avenue Cincinnati, Ohio 45238			<b>1D. STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED</b> (If different from 1.A.) INCLUDE ZIP CODE 30 - 22240 02201 same Leh 23475								
<b>1A. TELEPHONE</b> AREA CODE: NUMBER new office											
<b>2. PERSON TO CONTACT REGARDING THIS APPLICATION</b> Wagih Shehata, M.D.			<b>3. THIS IS AN APPLICATION FOR:</b> (Check appropriate item) a. NEW LICENSE b. AMENDMENT TO LICENSE NO. _____ c. RENEWAL OF LICENSE NO. _____								
<b>2A. TELEPHONE</b> AREA CODE: 513 NUMBER 872-2636											
<b>4. INDIVIDUAL USERS</b> (Name individuals who will use or directly supervise use of radioactive material. Complete Supplements A and B for each individual.) Wagih Shehata, M.D. Farook Jazy			<b>5. RADIATION SAFETY OFFICER (RSO)</b> (Name of person designated as radiation safety officer. If other than individual user, complete resume of training and experience as in Supplement A.) J. Freshcorn, M.S.								
<b>6. SEALED SOURCES TO BE USED IN TELETHERAPY UNITS</b> (Attach supplemental pages if necessary)											
BYPRODUCT MATERIAL (Element and Mass No.)		NAME OF SOURCE MANUFACTURER		SOURCE MODEL NUMBER	MAXIMUM ACTIVITY PER SOURCE						
A. Cobalt-60		Atomic Energy of Canada		AECL C-146 or 151	10500 Curies						
B.					(not more than						
C.					5200 Curies each)						
<b>7. TELETHERAPY UNITS</b> (Attach supplemental pages, if necessary)											
NAME OF MANUFACTURER (Include description, if unit is custom made)				MODEL NUMBER							
A. Atomic Energy of Canada				Theratron 80							
B.											
C.											
<b>8. USE</b> (Attach supplementary pages, if necessary)											
<table border="1"><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>X</td><td>X</td><td>X</td></tr></table> HUMAN USE ONLY HUMAN AND OTHER USE (Specify on separate sheet)						A	B	C	X	X	X
A	B	C									
X	X	X									
8506100274 850517 RE93 LIC30 34-23475-01 PDR											
22:22 SEP -5 1984											
<b>9. MONITORING DEVICES</b>											
TYPE (Check and/or complete as appropriate)		SUPPLIER (Service Company)		EXCHANGE FREQUENCY							
X (1) FILM BADGE - WHOLE BODY		Eberline Instrument Co Santa Fe, New Mexico		monthly							
(2) THERMOLUMINESCENCE DOSIMETER (TLD) - WHOLE BODY		Applicant									
(3) OTHER (Specify)		Check No. 1879 \$1500 Amount Fee \$837.75 Type of Fee 10 \$280 Date Check Rec'd 9/1/84 Received By [Signature]		18097							

# EXHIBIT A (Continued)

INFORMATION REQUIRED FOR ITEMS 10 THROUGH 21	
<p>For Items 10 through 21, check the appropriate box(es) and submit a detailed description of all the requested information. Begin each item on a separate sheet. Identify the item number and the date of the application in the lower right corner of each page. If you indicate that an appendix to the teletherapy licensing guide will be followed, do not submit the pages, but specify the revision number and date of the referenced guide: Regulatory Guide 10. Rev. _____ Date: _____</p>	
10. MEDICAL ISOTOPE COMMITTEE	15. BEAM STOPS
<input type="checkbox"/> None of the specialties attached; and (check one)	<input checked="" type="checkbox"/> Description of stops used to restrict beam orientation attached.
<input type="checkbox"/> a. Duties as in Appendix A, or	16. SHIELDING EVALUATION
<input checked="" type="checkbox"/> b. Equivalent duties attached.	<input checked="" type="checkbox"/> Evaluation of proposed shielding attached.
11. TRAINING AND EXPERIENCE	17. OPERATING AND EMERGENCY PROCEDURES
<input checked="" type="checkbox"/> a. Supplements A & B attached for each individual user; and	<input type="checkbox"/> a. Description of operating procedures attached; and
<input checked="" type="checkbox"/> b. Supplement A attached for RSO	<input checked="" type="checkbox"/> b. Copy of emergency procedures attached.
12. INSTRUMENTATION (check one)	18. INSTRUCTION OF PERSONNEL (check one)
<input type="checkbox"/> a. Appendix C form attached, or	<input checked="" type="checkbox"/> a. Training program and schedule in Appendix H followed, or "Guide for Preparation of Application for Licenses in Medical Teletherapy Programs"
<input checked="" type="checkbox"/> b. List manufacturer's name and model number	<input type="checkbox"/> b. Description of instruction program for employees attached
13. CALIBRATION OF INSTRUMENTS (check one)	19. LEAK TESTS OF SEALED SOURCES
<input type="checkbox"/> a. Appendix D, Part 2 procedures followed for instrumentation calibration, or	<input checked="" type="checkbox"/> Description of leak-test procedures attached.
<input checked="" type="checkbox"/> b. Description of sources, calibration frequency and equivalent procedures attached.	20. QUALIFIED EXPERT (Use only if the individual fails to meet 10 CFR 35.24 requirements.)
14. FACILITIES AND EQUIPMENT	Statement of qualifications of the expert who will perform teletherapy calibrations attached.
<input checked="" type="checkbox"/> a. Description and drawing of facilities attached; and	21. ALARA PROGRAM (check one)
<input checked="" type="checkbox"/> b. Description of patient viewing and communicating systems attached; and	<input checked="" type="checkbox"/> "Guide for Preparation of Application for Licenses in Medical Teletherapy Programs"
<input checked="" type="checkbox"/> c. Description of area safeguards attached.	Equivalent ALARA program attached
22. CERTIFICATE	
(This item must be completed by the applicant)	
The applicant and any official executing this certificate on behalf of the applicant named in Item 1a certifies that this application is prepared in conformity with Title 10, Code of Federal Regulations, Parts 30 and 35, and that all information contained herein, including supplements attached hereto, is true and correct to the best of our knowledge and belief.	
a. LICENSE FEE REQUIRED (See section 170.31, 10 CFR 170)	b. APPLICANT OR CERTIFYING OFFICIAL (Signature)
(11) LICENSE FEE CATEGORY	(11) NAME (Type or print)
7A	Wagih M. Shehata
(12) LICENSE FEE ENCLOSED	(12) TITLE
\$ 300	Wagih M. Shehata M.D.
	c. DATE
	8/24/84
WARNING: 18 U.S.C. Section 1001: Act of June 25, 1948; 62 Stat. 749, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.	

10. RADIATION SAFETY COMMITTEE

Radiation Safety Program will be under authority of Radiation Safety Committee.

- a. The Radiation Safety Committee will review safety aspects of of present program; keep records of committee meetings, actions, recommendations, and decisions; prepare and disseminate information pertaining to radiation safety; delegate responsibility to RSO for conduct of routine radiation safety programs; maintain records of receipts, transfers, and disposal of radioactive materials and also total possession level; initiate corrective actions as necessary to assure radiation safety to personnel and to patients; review training and experience of any individual who uses radioactive material and determine that qualifications are sufficient to perform duties safely; determine whether current procedures are maintaining exposure ALARA.
- b. The Committee shall meet quarterly (or more often if deemed necessary). The records of these meetings will be kept by W. Shehata, Chairman.
- c. The committee includes the following members:

Wagih Shehata, M. D., Radiation Therapist, Chairman  
Farooq Jazy, M. D., Radiation Therapist  
John Freshcorn, M.S., Radiologic Physicist, RSO  
James G. Kereiakes, Ph.D., Radiologic Physicist (Consultant)

#### 11. TRAINING AND EXPERIENCE

Drs. W. Shehata, F. Jazy are certified in Radiation Therapy by the American Board of Radiology and are presently certified for Cobalt Teletherapy Human Use under NRC License No. 34-00991-03 (Good Samaritan Hospital, Cincinnati, Ohio).

## 12. INSTRUMENTATION

On Premise: Eberline E-120 Survey Meter  
Access to: Texas Nuclear Model 2592 Ion Chamber Survey Meter  
Ion Chamber - Victoreen Instrument Corporation  
100 R Model 621, Serial #1055  
R-meter model 570, Serial #1055

Ion Chamber -  
NEL 2571 Serial #448  
Keithley Electrometer 35614, Serial #18058

## 13. CALIBRATION OF INSTRUMENTS

Survey Meters (see attached) - annually and as needed (following repair); constancy check performed as instrument used (see attached form); survey meters will be calibrated by James G. Kereiakes, Ph.D., Certified Radiological Physicist (American Board of Radiology), E555 Medical Sciences Building, University of Cincinnati, Cincinnati, OH 45267.

Ion Chamber and R-Meter

See attached for calibration

## 14. FACILITIES AND EQUIPMENT

### a. drawing of facilities attached

The unit will be placed in a presently existing underground area housing transformers. This area is attached to present underground portion of building. Three walls are outside underground walls. Remaining inside wall adjoins hallway and office area; area above is outside ground level.

### b. & c.

Safety devices to include the following:

1. Signal lights on the control panel will indicate source "off" (green) and source "on" (red). Lights above the entrance door and head unit will indicate source "on" (red) and source "off" (white).
2. A door interlock switch will turn the source "off" if the treatment room door is opened. The source will remain "off" until the treatment room door is closed and the control circuits reset.
3. Unit will have an emergency source "off" release on the head.



4. A sign with the radiation symbol and the wording "Caution High Radiation Area - COBALT 60,           Curies,           date  
Caution Radioactive Material" will be posted on the treatment room door.
5. A proper notice bearing the conventional radiation symbol and the word:

CAUTION  
RADIOACTIVE MATERIAL  
COBALT 60,   CURIES,           DATE

will be placed on the unit.

6. Patient viewing is accomplished by closed circuit TV system and also by combination of lead glass window in entrance door and convex mirror in maze wall. Patient communications is through an inter-communication system.
7. Check of source returning to "off" position at end of present time:  
  
At end of present time, room will be entered with G. M. survey meter to assure source is in "off" position switch then turned to "on" position (time not reset) and room entered with G. M. survey meter to assure source remained "off" position.
8. A source "on" error will be measured.
9. Room will have Primalert 10 Monitor installed on wall at end of maze (visible from view window and as personnel enter room); monitor will have battery power pack backup in case of electrical failure; check source will be used daily to check operation of monitor.
10. Source will be wipe tested every 6 months.
11. Commitment to: a) train new employees in emergency procedures as soon as they report for duty; and b) conduct "dry runs" of emergency procedures at least once every six months.
12. Operating procedures have been developed and will be implanted upon teletherapy operation. These procedures will include as a minimum:
  - a. Teletherapy unit, room and console will be secured when unattended
  - b. Operative procedures indicated that it is the responsibility of the therapy technologist to ensure that only the patient is in the treatment room when the primary beam is turned "on."

c. Safety devices will be checked (see enclosed by whom and frequency). Results will be recorded and prompt corrections of malfunctions or defects will be made. Commercial supplier will be called on to correct malfunctions or defects; patients to be treated at Good Samaritan Hospital.

15. BEAM STOPS:

1. For this unit, the head is mechanically stopped so that it will not tilt forwards or backwards.
2. Interlocks on head and gantry limit operation of unit to:
  - a. When head directed towards floor (beam stopper in beam); head rotation limited to  $+ 5^{\circ}$  (electrical stop)
  - b. When head directed towards reception and control area, (beam stopper in beam); head rotation limited to  $\pm 5^{\circ}$  (electrical stop).
  - c. When head directed towards floor (beam stopper not in beam); as for treatment of Hodgkin's disease, head and beam stopper rotated clockwise to  $45^{\circ}$  angle; head then rotated  $45^{\circ}$  counter-clockwise (now directed towards floor); mechanical and electrical stops limit head movement from  $7^{\circ}$  to left of vertical (towards floor) to  $5^{\circ}$  to right of beam stopper (beam towards beam stopper).
  - d. When head directed towards ceiling (beam stopper in beam); head limitations are  $\pm 5^{\circ}$  (electrical stop)
  - e. When head directed towards outside wall (beam stopper in beam); head rotation limited to  $\pm 5^{\circ}$  (electrical stop)

16. EVALUATION OF SHIELDING

Room protection data is attached for unit used at 80 cm SSD, 30 x 30 cm field size with head direction: 1) vertically down (beam directed against beam stopper); and 2) beam stopper at  $30^{\circ}$  angle to simulate maximum scatter situation). Assumed workload (W) of 40000 R/wk at 100 cm. A complete radiation survey will be performed following unit and source installation.

Area*	Type Area	Use Factor	Distance Feet	WUT R/wk at 1 meter	Present Shielding	Recommended Shielding	Exposure per hour mR/hr	Exposure per week mR/hr
Wall adjoining southeast outside wall (underground)	U	1/16	8	2500	10" concrete (underground)	18" concrete (extended)	---	---
Wall adjoining southwest outside wall (underground)	U	1	12	40000	---	18" concrete	---	---
Wall adjoining northwest outside wall (underground)	U	1	18	40000	---	18" concrete	---	---
Wall adjoining stairwell	U	1/16	15	2500	10" concrete	18" concrete	0.05	1.2
Entrance wall	U	1	11	40000	10" concrete	15" concrete	0.03	1.2
Entrance door	U	1	12	40000	---	1/4" lead (Pb)	0.03	1.2
View Window in entrance door	U	1	12	40000	---	1/4" Pb <sub>eq</sub> Pb glass	0.03	1.2
Maze wall	-	1	-	40000	---	24" concrete	---	---
Wall adjoining office area	U	1	9	40000	12" concrete	24" concrete	0.04	1.6
Area below (ground)	-	1/2	-	---	---	---	---	---
Area above (ground level)	U	5/16	13	12500	---	24" concrete	0.12	4.8

Ceiling concrete thickness of 24" will be extended for at least two feet below ground level on each outside wall



### Calculations

Workload = 40000 R/wk at 1 meter  
= 1000 R/hr at 1 meter

### Area Above (Ground Level)

#### Leakage

Head leakage = 0.1% of primary beam  
Use Factor (U) = 1  
Occupancy Factor (T) = 1  
WUT = 1000 R/hr at 1 meter  
distance - 4 meter  
$$\frac{1000 \text{ R/hr}}{(4)^2} = 62.5 \text{ R/hr at 4 meters}$$

.001 x 62.5 R/hr

= 62.5 mR/hr at 4 meters  
HVL = 6.2 cm concrete  
24" concrete = 61 cm  
Exposure per hour = .06 mR/hr  
Exposure per week = 2.4 mR/week

### Scatter (30°)

Use Factor (U) = 5/16  
Occupancy Factor (T) = 1  
WUT = 1000 R/hr at 1 meter  
x 5/16 = 312 R/hr at 1 meter  
$$x (1/4)^2 = 19.5 \text{ R/hr at 4 meters}$$
$$x .006 = 117 \text{ mR/hr at 4 meters (30° scatter)}$$

HVL - 6.1 cm concrete  
24" concrete = 61 cm  
Exposure per hour = 0.12 mR/hr  
Exposure per week = 4.8 mR/week

## Area Adjoining Hallway and Office

### Leakage

Head leakage = 0.1% of primary beam

Use Factor (U) = 1

Occupancy Factor (T) = 1

WUT = 1000 R/hr at 1 meter

distance = 2.8 meters

$\frac{1000 \text{ R/hr}}{(2.8)^2}$

= 128 R/hr at 2.8 meters

.001 x 128 = 128 mR/hr at 2.8 meters

HVL = 6.2 cm concrete

24" concrete = 61 cm

Exposure per hour = 0.12

Exposure per week = 4.8 mR/wk

### Scatter

Use Factor (U) = 1/16

Occupancy Factor (T) = 1

x 1/16 = 62.5 R/hr at 1 meter

x  $(2.8)^2$  = 8.0 R/hr at 2.8 meters

x .006 = 48 mR/hr at 2.8 meters (30° scatter)

HVL = 6.1 cm concrete

24" concrete = 61 cm

Exposure per hour = 0.045 mR/hr

Exposure per week = 1.8 mR/wk

### G-M Survey Meter Calibration Procedure

1. G-M survey meter is calibrated annually and following repair or battery replacement.
2. Calibration is accomplished by taking readings at various points from the calibration source and adjusting the meter readings to within  $\pm 10\%$  of the calculated exposure rates for those points. The points are chosen so that two readings, which are separated by at least 50% of the scale, are taken in each scale.
3. The calibration source used is a 1 mg<sup>226</sup>Ra needle manufactured by the Radium Chemical Company, Inc. Filtration is 0.5 mm Pt equivalent and the calibration of the source activity is traceable to NBS standards.
4. Calibration is done by James G. Kereiakes, Ph. D., Radiological Physicist, at the University of Cincinnati Medical Center.

18097.

17. OPERATING AND EMERGENCY PROCEDURES  
(see attached)
19. LEAK TESTS OF SEALED SOURCES - John Freshcorn, M. S.  
(see attached) Good Samaritan Hospital  
Cincinnati, OH 45267
20. QUALIFIED EXPERTS - James. G. Kereiakes, Ph. D.  
(see attached) John Freshcorn, M. S.
21. ALARA PROGRAM - see attached

### Ion Chamber Survey Meter Calibration Procedure

1. Meter is calibrated annually and calibrated following repair or battery replacement.
2. Calibration is accomplished by taking readings at various points from the calibration source and adjusting the meter readings to within  $\pm 10\%$  of the calculated exposure rates for those points. The points are chosen so that two readings, which are separated by at least 50% of the scale, are taken in each scale.
3. The calibration source used is an EON Corporation Gamma Survey Instrument Calibrator, Model 64-764, Serial Number 123, marketed by Nuclear Associates, Inc. The calibrator contains 100 mCi  $^{137}\text{Cs}$  and the design and manufacture meet NRC requirements (cf. enclosure).
4. Calibration done by James G. Kereiakes, Ph. D., Radiological Physicist, at the University of Cincinnati Medical Center.



# GAMMA SURVEY INSTRUMENT CALIBRATOR

## Gamma Survey Instrument Calibrator

- For use in radiation fields from 2 mR to 1 R/hr.
- Non-removable Cesium-137 source; long half-life.
- Automatic timer limits exposure periods.
- Container meets requirements of the A.E.C. and Agreement States.

This safe, sturdy, easy-to-use device permits the fast and accurate calibration of instruments used for surveying gamma radiation. It enables users of dosage measuring equipment to perform routine checks at will or as necessary to meet the regulations of the A.E.C. and Agreement States. This simple, fool-proof system is a time and money saver... it does away with the expense, inconvenience and work-time lost when sending such instruments to an outside calibration service.

Consists of a heavy-duty container that holds 100 mc of Cesium-137 encased at one end of a control rod. Since Cs-137 has a long half-life of 29 years, there is no need to calculate a correction factor for at least 1 or 2 years after the instrument has been received in the laboratory.

The source is kept in either of 2 positions: stored or exposed. In the fully-shielded "stored" position, radiation at the container's surface is less than 60 mr/hr; at 6" away it is less than 15 mr/hr. In the "exposed" position, the source faces a 45° port at the side of the shield, and the field can vary from 2 mr to 1 R/hr. The source is moved from "stored" to "exposed" merely by raising the control rod. For safety, the Cs-137 source cannot be removed from its shield except by the manufacturer.

For safety, the Calibrator includes a preset timer which limits the source's exposure period (1 to 60 minutes). At the expiration of the selected period, the source automatically drops to its safe storage position. Therefore, the source cannot remain exposed accidentally after an instrument has been calibrated.

Includes a built-in tape measure which helps accurately determine the distance from the Cs-137 source to the instrument being calibrated. A key-lock prevents any unauthorized use of the equipment. Convenient carrying handle. Measures 11" high x 7" 10". Weighs 75 lbs.

61-781 Gamma Survey Instrument Calibrator

\$245.00



61-781  
Gamma  
Survey  
Instrument  
Calibra  
In "Stored"  
Position



NUCLEAR ASSOCIATES, INC.

Subsidiary of KODAK MEDICAL PRODUCTS CORP.

35 URBAN AVENUE, WESTBURY, N.Y. 11590

PHONE (516) 331-9141 • TWX 510 777 8958

## SURVEY INSTRUMENT CALIBRATION

PLACE \_\_\_\_\_ DATE \_\_\_\_\_

CALIBRATED BY:

ATTENTION: Dr. W. Shehata

Technique: Survey meter placed at several distances from a calibration source of 1 mCi Ra<sup>226</sup> having 0.5 mm Pt. eq. filtration; gamma-ray constant of 0.825 mR/hr at 1m per mCi was used; survey meter reading adjusted to calculated exposure rate reading (two calibration points per range).

Instrument	Range	Distance, (cm)	Exposure Rate Calculated (mR/hr)	Meter Reading Adjusted (mR/hr)
Eberline E-120				

CINCINNATI, OHIO

SURVEY INSTRUMENT: Eberline Survey Meter Model E-120

PROCEDURE: Use check source ( ); place source up against front surface of survey meter just below front clamp; read range X-10, reading should be mR/hr and should be between and mR/hr; if not, notify Mr. John Freshcorn.

Date	Reading (X-10 range) mR/hr	Date	Reading (X-10 range) mR/hr	Date	Reading (X-10 range) mR/hr

## DOSIMETER SYSTEM CALIBRATION

1-16-84  
DATE

ELECTROMETER: Mfgr: Victoreen Submitted by: University of  
Model: 570 Cincinnati  
SN: 1055 Cincinnati, OH 45267

CHAMBER: Mfgr: Victoreen  
Model: 621 (100R)  
SN: x1055

Scales, Switch Positions, Conditions:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Orientation: model number toward source  
\_\_\_\_\_

Polarizing potential: 520.5 V System leakage: NA

<u>Beam Quality</u>				<u>Exposure</u>	<u>SCD</u>	<u>Calibration</u>		
<u>HVT (mm)</u>	<u>Al/Cu</u>	<u>H.C.</u>	<u>KVp</u>	<u>Rate R/M</u>	<u>(mm)</u>	<u>factor</u>	<u>Scale</u>	<u>Class</u>
Co-60	-	-	-	59.6	740	0.975 R/RDG	50%	III

Discharge Test Reading (refer to instruction manual) 42.6 % of scale.

COMMENTS: Fiber motion is not continuous as "zero set"  
wheel is rotated (Fiber drag)

Reviewed by: Robert A. Hagg Log C-4 Page(s) 27  
Title Associate Director Log \_\_\_\_\_ Page(s) \_\_\_\_\_  
Checked THS Log \_\_\_\_\_ Page(s) \_\_\_\_\_  
Log \_\_\_\_\_ Page(s) \_\_\_\_\_

# *K & S Associates, Inc.*

*Radiological Consultants*

*Medical - Industrial*

ACCREDITED DOSIMETRY CALIBRATION LABORATORY

## Calibration Report

Institution/Facility: University of Date: 1-27-84  
Cincinnati Report: 250  
Medical Science Building  
Cincinnati, OH 45267

Instrument: Victoreen 570, SN 1055  
Victoreen 621, SN x1055  
  
  
Test No.: 84007

The responsibility for calibration results provided by K & S Associates, Inc. and its employees extends only to the time the instruments leave the K & S laboratory facility. Constancy tests are highly recommended., It is the responsibility of the instrument user to assure himself that his interpretation of the information contained herein is consistent with the interpretation intended.



# *K & S Associates, Inc.*

*Radiological Consultants*

*Medical - Industrial*

ACCREDITED DOSIMETRY CALIBRATION LABORATORY

## Calibration Report

Institution/Facility: Good Samaritan Date: 1-30-84  
Hospital Report: 253  
3217 Clifton Avenue  
Cincinnati, OH. 45220

Instrument: NEL 2571, SN 448  
Keithley 35614, SN 18058  
\_\_\_\_\_  
\_\_\_\_\_

Test No.: 84015

The responsibility for calibration results provided by K & S Associates, Inc. and its employees extends only to the time the instruments leave the K & S laboratory facility. Constancy tests are highly recommended. It is the responsibility of the instrument user to assure himself that his interpretation of the information contained herein is consistent with the interpretation intended.

IONIZATION CHAMBER CALIBRATION

1-23-84  
DATE

CHAMBER: Mfgr: NEL Submitted by: Good Samaritan Hospital  
Model: 2571(0.6ml, graphite) 3217 Clifton Avenue  
SN: 448 Cincinnati, OH. 45220

ORIENTATION:

black line toward source  
\_\_\_\_\_  
\_\_\_\_\_

SATURATION: The ratio of the current at full collection potential to the current at 60% of full collection potential was 1.002 at a current of  $2.071 \times 10^{-10}$  Amperes.

Polarizing potential -352 V Chamber leakage  $< 1 \times 10^{-14}$  A

Beam Quality				Exposure Rate R/M	SCD (mm)	Calibration factor	Class
HVT (mm)	Al/Cu	H.C.	KVp				
3.10	Al	0.60	100	23.6	500	$4.741 \times 10^9$ R/C	II
*Co-60	-	-	-	59.4	740	$4.781 \times 10^9$ R/C	II

COMMENTS: \*with Delrin buildup cap  
\_\_\_\_\_  
\_\_\_\_\_

Reviewed by: Robert A. Hagg Log C-4 Page(s) 45  
Title: Associate Director Log T-4 Page(s) 39  
Log \_\_\_\_\_ Page(s) \_\_\_\_\_  
Checked: TWS Log \_\_\_\_\_ Page(s) \_\_\_\_\_

ELECTROMETER CALIBRATION

1-23-84

DATE

Instrument: Mfgr: Keithley Scales, Switch Positions, Conditions:  
Model: 35614 FUNCTION:  $10^{-8}$  C; CURRENT SUPPRESS:  
SN: 18058 OFF; BIAS: OFF  
Submitted by: Good Samaritan Hospital  
3217 Clifton Avenue  
Cincinnati, OH 45220

Bias: -359 V (BIAS: +, 100 PERCENT)

Leakage:  $-6.7 \times 10^{-15}$  A

LINEARITY:

within +/- 0.1% of full scale or the precision of the reading - whichever  
is greater

CHARGE CALIBRATION FACTOR:

(Multiply instrument reading by factor to obtain coulombs.)

Range	Factor (C/unit of reading)
<u>.2</u>	<u>0.994 C/RDG</u>
<u>2</u>	<u>0.994 C/RDG</u>
<u>20</u>	<u>0.994 C/RDG</u>

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Reviewed by: Thomas W. Sany Log: E-2 Page(s) 169  
Title: Director Log: \_\_\_\_\_ Page(s) \_\_\_\_\_  
Checked by: RK Log: \_\_\_\_\_ Page(s) \_\_\_\_\_

OPERATING PROCEDURES

<sup>60</sup>Co Teletherapy Unit

Annually

Full calibration

Qualified Expert

Semi Annually

<sup>60</sup>Co source wipe ,  
Emergency "dry" run

Qualified Expert  
Staff

Monthly

Output spot check  
Timer check  
Source "on" time  
Field congruency  
Distance markers  
Source "on" lights  
Door interlock

Qualified Expert  
"  
"  
"  
"  
"  
"

Weekly

Distance markers  
Door interlock  
Emergency devices

Technologist  
Technologist  
Technologist

Daily

Source "on" lights  
Area monitor

Technologist  
Technologist

EMERGENCY PROCEDURES  
AECL Cobalt-60 Therapy Unit

IN THE EVENT OF EQUIPMENT FAILURE  
RESULTING IN SOURCE REMAINING "ON"

A. If patient is ambulatory:

1. Instruct patient to get off table and leave the room

B. If patient is not ambulatory:

Enter treatment room but avoid exposure to the direct beam.  
Pull treatment table as far away from direct beam as possible.  
Transfer patient to a stretcher and remove patient from room.

C. Then:

1. Close, lock and post treatment room door
2. Turn off main switch at control panel
3. Notify the responsible physician and radiation safety officer at once
4. Conspicuously post a sign in the area to warn others of the problem

W. Shehata, M.D.  
Office: 872-2636  
Home: 831-4057

F. Jazy, M.D.  
Office: 872-2636  
Home:

J.G. Kereiakes, Ph.D.  
Office: 872-5476  
Home: 561-4067

J. Freshcorn, M.S.  
Office: 872-5476  
Home: 874-6014

AECL  
CHICAGO OFFICE  
(312) 593-3242  
Dan Tigmeier

CAUTION: STAY OUT OF DIRECT BEAM AT ALL TIMES



TELETHERAPY SOURCE LEAK TEST REPORT

1. Name and address of licensee: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. License Number: \_\_\_\_\_
3. Date of source installation: \_\_\_\_\_
4. Source serial number: \_\_\_\_\_
5. Make and model number of teletherapy unit: \_\_\_\_\_
6. Date of test for leakage and contamination: \_\_\_\_\_
7. Test technique: wipe around inside of all of collimator near source  
\_\_\_\_\_  
location with moistened cotton applicator  
\_\_\_\_\_
8. Instrumentation: Picker Well Scintillation Counter and Spectroscaler 4;  
levels, LL = 0020, UL = 1000, HV = 370 (900 v), Co-60 Efficiency = 25%  
$$MDA = \frac{3}{0.25 \times 2.20 \times 10^6} \sqrt{\frac{145}{5}} = 2.9 \times 10^{-5} \mu\text{Ci (5 min counting time)}$$
9. Instrument reading on wipes: \_\_\_\_\_
10. Instrument background reading: \_\_\_\_\_
  - A. Instrument reading on wipes minus background: \_\_\_\_\_
  - B. Reading on wipes minus background: \_\_\_\_\_
12. Electric interlock on door checked 5 times and found to be operating properly.

\_\_\_\_\_  
Radiologic Physicist

## CURRICULUM VITAE

### PERSONAL INFORMATION:

NAME: John E. Freshcorn  
ADDRESS: 5810 Gilmore Drive  
Fairfield, Ohio 45014  
TELEPHONE: (513) 874-6014  
DATE OF BIRTH: January 20, 1956  
PLACE OF BIRTH: Cincinnati, Ohio  
SOCIAL SECURITY NUMBER: 301-58-3861  
MARITAL STATUS: Married, Two Children

### EDUCATION:

9/80 - 6/81 M.S. Radiological Science  
University of Cincinnati  
Thesis: Measurement of the extrafocal radiation  
component for diagnostic x-ray systems and deter-  
mination of the possible significance when  
utilizing rare earth screens.

9/74 - 6/78 B.S., Biology  
University of Cincinnati  
Cincinnati, Ohio 45221

### POSITION:

2/83 - Instructor in Radiology, Department of Radiology  
University College of Medicine

### EXPERIENCE:

- Acceptance Testing of Clinac 6/100 Supervoltage X-Ray units
- Data Acquisition of Clinac 6/100 Supervoltage X-Ray Units
- Calibration of both Supervoltage Photon and Electron Beams
- Annual and Replacement Source Calibration of Co-60 Teletherapy Units
- Quality Assurance of Megavoltage Accelerators and Simulator
- Quality Assurance of Nuclear Medicine and Diagnostic X-Ray Equipment (including Ultrasound and Computerized Tomography)
- Computerized Treatment Planning
- Brachytherapy Dosimetry Involving Ra-226, Cs-137, Au-198, Ir-192, I-125, and Sr-90

PROFESSIONAL ACTIVITIES:

American Association of Physicists in Medicine - Member

TEACHING:

SUPERVISE AND LECTURER:

RADIATION HEALTH I AND II - graduate level course offered in  
Department of Radiology, University College of Medicine

PAPERS:

"Characteristics of Off-Focal Radiation and its Clinical  
significance in Pediatric Radiology", presented at  
RSNA by Dr. Stephen Thomas, Ph.D. in 1981

PUBLICATIONS:

Freshcorn, J. with S.R. Thomas, K. Krugh, G. Henry, J.G.  
Kereiakes and R. Kaufman. Characteristics of extrafocal  
radiation and its potential significance in pediatric  
radiology. Radiology 146:793, 1983.

PROGRAM FOR MAINTAINING OCCUPATIONAL  
RADIATION EXPOSURES AT ALARA

Medical Arts Building

Cincinnati, Ohio

August 13, 1984  
Date

I. Management Commitment

- a. We, the management of this hospital are committed to a program for keeping exposures (individual and collective) as low as reasonably achievable (ALARA). In accord with this commitment, we hereby describe an administrative organization for radiation safety and will develop the necessary written policy, procedures and instructions to foster the ALARA concept within our institution. The organization will include a Radiation Safety Committee (RSC) and a Radiation Safety Officer (RSO).
- b. We will perform a formal annual review of the radiation safety program including ALARA considerations. This shall include reviews of operating procedures and past exposure records, inspections, etc., and consultations with the radiation protection staff or outside consultants.
- c. Modification to operating and maintenance procedures and to equipment and facilities will be made where they will reduce exposures unless the cost, in our judgement, is considered to be unjustified. We will be able to demonstrate, if necessary, that improvements have been sought, that modifications have been considered, and that they have been implemented where reasonable. Where modifications have been recommended but not implemented, we will be prepared to describe the reasons for not implementing them.
- d. In addition to maintaining doses to individuals as far below the limits as is reasonably achievable, the sum of the doses received by all exposed individuals will also be maintained at the lowest practicable level. It would not be desirable, for example, to hold the highest doses to individuals to some fraction of the applicable limit if this involved exposing additional people and significantly increasing the sum of radiation doses received by all involved individuals.

II. Radiation Safety Committee (RSC)

- a. Review of Proposed Users and Uses
  1. The RSC will thoroughly review the qualifications of each applicant with respect to the types and quantities of materials and uses for which he has applied to assure that the applicant will be able to take appropriate measures to maintain exposure ALARA.
  2. When considering a new use of byproduct material, the RSC will review the efforts of the applicant to maintain exposure ALARA. The user should have systematized procedures to ensure ALARA, and shall have incorporated the use of special equipment such as syringe shields, rubber gloves, etc., in his proposed use.

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of the investigation. The details of these reports will be recorded in the Committee minutes. Committee minutes will be sent to the management of this institution for review. The minutes, containing details of the investigation, will be made available to NRC inspectors for review at the time of the next inspection.

- d. Re-establishment of an individual occupational worker's Investigational Level II above that tested in Table 1.

In cases where a worker's or a group of worker's exposures need to exceed Investigational Level II, a new, higher Investigational Level II may be established on the basis that it is consistent with good ALARA practices for that individual or group. Justification for a new Investigational Level II will be documented.

The Radiation Safety Committee will review the justification for, and will approve, all revisions of Investigational Levels II. In such cases, when the exposure equals or exceeds the newly established Investigational Level II, those actions listed in paragraph c above will be followed.

VII. Signature of Certifying Official<sup>1</sup>

I hereby certify that this institution (or private practice), has implemented the ALARA Program set forth above.

Wagih M. Shehata  
Signature

Wagih M. Shehata  
Name (print or type)

MD  
Title

Institution Name and Address:

Suite 4, Medical arts Building  
4966 Glenway Avenue  
Cincinnati, Ohio 45238

Wagih M. Shehata MD

1

The individual who is authorized to make commitments for the administration of the institution (e.g., hospital administrator, etc.).



TRAINING AND EXPERIENCE  
AUTHORIZED USER OR RADIATION SAFETY OFFICER

1. NAME OF AUTHORIZED USER OR RADIATION SAFETY OFFICER  John Freschorn, M.S.	2. STATE OR TERRITORY IN WHICH LICENSED TO PRACTICE MEDICINE
--	--

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
passed ABR (Radiologic Physics) written exam - 1983		

4. TRAINING RECEIVED IN BASIC RADIOISOTOPE HANDLING TECHNIQUES

FIELD OF TRAINING A	LOCATION AND DATE(S) OF TRAINING B	TYPE AND LENGTH OF TRAINING	
		LECTURE/ LABORATORY COURSES (Hours) credit	SUPERVISED LABORATORY EXPERIENCE (Hours) credit
a. RADIATION PHYSICS AND INSTRUMENTATION	University of Cincinnati Rad Instrumentation & Engr. Rad Dosimetry Modern Physics	11	
b. RADIATION PROTECTION	University of Cincinnati Radiation Health-2 quarters Rad. Sciences Lab	4	2
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	University of Cincinnati Rad. Instrumentation Rad. Dosimetry	8	
d. RADIATION BIOLOGY	University of Cincinnati Radiation Biology-3 quarters	6	
e. RADIOPHARMACEUTICAL CHEMISTRY	University of Cincinnati Clinical Nuclear Medicine Radiation Health	4	

5. EXPERIENCE WITH RADIATION. (Actual use of Radioisotopes or Equivalent Experience)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Co-137	100 + cases	Norfolk General Hospital Dept of Rad. Oncology University of Cincinnati	July 81-Jan. 83	Intracavity
Au-198 seeds	20 + cases	"	"	Intracavity
Ir-192 seeds	10 + cases	University of Cincinnati	Sept. 83 -	Interstitial
P-32	5 +	NGH/Univ. of Cincinnati	July 81 - present	Intra- Pleural & peritoneal
collodial				
I-125 seeds	10 +	NGH/Univ. of Cincinnati	"	Interstitial



Isotope	Maximum Amount	Where Experience was Gained	Duration of Exper.	Type of Use
Sr-90 applicator	5 +	NGH/Univ. of Cincinnati	July 81-present	Pterigium
I-131	5 + (40-100 mCi)	NGH/Univ. of Cincinnati	"	Thyroid

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