NRC Form 313T
10 CFR 35

U.S. NUCLEAR REGULATORY COMMISSION

Approved by OMB 3150-0081

APPLICATION FOR MATERIALS LICENSE — TELETHERAPY

INSTRUCTIONS — 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 Material 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.

1.a. NAME AND MAILING ADDRESS OF APPLICANT (Institution, firm, clinic, physician, etc.) INCLUDE ZIP CODE

Ohio Valley Hospital
380 Summit Avenue
Steubenville, Ohio 43952

TELEPHONE: AREA CODE (614) NUMBER 283-7000

1.b. STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED (If different from 1.a.) INCLUDE ZIP CODE

Same

2. PERSON TO CONTACT REGARDING THIS APPLICATION

Neil Yates (614) 283-7000

TELEPHONE: AREA CODE ( ) NUMBER

3. THIS IS AN APPLICATION FOR (Check appropriate item)

- [ ] a. NEW LICENSE
- [ ] b. AMENDMENT TO LICENSE NO.
- [X] c. RENEWAL OF LICENSE NO. 34-13317-01

4. INDIVIDUAL USERS (Name individuals who will use or directly supervise use of radioactive material. Complete Supplements A and B for each individual.)

See Item 4, attached

5. RADIATION SAFETY OFFICER (RSO) (Name of person designated as radiation safety officer if other than individual user, complete resume of training and experience as in Supplement A.)

Thomas Havrilla, M.D.

6. SEALED SOURCES TO BE USED IN TELETHERAPY UNITS (Attach supplemental pages if necessary)

	BYPRODUCT MATERIAL (Element and Mass No.)	NAME OF SOURCE MANUFACTURER	SOURCE MODEL NUMBER	MAXIMUM ACTIVITY PER SOURCE	NUMBER OF SOURCES
A	Co-60	Neutron Products	NPI-20-4800 NPI-20-7000W	8200 Curies	1
B					
C					

7. TELETHERAPY UNITS (Attach supplemental pages if necessary)

	NAME OF MANUFACTURER (Include description, if unit is custom made)	MODEL NUMBER
A	Picker	6296 (C9M/80)
B		
C		

8. USE (Attach supplementary pages if necessary)

A	B	C	
X			HUMAN USE ONLY
			HUMAN AND OTHER USE (Specify on separate sheet)

Applicant [illegible]
Check No. [illegible] 9122
Amount Fee Category [illegible] $80
Type of Fee [illegible]
Date Check Rec'd [illegible] 9/25/84
Received By [illegible]

RECEIVED BY LFMB
Date [illegible]
Log [illegible]
By [illegible]
Orig. To [illegible]
Action Com [illegible]

9. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate)	SUPPLIER (Service Company)	EXCHANGE FREQUENCY
(1) FILM BADGE - WHOLE BODY	R.S. Landauer & Company Glenwood, IL	Monthly
(2) THERMOLUMINESCENCE DOSIMETER (TLD) - WHOLE BODY		
(3) OTHER (Specify)		

8508020549 850719
REG3 LIC30
34-13317-01 PDR

INFORMATION REQUIRED FOR ITEMS 10 THROUGH 21

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 control 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 _____

10. MEDICAL ISOTOPE COMMITTEE

- [ ] Names and specialties attached, and (check one)
  - [ ] a. Duties as in Appendix A, or
  - [X] b. Equivalent duties attached.

11. TRAINING AND EXPERIENCE Refer to Item 4

- [ ] a. Supplements A & B attached for each individual user, and
- [ ] b. Supplement A attached for RSO.

12. INSTRUMENTATION (check one)

- [ ] a. Appendix C form attached, or
- [X] b. List manufacturer's name and model number _____

13. CALIBRATION OF INSTRUMENTS (check one)

- [ ] a. Appendix D, Part 2 procedures followed for instrumentation calibration, or
- [X] b. Description of sources, calibration frequency and equivalent procedures attached.

14. FACILITIES AND EQUIPMENT

- [X] a. Description and drawing of facilities attached, and
- [ ] b. Description of patient viewing and communicating systems attached, and
- [ ] c. Description of area safeguards attached.

15. BEAM STOPS

- [ ] Description of stops used to restrict beam orientation attached.

16. SHIELDING EVALUATION

- [ ] Evaluation of proposed shielding attached.

17. OPERATING AND EMERGENCY PROCEDURES

- [X] a. Description of operating procedures attached, and
- [X] b. Copy of emergency procedures attached.

18. INSTRUCTION OF PERSONNEL (check one)

- [ ] a. Training program and schedule in Appendix H followed, or
- [X] b. Description of instruction program for employees attached.

19. LEAK TESTS OF SEALED SOURCES Refer to Item 13A

- [X] Description of leak test procedures attached.

20. QUALIFIED EXPERT (Use only if the individual fails to meet 10 CFR 35.21 requirements.)

- [ ] Statement of qualifications of the expert who will perform calibrations attached.

21. ALARA PROGRAM (check one)

- [ ] ALARA Program as in Appendix I, or
- [X] 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 his knowledge and belief.

a. LICENSE FEE REQUIRED (See section 170.31, 10 CFR 170)	e. APPLICANT OR PERSON ACTING OFFICIAL (Signature)
b. LICENSE FEE CATEGORY	(1) NAME (Type or print)
c. LICENSE FEE ENCLOSED $	(2) TITLE
	f. DATE

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.

AUTHORIZED USERS

JOSEPH CONCANNON, M.D.

JAMES HUGHES, M.D.

GERALD MEDWICK, D.O.

TRAINING AND EXPERIENCE ON FILE UNDER LICENSE #37-01317-02 FOR DRS. CONCANNON AND HUGHES. DR. MEDWICK WAS CERTIFIED BY THE AMERICAN BOARD OF RADIOLOGY IN JUNE, 1984. PLEASE SEE ATTACHED.

NRC Form 374A (82)

U.S. NUCLEAR REGULATORY COMMISSION

PAGE 1 OF 1 PAGES

MATERIALS LICENSE
SUPPLEMENTARY SHEET

This copy is for your files

License number: 37-01317-02

Docket or Reference number:

Amendment No. 14

Allegheny Health, Education and Research
Corporation
Division of Radiology
Radiation Therapy Department
320 East North Avenue
Pittsburgh, Pennsylvania 15212

In accordance with letters dated November 29, 1982 and December 9, 1982, License Number 37-01317-02 is amended as follows:

To Add:

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
B. Cobalt 60	B. Teletherapy sealed source (AECL Model C-146 or C-151)	B. One source not to exceed 4,500 curies

9. Authorized use

B. For storage only in the head of an AECL Eldorado Super G teletherapy unit or in an AECL mobile shielded transportation/storage vault in accordance with the statements, representations and procedures contained in letters dated November 29, 1982 and December 9, 1982.

Conditions 12. and 24. are amended to read:

12. Licensed material may be used by, or under the supervision of, Joseph P. Concannon, M.D., James M. Hughes, M.D., Peter T. Chopping, M.D., or Prabha Bansal, M.D. Licensed material for non-human use may also be used by, or under the supervision of, Roy E. Summers, Prakash N. Shrivastava, Ph.D., or Frank P. Ottino, M.Sc.

24. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 9 of this license in accordance with statements, representations, and procedures contained in letter with enclosures dated April 2, 1979 signed by Lad F. Grapski, President; letter with enclosures dated March 20, 1981 signed by Frank P. Ottino; and Model ALARA Program contained in Appendix I of "Guide for the Preparation of Applications for Licenses in Medical Teletherapy Programs," (Division 10, Task TM 608-4), March 1982. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

DOR 8412180646

FOR THE U. S. NUCLEAR REGULATORY COMMISSION

Patricia A. Vacca

By Material Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D. C. 20555

Date DEC 31 1982

The American Board of Radiology

Dear Doctor:

I am pleased to inform you that at its last meeting The American Board of Radiology voted to grant you its certificate in THERAPEUTIC RADIOLOGY.

With personal congratulations, I am

Sincerely yours,

TR 27068
Gerald R. Medwick, D.O.
3874 Beechwood Blvd.
Pittsburgh, PA 15217

RADIATION SAFETY COMMITTEE

Meeting Frequency

The medical isotopes committee shall meet as often as necesary to conduct its business but not less than once in each calendar quarter.

Responsibilities

The committee is responsible for

1. Ensuring that all individuals who work with or in the vicinity of radioactive material have sufficient training and experience to enable them to perform their duties safely and in accordance with NRC regulations and the conditions of the license.

2. Ensuring that all use of radioactive material is conducted in a safe manner and in accordance with NRC regulations and the conditions of the license.

Duties

The committee shall

1. Be familiar with all pertinent NRC regulations, the terms of the license, and information submitted in support of the request for the license and its amendments.
2. Review the training and experience of any individual who uses radioactive material (including physicians, technologists, physicists, and pharmacists) and determine that the qualifications are sufficient to enable them to perform their duties safely and in accordance with NRC regulations and the conditions of the license.
3. Establish a program to ensure that all individuals whose duties may require them to work in the vicinity of radioactive material (e.g., nursing, security, and housekeeping personnel) are properly instructed as required by 19.2 of 10 CFR part 19.
4. Review and approve all requests for use of radioactive material within the institution.
5. Prescribe special conditions that will be required during a proposed use of radioactive material such as requirements for bioassays, physical examinations of users, and special monitoring procedures.
6. Review the entire radiation safety program at least annually to determine that all activities are being conducted safely and in accordance with NRC regulations and the conditions of the license, to include the ALARA Program. The review shall include an examination of all records, reports from the radiation safety officer, results of NRC instpections, written safety procedures, and management control system.
7. Recommend remedial action to correct any deficiencies identified in the radiation safety program.

RADIAITON SAFETY COMMITTEE

Duties (continued)

8. Maintain written records of all committee meetings, actions, recommendations, and decisions.
9. Ensure that the byproduct material license is amended, when necessary, prior to any changes in facilities, equipment, policies, procedures, and personnel.

Members

The membership of this committee will consist of at least three members and will include:

1. the radiation safety officer;

2. the hospital administrator, or other administrative official directly responsible to the hospital administrator in the hospital's internal chain of command;

3. a physician specialist from each department where radioactive materials are used; and

4. a representative of the hospital's nursing staff.

The names and qualifications of the committee members will be documented in the committee's records, will be updated as necessary, and will be available for inspection by the NRC.

INSTRUMENTATION

1. Survey meters

   a. Manufacturer's name: Eberline
   Manufacturer's model number: Model E-120
   Number of instruments available: One
   Minimum range: 0 mr/hr to .5 mr/hr
   Maximum range: 0 mr/hr to 50 mr/hr

   b. Manufacturer's name: Victoreen
   Manufacturer's model number: Model 493
   Number of instruments available: One
   Ranges:
   Minimum range: 0 mr/hr to .5 mr/hr
   Maximum range: 0 mr/hr to 50 mr/hr

   Manufacturer's name: Victoreen
   Manufacturer's model number: Model 470A
   Number of instruments available: One
   Minimum range: 0 mr/hr to 3 mr/hr
   Maximum range: 0 mr/hr to 1000 mr/hr

2. Beam-on Monitor

   Manufacturer's name: Primalert Victoreen
   Manufacturer's model number: Model 05-440
   Number of instruments available: One
   Backup Battery Power Supply: Yes X No ____

3. Dosimetry System

   a. Electrometer

   Manufacturer's name: Nuclear Enterprise Limited
   Manufacturer's model number: Farmer-Dose Meter 2570 SN 236

   b. Probes

   Manufacturer's name: Nuclear Enterprise Limited
   Manufacturer's model number: Farmer Chamber 2571 SN 530
   Number of probes: One
   Ranges: 0-1000 R

CALIBRATION OF SURVEY METER INSTRUMENTATION

Survey meter calibrations will be conducted at intervals not to exceed six (6) months by Health Physics Services, Inc., Potomac, Maryland, using sealed a Cesium-137 source of approximately 500 mCi, authorized by the State of Maryland under License Number MD-31-035-01. The calibration procedures are on file with the NRC, under License No. 19-19791-01.

LEAK TESTING OF SEALED SOURCES

At intervals not to exceed six (6) months, all sealed sources of radioactive material will be leak tested by Health Physics Services, Inc., in accordance with their Maryland license, No. MD-31-035-01.

Health Physics Services, Inc.

7825 Tuckerman Lane, Suite 214
Potomac, Maryland 20854
Phone: (301) 299-2700 Toll Free: 800-638-8488

CALIBRATION CERTIFICATE

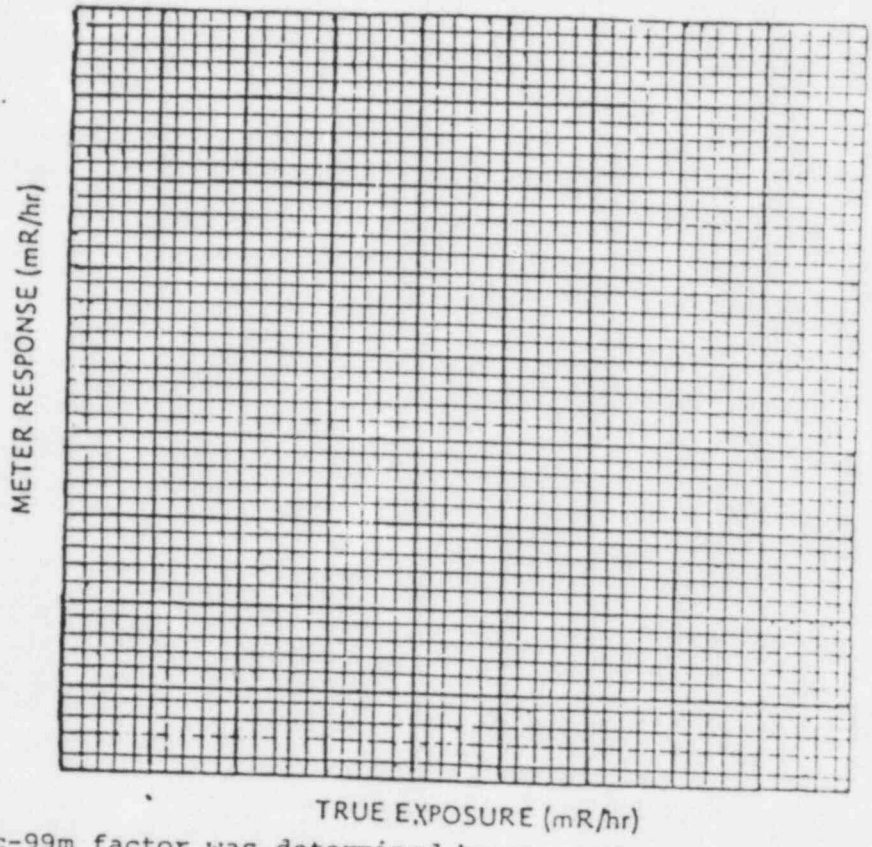
OWNER _____ CALIBRATION DATE _____ NEXT DUE _____

MANUFACTURER _____ MODEL NUMBER _____ SERIAL NUMBER _____

BATTERIES CHANGED: ___YES ___NO INTERNAL ADJUSTMENT: ___YES ___NO

The instrument was calibrated with the sensitive chamber positioned parallel/perpendicular to the radiation field.

METER RESPONSE (mR/hr)	SCALE	TRUE EXPOSURE (mR/hr)



After calibration with Cesium-137, a Tc-99m factor was determined by measuring the reponse of this instrument to a calibrated source of Cobalt-57. The exposure rate at an arbitrary distance for the Cobalt-57 source is determined using the inverse square law and verified with a calibrated dose rate meter.

TRUE EXPOSURE	MEASURED EXPOSURE

THIS CERTIFIES that the instrument described above was calibrated with Cesium-137. Exposure rates for this source have been verified with instrumentation whose calibration is traceable to the National Bureau of Standards.

_____
Health Physics Technican

BEAM-ON MONITOR

B. Daily checks are made to ensure the beam-on monitor is operating properly.

C. The dosimetry system used for teletherapy calibrations and spot checks is calibrated in accordance with 10 CFR 35.23

THE OHIO VALLEY HOSPITAL
RADIATION THERAPY

COBALT DAILY WARM-UP LOG

DATE																
FIELD LIGHT																
DISTANCE LIGHT																
BACK POINTER																
FIELD LIGHT ON BACKSTOP																
FIELD SIZE 10 X 10																
CONSOLE																
ON RED																
OFF GREEN																
MACHINE HEAD																
ON RED																
OFF WHITE																
WALL MONITOR																
ON RED																
OFF GREEN																
DOOR INTERLOCK																
CEILING LIGHT																
ON RED																
OFF WHITE																
ELAPSED TIMER																
ON																
OFF																
INITIALS																

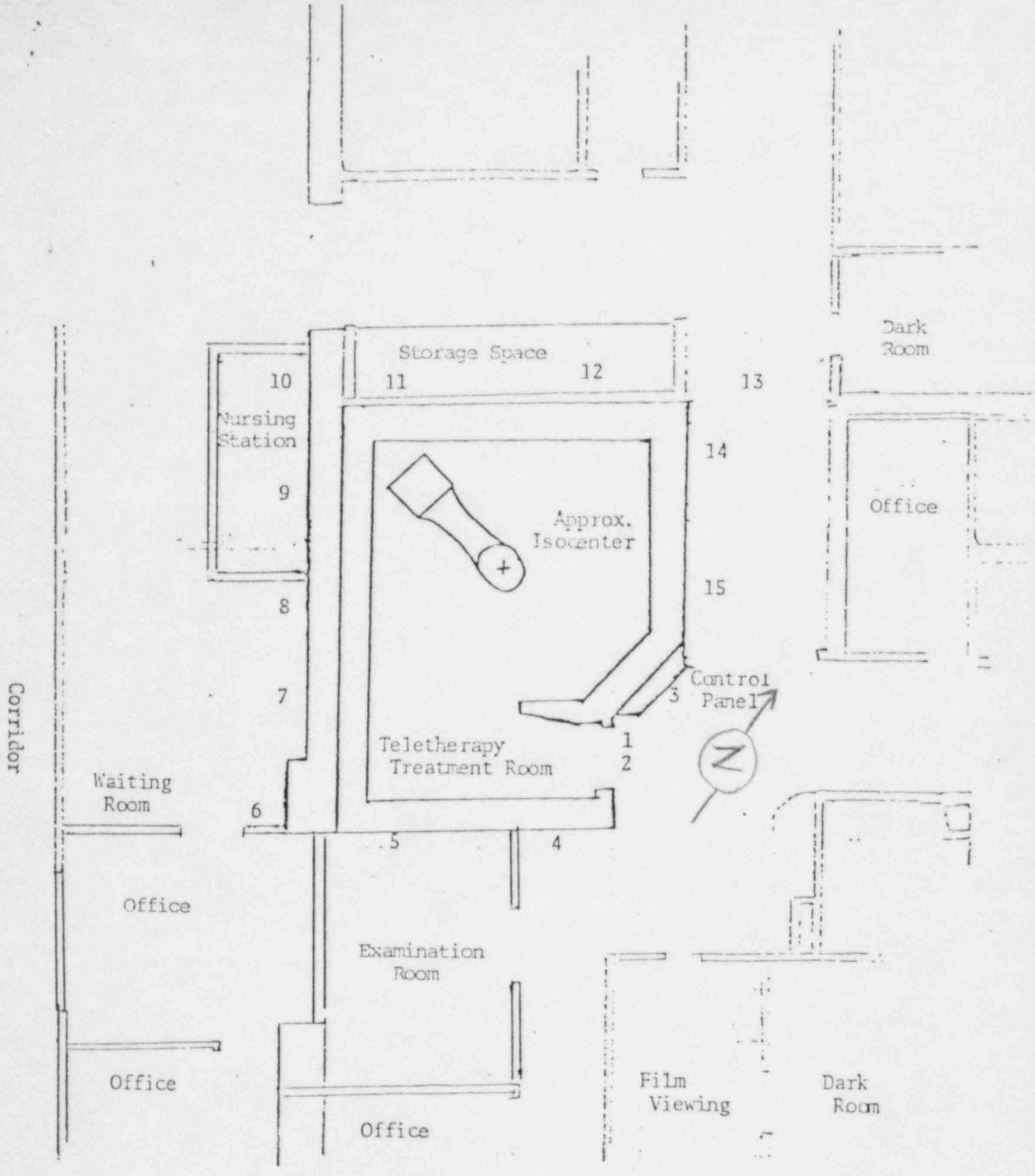
2-22-83/cfk

DESCRIPTION AND DRAWING OF FACILITIES

The ^{60}Teletherapy room is situated on the ground floor of the southwest wing of the hospital in the Radiology Department. The department is, for the most part, a single story structure and the area above the ^{60}Cobalt room is non-occupied roof. Above the area designated waiting room in the facility diagram, there is a second floor containing occupied offices. These areas were surveyed following source change in July 1982 and maximum levels were below .5 mR/hr at various gantry orientations with a maximum estimated weekly exposure of less than 5 mR. (Enclosed find the report of survey done at this time).

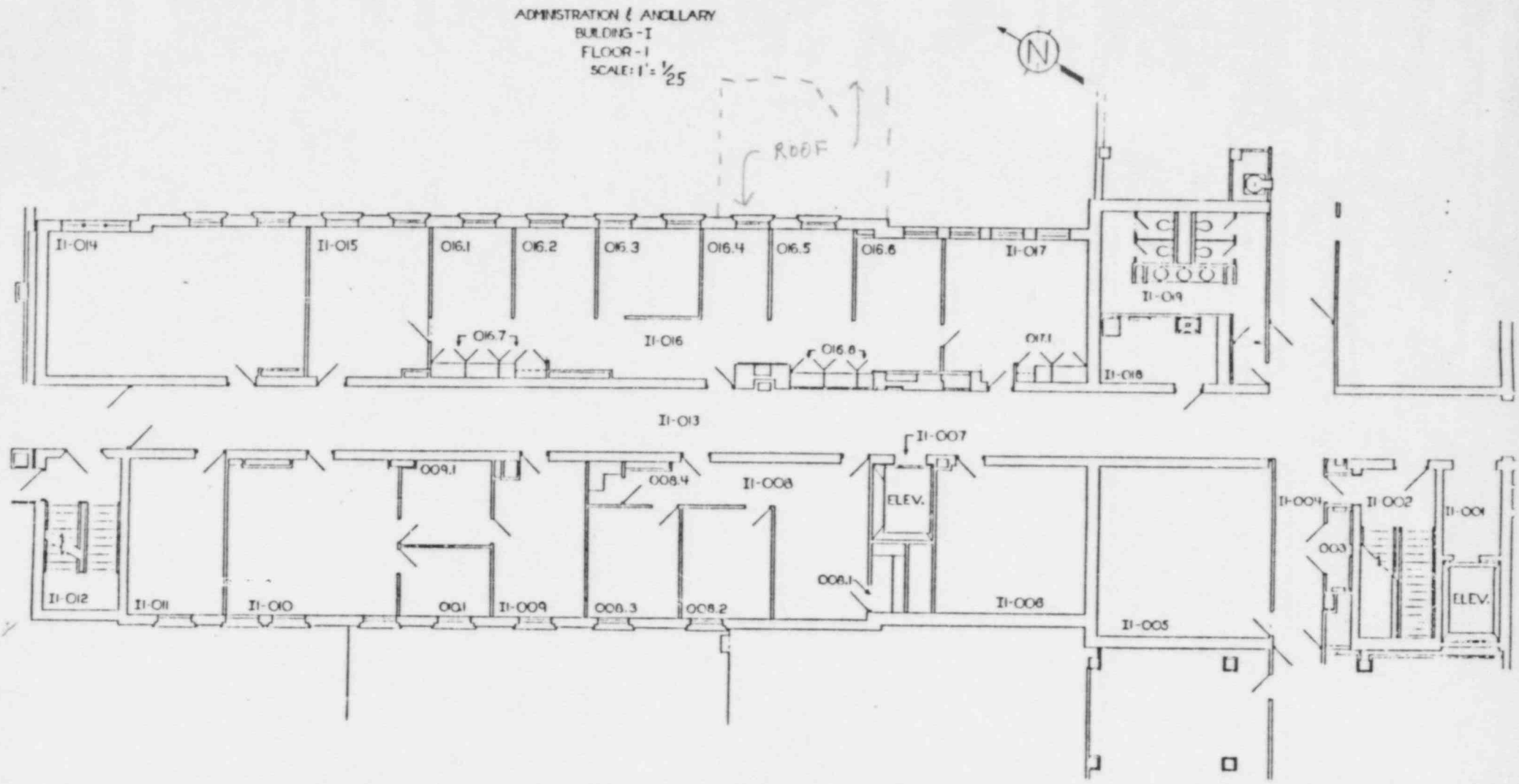
Access to the roof, as stated in the report, is not possible from within the building and can only be reached by ladder from the outside.

Item 14



Approximate Facility Diagram
Ohio Valley Hospital, Steubenville, Ohio
Teletherapy unit. BML-34-13317-01
Scale approx. 1/96 (1/8" = 1')
Numbers refer to survey locations.

LOCATION OF TELETHERAPY ROOM RELATIVE TO UPPER FLOOR



SAFETY AND SURVEY REPORT
OF
JULY 1982

A. LEAK TEST SUMMARY

Leak tests of both the old and replacement sources were conducted by Neutron Products, Inc. As stated on the teletherapy source transfer (attached), the old source (NPI-20-4000, S.N. RT-46) was determined to be leak free by a wipe test and the new source (NPI-20-6000, S.N. T-568) was determined to be leak free by a helium pressure test and by a wipe test. Maximum removable activity on the new source was measured to be 0.0006 microcuries, below the allowable leakage limit of 0.05 microcuries. A supporting leak test was performed by Marcel Szal (Medical Physics and Engineering Department, Allegheny General Hospital, Pittsburgh, PA), and a copy of this leak test survey is enclosed.

B. HEAD LEAKAGE SURVEY

On July 31, 1982, a head leakage survey was performed by personnel of the Medical Physics and Engineering Department of the Allegheny General Hospital, Pittsburgh, PA. The survey was performed using calibrated survey meters (an ionization meter and a Geiger-Meuller survey meter). The two meters (Victoreen 490 GM (Thyac III) with a Johnson tungsten shielded pancake probe (model PPA-2) and Victoreen 470-A survey meter) were calibrated July 27, 1982.

With both survey meters, the average of the 26 points measured on a one meter sphere, (see figure beam off survey sheet) was approximately 1.65 mR/hour at one meter from the source with the ion chamber and 1.75 mR/hour with the Geiger-Meuller survey meter. The maximum readings were obtained on the vertical axis at a point directly beneath the collimator with the collimator jaws set for 10 x 10 cm^2 field size where radiation leakage level was measured to be approximately 9.8 mR/hour. These exposure rates from head leakage are below the maximum levels of 10 mR/hour and averaged level of 2 mR/hour at one meter from the source in its 'off' position.

C. SAFETY FEATURES

1. Timer accuracy and End Error: During the calibration of this unit, the accuracy of the treatment timer was tested. Internal inaccuracy, as measured by comparison with a stopwatch, was less than 0.1 seconds per minute. The timer end error was determined and used to correct the calibration of unit output.

2. Emergency switch: Depressing the 'Emergency' switch located on control panel during irradiation causes the source to return to the 'off' position. Only a control panel reset is possible.

3. Door interlock: Access to the treatment room is by means of a single door located near the console. The interlock on this door was tested as part of the radiation survey. With the source in

its 'on' position (source in its treatment position in the head of the unit), opening the door causes the source to return to its 'off' position (verified by movement of source position wheel on the teletherapy head and demonstrated by changes in radiation levels). If the door were to close, the machine does not turn back 'on'. Only resetting the 'on-off' controls at the console can result in regaining the useful beam.

4. 'On-Off' indicators:

   a) On the console is a twin light status indicator. The green light indicates that the source is in its 'off' position and that electrical power is supplied to the unit. The red light indicates that the source is in its 'on' position. Both lamps were operational and functioning at the time of the survey.

   b) Located above the door to the treatment room is another twin light indicator. The white lamp indicates a safe condition while the red lamp indicates that the source is in its 'on' position. Both lamps were functional at the time of the survey.

   c) Indicator lamps are also located on the teletherapy source housing. A white lamp indicates a safe condition (source in its 'off' position) while red lamps indicate the source is in its 'on' position. Lamps were functioning properly at the time of the survey.

   d) This teletherapy unit model also has a mechanical indication of source status: a rotating wheel on the front of the source housing. The red portion of the wheel indicates where the source is. The red portion directed to the top of the housing indicates the source is in the 'off' position while the red position directed toward the bottom of the housing indicates the source is in the 'on' position.

   e) An independent radiation monitor is located on the wall opposite the access door. The unit is a Primalert-10 radiation monitor marketed or manufactured by Nuclear Associates, Inc. Green lights indicate a 'safe' condition (radiation intensity low at the detector positon), while flashing red lights indicate 'unsafe' or 'high' radiation levels. The unit was functioning at the time of the survey.

5. Electrical/mechanical stops: The unit incorporates the 'Zoneguard' system engineered by the Picker Corporation to limit or restrict the use of the primary beam of radiation. The system is connected to the indicator lamp system located on the source housing. With electrical power supplied to the unit, the white 'safe' light is usually lit. If this lamp is lighted, it is an indication that an allowable orientation or configuration has been obtained and that it is possible to produce a primary beam. If the lamp goes out during an angulation of the head or gantry, a disallowed orientation has been reached, and it is not possible to

obtain a useful beam. (This was verified by attempting to turn 'on' the source in such conditions. The source could not be moved from the 'off' position in these orientations.)

The head of this unit could not be aimed toward the front of the unit or toward the back because this motion is mechanically locked.

The head could be angled through 30° to either side of the normal incidence but only with the beam aimed vertically down. In these conditions the primary beam could be directed off the beam stop and at the floor. This angulation capability is restricted to ±10° of the vertical downward direction. With the gantry in the range of -10° to +10° (350° to 10°) with 0° corresponding to vertically downward, this lateral angulation is limited to ±30° as indicated by an angle indicator located on the unit. If the gantry is not oriented vertically downward (to ±10°), no lateral angulation of the head is possible (the restriction system does not allow lateral head angulation at other gantry positions).

5. Other safety features: On the access door are 'Caution Radioactive Materials' and 'Caution High Radiation Area' signs. 'Caution Radioactive Materials' signs are also on the head of the unit for both the Co-60 in the source and for the (depleted) uranium used as shielding material in the head.

Continuous patient observation is by means of a closed circuit television and intercom system. From the control panel position, the operator can maintain surveillance over the console and television monitor from the same location. In the event of a CCTV malfunction, a backup system consisting of a window in the access door and a mirror in the wall opposite permits patient observation.

Emergency instructions are posted on the left side of the entrance door above the console. A copy of the instructions, which contains the information described in license condition 16, are attached to this report. Table collision interlock located lower rear portion of the unit head was tested and verified to be working properly interruting the gantry rotation when the interlock switch was tripped.

D. RADIATION SURVEY

Following the installation of the new source and maintenance inspection, a radiation survey of the surrounding areas were performed by Thaddeus Samulski and Marcel Szal of the Medical Physics and Engineering Department of the Allegheny General Hospital, Pittsburgh, PA, to measure and evaluate radiation levels consequential to the use of the machines.

The principal instrument used in this survey was an ionization meter (Victoreen Instruments, Inc., Model 470A survey meter), which was last

calibrated in July 1982 using a 137 Cs source.

Reference should be made to the attached floor plans.

The intensity of reference is that of a 10 x 10 cm field at 80 cm SSD where the dose rate was measured to be 125.5 rads/minute (a 30 x 30 cm field would produce a dose rate of around 136 rads/minute at an 80 cm SSD).

Radiation levels were measured for the following machine orientations (30 x 30 cm field at 80 cm) using a 30 x 30 x 40 water filled scattering phantom:

a - beam directed vertically downward
b - beam aimed 90° to left (gantry angle 90°)
c - beam aimed 90° to right (gantry angle 270°)
d - beam aimed vertically upward (gantry angle 180°)

Position*	Exposure rate (mR/Hr) for beam orientation				
	a	b	c	d	mR/week***
1	0.5	0.2	0.1	0.2	13
2	1.0	0.5	0.1	0.5	26
3	0.3	0.1	0.1	0.1	8
4	0.8	0.2	<0.1	0.1	18
5	0.4	0.1	0.1	0.1	10
6	<0.1	<0.1	<0.1	<0.1	<5
7	<0.1	<0.1	<0.1	<0.1	<5
8	<0.1	<0.1	<0.1	<0.1	<5
9	<0.1	<0.1	<0.1	<0.1	<5
10	<0.1	<0.1	<0.1	<0.1	<5
11	<0.1	<0.1	0.3	<0.1	<5
12	<0.1	<0.1	0.2	<0.1	<5
13	<0.1	<0.1	0.1	<0.1	5
14	<0.1	<0.1	2.3**	0.15	15
15	<0.1	<0.1	1.0	<0.1	8

*Numbers refer to positions shown on floor plan.

**This exposure rate is not corrected for beam on time which is estimated to be 50%. When corrected this rate falls within the requirement of 2 mR/Hr.

***Maximum estimated exposure to any individuals calculated by assuming a maximum weekly beam on time of 20 hours per week and are factors of 1 for orientation a, 1/4 for b,c and d.

The areas beneath the teletherapy room is unexcavated and not accessible. There are no plans at present to change this condition.

One roof of the building is located above the treatment room. Above the waiting room are occupiable areas. These areas were also surveyed to assess possible radiation exposures. The measured radiation levels

to assess possible radiation exposures. The measured radiation levels in these areas were less than 0.5 MR/hour maximum for the beam orientations tested at various gantry angulations with a phantom present. The exposure estimated in these areas is less than 5 MR/week.

On the roof area the roofing and structural materials are thicker over the treatment room. Access to the roof is not possible from within the building and can be reached only by ladder from outside. Outisde of this thickened area, exposure rates were measured as less than 0.1 mR/hour for the tested machine orientations. Above the treatment room (on the thickened portion of the roof) the highest measured exposure rates were for machine orientation (vertical gantry) when an average of 5 mR/hour was obtained (two locations on this area gave readings of 7 mR/hour but most sites were in the range of 1 to 2 mR/hour). For orientations b and c the average reading on the roof above the treatment room was in the range 0.1 to 0.3 mR/hour (no reading exceeded 1.0 mR/hour). Other machine orientations resulted in readings of 0.1 mR/hour or less.

E. UNIT CALIBRATION

A complete calibration of the unit was performed using a Capintec Model Pro-6 Farmer-type ionization chamber, S.N. 62631, calibrated by Memorial Sloan-Kettering Regional Calibration Laboratory August 25, 1981. The dose output was measured to be 125.5 rads/min for a 10 x 10 cm^2 field at 80 cm SSD. Dose output for other field sizes and treatment distances are included in the attached report.

LEAK TEST SURVEY FORM

date 8/9/82

source description Co 60 Teletherapy Unit

Ohio Valley Hospital location Steubenville, OH

date previous survey

ANALYSIS: instrument used PCC 11TC Proportional Counter

inst parameters 1850 Volts

background 8.8 cp/1 m

efficiency = $\frac{\text{std cpm - bkg cpm}}{\text{std (µCi or dpm)}} = \frac{196589 - 8.8}{2534575} = 7.756\%$ (o/o or cpm/µCi)

3 sigma error = $\frac{3 \times \sqrt{\text{mean bkg. ct.}}}{\text{counting time}} = 8.9$ cpm

sensitivity = 3 sigma error/efficiency = 114.7 d/m 5.21×10^{-5} µCi

RESULTS OF WIPES OF ACCESSIBLE SURFACES

date taken 7/29/82

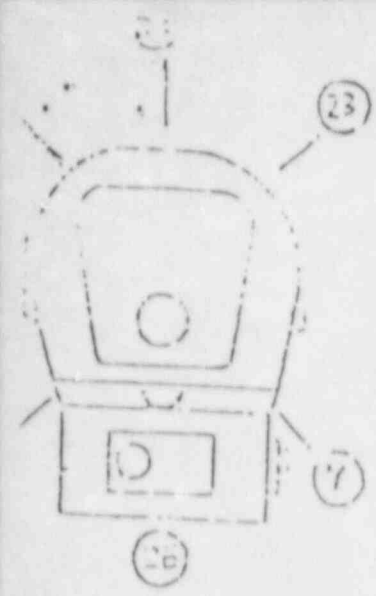
#	wipe location.	gross ct.	ct. time	gross cpm	net cpm	µCi
0	background	26.5	3 min	8.8	xxx	xxx
1	collimators	9.2	1 min	9.2	0.4	$\leq 5.2 \times 10^{-5}$
2	trimmers	9.7	1 min	9.7	0.9	$\leq 5.2 \times 10^{-5}$
3	head	13.7	1 min	13.7	4.9	$\leq 5.2 \times 10^{-5}$
4						

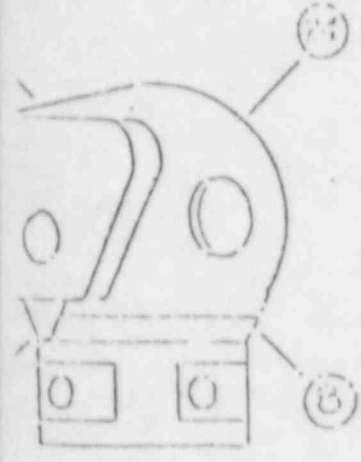
describe method of test swipe with Q-tip soaked with alcohol.

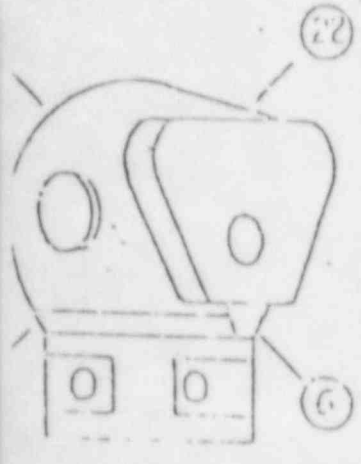
comments/remarks source appears to be leak free.

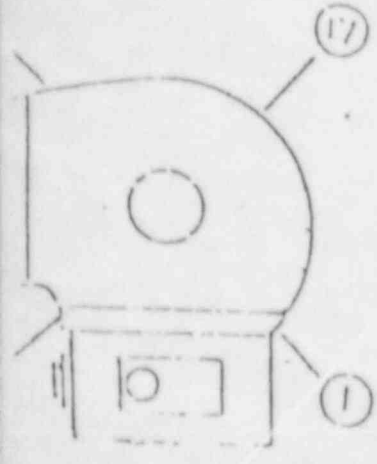
signed Marcel Sral title date 8/22/82

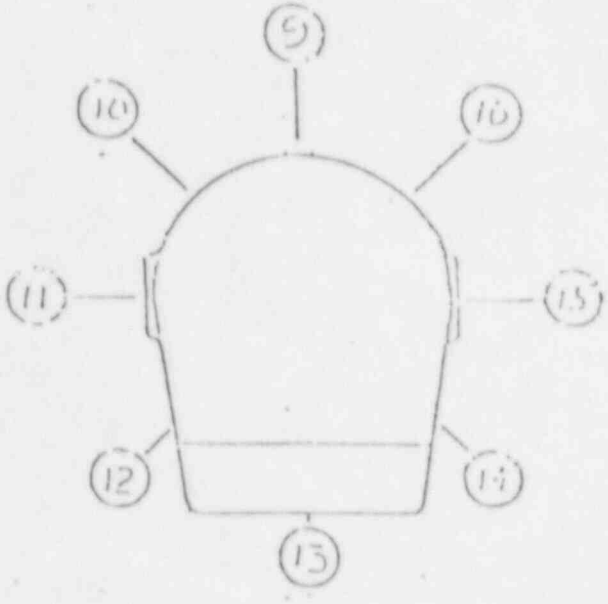
JGY/1/76











[illegible] Cal. Lab. A, I, G HEAD

[illegible] HEAD [illegible] SERIAL No. 214
SOURCE, CAT. AMS-3B2 [illegible] cm. DIA.
from 5510 on 7 / 31 / 82
CURIES 5690 on 7 / 29 / 82
COBALT HEIGHT 2.78 CAP TYPE [illegible]
SURVEY DATE 7 / 31 / 82 ENGR. [illegible]
METER USED MFG. Victoreen MODEL 470A/490GM SER. [illegible]
METER CALIBRATION DATE 7/82

FOR: Allegheny General Hospital, Pittsburgh PA
INV. NO. [illegible]

No.	Dist.	Victoreen 490-GM	Victoreen 470-A	No.	Dist.	Victoreen 490-GM	Victoreen 470-A
1.	70cm.	2.4	2.7	14.	67cm.	1.0	0.9
2.	70	1.9	1.5	15.	73	0.7	0.6
3.	70	2.4	2.2	16.	73	0.9	0.8
4.	70	1.9	2.0	17.	73	1.0	0.9
5.	67	3.6	4.0	18.	73	0.9	1.0
6.	70	2.4	1.6	19.	73	1.1	1.0
7.	70	3.0	1.8	20.	71	0.4	0.4
8.	70	2.4	1.5	21.	69	1.1	0.8
9.	73	0.4	0.5	22.	71	0.7	0.8
10.	73	1.0	1.0	23.	73	0.8	1.1
11.	73	0.9	0.8	24.	73	1.0	1.0
12.	67	1.0	1.0	25.	76	1.7	2.0
13.	63	1.3	1.4	26.*	41	9.6	9.8

Note: * On test stand multiply true by .74

TOTAL	26 POINTS	45.5	43.1
AVERAGE	26 POINTS	1.75	1.66

Operating Procedures

(These procedures will be placed in
the control booth area)

Safety Device Checks

Safety devices will be checked weekly by the teletherapy technologist to ensure that they are operating properly. Such devices include timers, mechanical and electrical interlocks, warning lights and alarms, safety switches, beam collimators, and other devices that actively warn of, limit, or prevent radiation exposure to either patients or personnel. A record of the results of the checks will be made on Attachment 1 of the Operating Procedures.

1. Timer - The source should be exposed for a preset time. The timer is functional if the source automatically returns to the shielded position after the preset time. Time accuracy will be determined by a qualified expert as part of the monthly spot check.

2. Interlocks - Interlocks will be tested by exposing the source and attempting to defeat the interlock, i.e. opening the door should cause the source to retract.

3. Warning lights - Lights indicating that the source is in the exposed position should be checked with the source in the exposed position.

4. Beam collimators - The collimators should be easily adjusted to a set field size. Once the field is set, the collimators should stay in position unless readjusted by the technologist.

5. Beam-on monitor - The primalert should be tested with the unit in the exposed position. The monitor will give visible indication that the source is exposed.

Should any malfunctions of these items be identified prompt action will be taken to correct the deficiency. Use of the unit is forbidden if the timer, or beam collimators are not functional. If the warning lights or interlocks are not functional, the unit may be operated; however, the entrance doorway must be under constant surveillance. If the primalert is not functional any individual entering the room will carry an operable survey meter.

Personnel Dosimetry

Teletherapy personnel should where dosimetry devices (whole body film badges) at collar or waist level. In the event a person receives or suspects that he/she has received a high exposure, the film badge will be sent for immediate processing. The film badges will be stored in a non-radiation area.

Full Calibration and Monthly Spot Checks of Teletherapy Unit

These checks will be performed by a qualified expert as described in 10 CFR 35.24. These checks will be performed in accordance with 10 CFR 35.21 and 35.22.

Recordkeeping

Treatment records are reviewed by the qualified expert on a weekly basis. Daily treatment records are maintained by the radiation therapy technologist. At a minimum, the following information is entered in the records: patient's name, date, dose administered, treatment time, and technologist's initials.

Emergency Procedures

The emergency procedures specified in Attachment 3 will be posted at the control console. Practice runs of the procedures will be performed after significant changes in personnel and semi-annually thereafter.

Depending upon the severity of an accident or unusual occurrence, the individuals occupying the positions listed on the attachment may need to be notified.

Securing Teletherapy Unit

When not in use, the unit will be secured by locking the room door and removing the control panel key. The teletherapy technologist will have keys to the room and control panel.

Instrument Calibration

Survey meters will be calibrated by Health Physics Services, Inc., Potomac, Maryland, every three (3) months. The instruments will be picked up by HPSI or mailed by Ohio Valley Hospital. In the event the survey meters are mailed by Ohio Valley Hospital, they should be placed in cardboard cartons with packing material to prevent damage. The package should be sent by United Parcel Service.

Beam-on monitors will be checked daily to insure they are functional. The results of the daily checks will not be recorded. The results of the weekly check will be recorded.

Dosimetry systems will be calibrated in accordance with 10 CFR 35.23. The unit will be placed in a strong carton and mailed/shipped to either the National Bureau of Standards or a regional calibration lab.

Emergency Procedures in Case Beam Control Fails or Malfunctions

If the light signals or beam-on monitor indicate that the beam control mechanism has failed to terminate the exposure at the end of the preset time (e.g., if the red light stays on and the green light is off, or if both the red and the green lights stay on for more than a few seconds), the source may still be in the on position. The following steps are to be carried out promptly and in a calm manner.

For the Radiation Therapy Technologist

a. Open the door to the treatment room.

b. If the patient is ambulatory, direct him to get off the table and leave the room.

c. If the patient is not ambulatory:

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

d. Close the door and secure the area by locking the door to the treatment room or posting a guard at the entrance.

e. Turn off the main switch at the control panel.

f. Notify the radiation therapist and radiation safety officer at once.

g. Conspicuously post a sign in the area to warn others of the problem.

Radiation Therapist Dr. Concannon
Phone No.: On Duty (412) 728-7000 x 1616 Off Duty (412) 775-8865

Radiation Safety Officer Dr. Thomas Havrilla
Phone No.: On Duty 283-7981 Off Duty 614-264-7070

Attachment 3

EMERGENCY NOTIFICATION TELEPHONE NUMBERS

1. Radiation Safety Officer: Dr. Thomas Havrilla

   Office Phone: 7781

   Home Phone: 614-364-7080

2. Chief, Radiology Department: Mr. Neil Yates

   Office Phone: 7780

   Home Phone: 304-748-6205

3. Radiation Therapist: Dr. Concannon

   Office Phone: (412)-728-9620 2225

   Home Phone: 412-728-9620

4. Radiation Physicist: Mr. Tony Combine

   Office Phone: (412) 728-7000 EX1616

   Home Phone: (412) 775-8865

5. Health Physics Services, Inc. (800) 638-8488

6. Neutron Products

7. U.S. Nuclear Regulatory Commission, Region II
   Regional Administrator

   (312) 790-5500

PERSONNEL TRAINING PROGRAM

The personnel training program will be given to all personnel who work with or in the vicinity of radioactive materials. The training will be in the form of lectures and the duration of each session will depend on the extent of applicability to the employees involved. The training program will be of sufficient scope to ensure that all personnel, including technical, clerical, nursing, housekeeping, and security personnel receive proper instruction in the items specified in 19.12 of 10 CFR Part 19, to include:

A. Areas where radioactive materials are used or stored.
B. Potential hazards associated with radioactive material
C. Radiological safety procedures appropriate to their respective duties.
D. Pertinent NRC regulations.
E. Rules and regulations of the licensee.
F. Pertinent terms of the license.
G. Their obligation to report unsafe conditions.
H. Appropriate response to emergencies or unsafe conditions.
I. Their right to be informed of their radiation exposure and bioassay results.
J. Locations where the licensee has posted or made available notices, copies of pertinent regulations, and copies of pertinent licenses and license conditions (including applications and applicable correspondence), as required by 10 CFR Part 19.

Personnel will be properly instructed as follows:

1. Before assuming duties with or in the vicinity of radioactive materials.

2. During annual refresher training.

3. Whenever there is a significant change in duties, regulations, or the terms of the license.

OVH OHIO VALLEY HOSPITAL • 380 Summit Avenue
• Steubenville, Ohio 43952
• Area Code 614/283-7000

FOREWORD

Ionizing radiation is among the most versatile and useful tools of modern medicine and biomedical research. Like many other instrumentalities of medicine, ionizing radiation is potentially hazardous unless used with strict adherence to safety rules and procedures. Thus, the safety rules which govern the uses of radiation are concerned with preventing genetic damage as well as with protecting the health of the exposed individual.

The rules and procedures set forth here have one single, straightforward purpose: to protect the patients, employees, and visitors from unnecessary and potentially harmful radiation.

The existing radiation safety program has many facets designed to keep the levels of exposure to personnel at a minimum. This program has three main phases:

PHASE I

Achieve the objective of maintaining radiation exposures to "As Low As Reasonably Achievable" (ALARA) to employees, visitors, students and patients who are not under medical supervision for the administration of radiation or radioactive materials for diagnostic or therapeutic purposes.

PHASE II

Control operational procedures by the user of radiation sources.

PHASE III

Evaluate the radiation safety program performed by the Radiation Safety Officer, health physics consultant, and the Radiation Safety Committee.

We, the management of this hospital, are committed to the program procedures and develop new procedures as appropriate to implement the ALARA concept.

Control No. 77411

Administrator

August 22, 1984
Date

Item 21

RADIATION SAFETY PROGRAM (ALARA)

I. INTRODUCTION

A. Purpose

This program sets forth the philosophy and general management policies that are established by this hospital to achieve the objective of maintaining radiation exposures to "as low as reasonably achievable" (ALARA), for employees, visitors, students, and patients not under medical supervision for the administration of radiation or radioactive materials for diagnostic or therapeutic purposes.

B. Policy

In addition to complying with the limits set forth in pertinent regulations, guides, and standards, users and supervisors of radiation sources shall make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas to as low as reasonably achievable.

II. MANAGEMENT COMMITMENT

A. The management and the entire staff of this hospital are committed to the program described herein for keeping radiation exposures, individual and collective, to as low as reasonably achievable.

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 judgment, 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.

E. The services of Health Physics Services, Inc., have been contracted to assist in the program management to insure that all pertinent hospital staff and employees receive appropriate briefings and training in radiation safety including ALARA concepts.

III. RADIATION SAFETY COMMITTEE

In addition to other responsibilities delineated in pertinent radiation control standards, the Radiation Safety Committee (RSC) shall:

A. Determine whether current procedures are, in fact, maintaining radiation exposures to ALARA. The efforts of the radiation safety officer (RSO), health physics consultant, users and supervisors of radiation sources will be reviewed during the committee meeting.

B. 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.

C. Perform an annual audit of all aspects of the radiation safety program to insure that the overall philosophy and policies of the ALARA program are being accomplished.

D. The RSC will thoroughly review the qualifications of each applicant with respect to the types and quantities of materials and the uses for which he has applied, to assure that the applicant will be able to take appropriate measures to maintain exposure ALARA.

E. Delegation of Authority

1. The RSC will delegate authority to the RSO and his consultant staff for enforcement of the ALARA concept.

2. The RSC will support the RSO in those instances where it is necessary for the RSO to assert his authority. Where the RSO has been overruled, the Committee will record the basis for its action in the minutes of the Committee's quarterly meeting.

F. Review of the ALARA program

1. The RSC will encourage all users to review current procedures and develop new procedures as appropriate to implement the ALARA concept.

2. The RSC will perform a quarterly review of occupational radiation exposure with particular attention to instances where Investigational Levels in Table 1 below are exceeded. The principle purpose of this review is to assess trends in occupational exposure as an index of the ALARA program quality and to decide if action is warranted when Investigational Levels are exceeded.

3. The RSC will evaluate our institution's overall efforts for maintaining exposures ALARA on an annual basis. This review will include the efforts of the RSO, authorized users, and workers as well as those of management.

IV. RADIATION SAFETY OFFICER, AND HIS CONSULTANT STAFF ARE RESPONSIBLE FOR THE FOLLOWING:

A. Annual and Quarterly Review

1. Annual review of the Radiation Safety Program. The RSO will perform an annual review of the Radiation Safety Program for adherence to ALARA concepts. Reviews of specific procedures may be conducted on a more frequent basis.

2. Quarterly review of Occupational Exposures. The RSO will review at least quarterly the external radiation exposures of authorized users and workers to determine that their exposures are ALARA in accordance with the provisions of paragraph VII of this program.

3. Quarterly review of records of Radiation Level Surveys. The RSO will review radiation levels in unrestricted andf restricted areas to determine that they were at ALARA levels during the previous quarter.

B. Education Responsibilities for an ALARA Program

1. The RSO will schedule briefings and educational sessions to inform workers of ALARA program efforts.

2. The RSO will assure that authorized users, workers, and ancillary personnel who may be exposed to radiation will be instructed in ALARA philosophy and informed that management, the RSC and the RSO are committed to implementing the ALARA concept.

C. Cooperative Efforts for Development of ALARA Procedures

Radiation workers will be given opportunities to participate in the formulation of the procedures that they will be required to follow.

1. The RSO will be in close contact with all users and workers in order to develop ALARA procedures for working with radioactive materials.

2. The RSO will establish procedures for receiving and evaluating the suggestion of individual workers for improving health physics practices and encourage the use of those procedures.

D. Reviewing Instances of Deviation from Good ALARA Practices

The RSO will investigate all known instances of deviation from good ALARA practices and, if possible, determine the causes. When the cause is known, the RSO will require changes in the program to maintain exposures ALARA.

V. AUTHORIZED USERS

A. New Procedures Involving Potential Radiation Exposures

1. The authorized user will consult with, and receive the approval of, the RSO and/or RSC during the planning stage before using radiation sources for a new procedure.

2. The authorized user will evaluate all procedures before using radiation sources to ensure that exposures will be kept ALARA. This may be enhanced through the application of trial runs.

B. Responsibility of the Authorized User to Those He Supervises

1. The authorized user will explain the ALARA concept and his commitment to maintain exposures ALARA to all of those he supervises.

2. The authorized user will ensure that those under his supervision who are subject to occupational radiation exposure are trained and educated in good health physics practices and in maintaining exposures ALARA.

VI. PERSONS WHO RECEIVE OCCUPATIONAL RADIATION EXPOSURE

A. The worker will be instructed in the ALARA concept and its relationship to his working procedures and work conditions.

B. The worker will know what recourses are available if he feels that ALARA is not being promoted on the job.

VII. ESTABLISHMENT OF INVESTIGATIONAL LEVELS IN ORDER TO MONITOR INDIVIDUAL OCCUPATIONAL EXTERNAL RADIATION EXPOSURES

This institution hereby establishes Investigational Levels for occupational external radiation exposure which, when exceeded, will initiate review or investigation by the Radiation Safety Officer or consultant staff. The Investigational Levels that we have adopted are listed in Table 1 below. These levels apply to the exposure of individual workers.

TABLE 1

	Investigational Levels - (mrems per calendar quarter)	
	LEVEL I	LEVEL II
1. Whole body; head and trunk; active bloqd-forming organs; lens of eyes; or gonads	125	375
2. Hands and forearms; feet and ankles	1875	5625
3. Skin of whole body*	750	2250

* Not normally applicable to medical facilities except those using significant quantities of beta emitting isotopes.

The Radiation Safety Officer will review the results of personnel monitoring, film badge report, not less than once in any calendar quarter, as is required by 10 CFR 20, 20.401. The following actions will be taken at the Investigational Levels as stated in Table 1:

A. Quarterly exposure of individuals to less than Investigational Level I.

Except when deemed appropriate by the RSO, no further action will be taken in those cases where an individual's exposure is less than Table 1 values for the Investigational Level I.

B. Personnel exposures equal to or greater than Investigational Level I, but less than Investigational Level II.

The RSO will review the exposure of each individual whose quarterly exposures equal or exceed Investigational Level I. He will report the results of his reviews at the first RSC meeting following the quarter when the exposure was recorded. If the exposure does not equal or exceed Investigational Level II, no action

related specifically to the exposure is required unless deemed appropriate by the Committee. The Committee will, however, consider each such exposure in comparison with those of others performing similar tasks as an index of ALARA program quality and will record the review in the Committee minutes.

C. Exposure equal to or greater than Investigational Level II.

The RSO will investigate in a timely manner the cause(s) of all personnel exposures equaling or exceeding Investigational Level II and, if warranted, take action. A report of the investigation, actions taken, if any, and a copy of the individual's film badge record will be presented to the RSC at the first RSC meeting following completion 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 Invewstigational Level II above that listed in Table 1.

In cases where a worker's or a group of workers' exposure needs 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 Levewl II will be documented.

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

VIII. SIGNATURE OF CERTIFYING OFFICIAL

I hereby certify that this institution has implemented the ALARA Program set forth above.

Signature of Administrator

George B. Byrum
Name (type or print)

President
Title

Control No. 77411