

West Virginia  
University

MEDICAL CENTER  
MORGANTOWN, WEST VIRGINIA 26506

School of Medicine  
Department of Radiology  
Division of Medical Physics and Radiation Safety  
Telephone: 304-293-3413

August 3, 1978

Patricia A. Vacca  
Division of Materials and Fuel Cycle Facilities Licensing  
Materials Branch  
United States Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Ms. Vacca

Enclosed is the survey report for the new Cobalt-60 unit on license number 47-01163-22. I trust that all the material you require will be found therein.

My apologies for its tardiness. As indicated in my letter of 18 July 1978, a resignation has left us short handed.

Sincerely,

*Stephen T. Slack*

Stephen T. Slack, Ph.D.  
Radiation Safety Officer

STS/net

cc: J.C. Frich, M.D.  
O.P. Gabriele, M.D.  
R. Koppelman, Ph.D.

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for tto survey  
report 95872*

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## TELETHERAPY SURVEY REPORT

An Atomic Energy of Canada, Ltd. Theratron 780 Cobalt-60 teletherapy unit (source number S 2779, type C-146) was recently installed in the radiation oncology section of the Dept. of Radiology of West Virginia University Medical Center, Morgantown, W.Va. 26506 (license number 47-01163-22). Installation began on 5 May and the first patient was treated on 22 June 1968.

The survey was conducted 29 May, 6 June and 21 June by Snarad R. Amtey, Ph.D., at that time on the faculty of West Virginia University and now with the Dept. of Radiology, The University of Texas Medical School at Houston, 6431 Fannin, Houston, Texas 77030. Follow up work was on 2 July and 1 and 2 August by Stephen T. Slack, Ph.D., Radiation Safety Officer of West Virginia University.

Surveys were conducted with a Victoreen Thyac III, Model 490, Serial 164, calibrated 27 February and with a second such meter, serial 2376, calibrated 16 June 1978. Meters were calibrated against a Cobalt-60 source of known activity at known distances. Exposure measurements in the beam were made with a Victoreen Radocon II, Model 555 of great antiquity and a Victoreen Model 570 Condenser R-meter with chamber number 621, calibrated by Victoreen on 28 October 1976. The readings differed by 2.2%. However, the Radiological Physics Center in Houston, Texas had provided Lithium Fluoride Dosimeters, which were irradiated on 12 July 1978; these results will be used in reconciling the differences between ion chambers.

The source activity was 10,394 Ci on 15 February, and thus was approximately 9944 Ci at the time of the first treatment. The measured exposure rate for a 10x10 cm field at 80 cm was 262.4 R/min on 29 May 1978.

Leakage radiation levels were measured for fourteen points around the head, as indicated in the accompanying diagram. The average of the points was 0.5 mR/hr, with a maximum of 1.0 mR/hr. The maximum exposure rate measured within 5 cm of the surface of the head was 6 mR/hr.

Source leakage was checked by taking swabs of the collimators as close to the source location as could be reached. These were measured on a Searle well counter for ten minutes each. The results were not significantly different from background, that is, of the order of  $10^{-12}$  Ci for these conditions.

Stops on the head rotation were checked, and it was discovered that the arm rotation and head rotation stops were interrelated. Rotation beyond the stops is possible, but the source cannot be activated when the stop has been passed. With the head toward the adjacent room, the beam can be activated through any angle from the beamstop to a point on the floor a few feet from the wall. With the head toward the wall backed by dirt fill, the beam could be activated through an arc from a point on the floor directly below the isocenter to a point half way up the wall. Under most circumstances, approximately 110 degrees.

Radiation levels were checked in the adjacent room with the beam aimed as close to the base of the wall as the stops would permit, but with no phantom. A reading of 0.03 mR/hr was obtained. A RANDO phantom was placed on the floor in a position which would simulate a typical configuration for use without the beamstop, and readings taken in adjacent areas:

w/o BS  
of beam  
X Ray Room

Console	0.03 mR/hr
door	0.04 mR/hr
Orthovoltage room	0.02 mR/hr
upstairs	0.01 mR/hr

A RANDO phantom was placed on the couch, and the arm rotated through 360 degrees, with readings taken every 15 degrees in adjacent areas. The maximum readings obtained were

a/BS

Console	0.05 mR/hr	75-90	degrees
Orthovoltage room	0.05 mR/hr	120	degrees
upstairs	0.04 mR/hr	135, 195, 210	degrees

The lack of symmetry on the upstairs readings is due to the location chosen for the readings, which was slightly removed from directly above the isocenter.

The door interlock was checked by turning the beam on and opening the door. This was repeated two additional times. A single check is part of the routine morning start up procedure. Turning the beam on once again requires a sequence of operations at the control console.

Source on-off indicators were checked against the rod attached to the source holding mechanism and the meter display of the Radocon II. The so-called timer correction term, which really indicates the delay of the on-off mechanism, was -0.011.

Because the radiation levels in surrounding areas were so low, the transmission factor for the beam stop was not directly measured. The unit has a fixed beam stop, so that there is no question of its not being in the proper position. Angle interlocks were checked earlier to see to it that the unit could not be engaged unless directed at either the beam stop or a barrier backed by earth.

The unit is equipped with an electromechanical timer, backed up by a separate electronic timer. In runs of 1, 2, 3, 5 and 10 minutes, these agreed with each other with zero error. When compared with a sweep second hand wall clock, the discrepancy was less than two seconds, and one is inclined to suspect that this is entirely due to errors in reading the wall clock while turning on the unit and listening to it turn off.

(Source in "OFF" position  
Measurements taken one meter  
from source)

Top View - Showing orientation  
of Views A through D

Position No.	Radiation Level (mR/hr)
View A 1	1.0
2	0.7
3	0.4
4	0.1

View B 5	0.7
6	0.6
7	0.3
8	0.6

View C 9	0.5
10	0.3

View D 11	0.4
12	0.3
13	0.6
14	0.7

Average value 0.5

Maximum value 1.0

Instrument used Victoreen

Thy 11 Model 170

HHM-7000

Curies 10.394

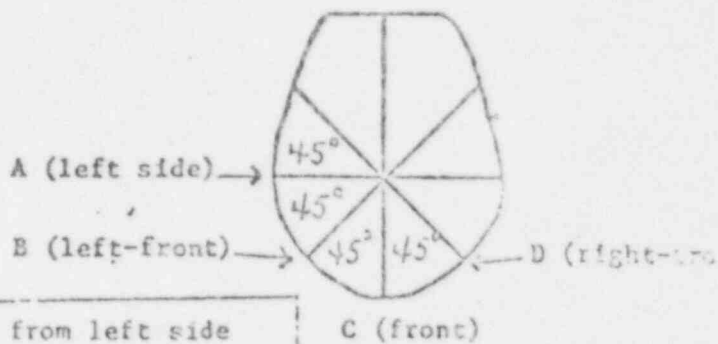
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Date 15 Feb 1978

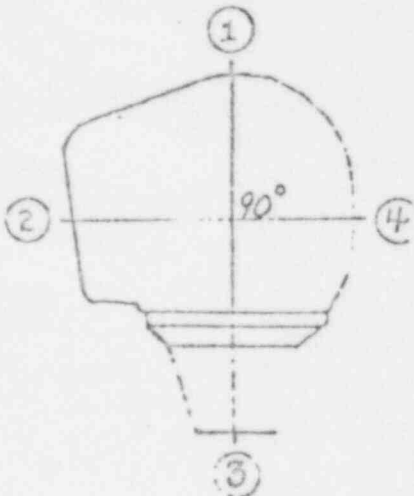
Manufacturer's name & model # of teletherapy unit A.E.C.L.

Theratron 780

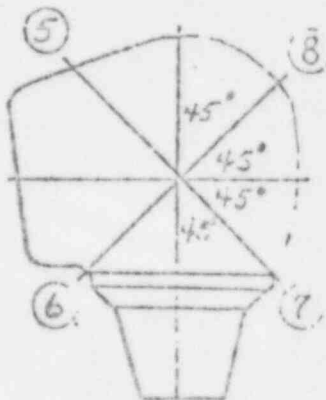
Rear



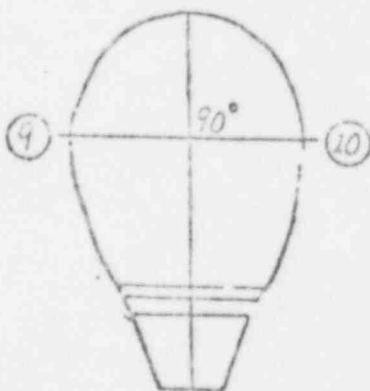
View A - Vertical from left side



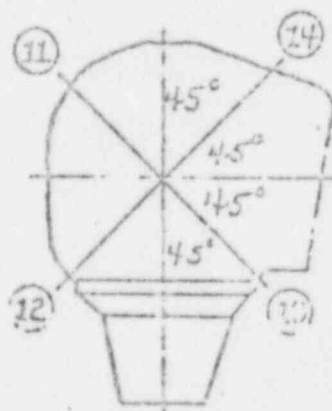
View B - Vertical from left-front



View C - Vertical from front



View D - Vertical from right-front

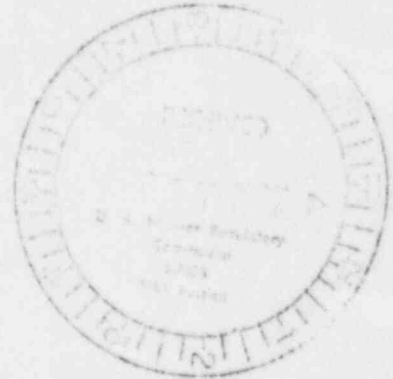


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August 10, 1977



John E. Bowyer  
Materials Branch  
Directorate of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20545

Dear Mr. Bowyer

There has been a change of personnel within the radiation safety program at West Virginia University. The basic structure remains the same as was described in our Radiation Safety Manual. Stephen T. Slack has been named the Radiation Safety Officer. His curriculum vitae is attached. The NRC licenses which we currently hold are: 47-01163-20, 47-01163-22, 47-01163-24, 47-01163-26, R-58, SNM-1512, SNM-1713. If any additional action from us is desired regarding this change, please let me know.

Sincerely,

*M. Douglass Allan*

M. Douglass Allan  
Medical Physicist

MDA/jlr  
Attachment

*See Board  
License for  
RSO & T&E  
PCV area*

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2 pp.

Stephen T. Slack  
1261 Stewartstown Road, Apt. C.  
Morgantown, WV 26505  
(304)-599-2036

office: Dept. of Radiology  
West Virginia Univ. Medical Center  
Morgantown, WV 26506  
(304)-293-3413

#### EXPERIENCE

- 1975-77 Dept. of Radiology, West Virginia Univ. Medical Center. Asst. Prof. All clinical physics duties for radiation therapy. Instruction of student therapy technicians.
- 1974-75 Physics Section, Dept. of Radiology, University of California, San Francisco. Post-doctoral training. Routine work throughout the department. Part-time employee of physics consultation service - large share of responsibility for acceptance testing of accelerator at Franklin Hospital.
- 1972-74 Physics Dept., Emmanuel College, Boston. Instructor: Theoretical Physics, Intermediate Mechanics, General Physics, Physical Science.
- 1966-72 Physics Dept. The Pennsylvania State University. Graduate Student. Nuclear spectroscopy studies with NaI(Tl) and Ge(Li) detector systems, 6 MV de Graaff accelerator, PDP 15 computer. Working knowledge of FORTRAN IV on IBM 360 and 370.
- 1964-66 Central Catholic High School, Wheeling, W.Va. Instructor, physics and mathematics. Acting head of math dept., 1966.

#### EDUCATION

- The Pennsylvania State Univ. Ph.D., Physics, 1974  
Thesis: Study of the  $^{24}\text{Mg}(\alpha, \gamma)^{28}\text{Si}$  Reaction at Alpha Particle Energies from 3.2 to 6.2 MeV.
- Marist College, Poughkeepsie, N.Y., B.A., Physics, 1964.

#### PROFESSIONAL SOCIETIES

- American Association of Physicists in Medicine  
American Physical Society  
American Association of Physics Teachers

JUN 13 1986

MEMORANDUM FOR: Files

FROM: C. James Holloway, Jr. Acting Director  
License Fee Management Staff, ADM

SUBJECT: FEE FOR MATERIALS LICENSES 47-23066-01  
AND 47-20366-02

By letters dated May 22, 1984, West Virginia University informed the Commission that the West Virginia legislature had set up a corporation to administer West Virginia University Hospital. The University requested that Materials Licenses 47-01163-20, 47-01163-22, and SNM-1713 be amended to reflect West Virginia University Hospital, Inc. as the licensee and that a new license be issued to West Virginia University for the use of the materials that remained under the University's control. Since the exemption in §170.11(a)(9) of 10 CFR 170 does not apply to the West Virginia University Hospital, Inc., amendment fees of \$120 and \$230 were collected for the amendments to Licenses 47-01163-20 and -22 respectively. A fee was not required to amend License SNM-1713, a pacemaker license.

For administrative reasons, the Licensing staff terminated Materials Licenses 47-01163-20, 47-01163-22 and SNM-1713 and issued new Licenses 47-23066-02, 47-23066-01 and SNM-1948 to replace them (refer to Earl Wright's letter dated 4/9/85). Since the issuance of the new licenses was initiated by the Licensing staff, and since amendment-type reviews were performed, the \$120 amendment fee collected on August 8, 1984 is the correct fee for the issuance of License No. 47-23066-02, and the \$230 amendment fee collected on September 24, 1984, is the correct fee for the issuance of License No. 47-23066-01. License SNM-1948, which replaced License SNM-1713, is exempt from fees since it is a pacemaker license and West Virginia University Hospital, Inc. holds nuclear medicine License 47-23066-02. New License 47-23035-01, which was issued to West Virginia University for the possession and use of the materials remaining under the University's control, continues to be fee exempt pursuant to 170.11(a)(9).

Signed, C. James Holloway, Jr.

C. James Holloway, Jr.  
Acting Director  
License Fee Management Staff  
Office of Administrator

DISTRIBUTION:

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GJackson, LFMS  
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DATE: 6/12/86

LFMS:ADM  
CJHolloway  
6/12/86

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Lp.