ELLIS FISCHEL
State Cancer Center

GOVERNED BY THE MISSOURI STATE CANCER COMMISSION

February 17, 1988

Nuclear Regulatory Commission
Region 3
Radioisotopes Licensing Section
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Re: Renewal of License #24-00481-04
Expiration date 3/31/88
Program Code 02300

Gentlemen:

Subject: Notice of Expiration

Please accept this letter as our official renewal application for the above referenced license which will expire on 31 March, 1988. We are submitting this letter requesting renewal of our teletherapy license and also providing the "limited supporting information" you described in your letter of December 1, 1987. Our supporting information ties to the alpha characters in your license renewal form.

This letter specifically requests renewal of the following license:

A. Number of license to be renewed: 24-00481-04

B. Name of Licensee to be used in Item 1:

Ellis Fischel State Cancer Center
Radiotherapy Department

C. Mailing address to be used in Item 2:

115 Business Loop 70 West
Columbia, MO 65203

D. Location of teletherapy units for condition 10:

Unit: Picker Model 6096A:
Ellis Fischel State Cancer Center
115 Business Loop 70 West, Columbia, MO.
Room 140, First Floor West

8811010160 880606 PNU
REG3 LIC30
24-00481-04

2/29/88
Mar-3-11
Date Completed 3/3/88

RECEIVED
FEB 22 1988
REGION III

FEE EXEMPT
10.166(5)

CONTROL NO. 8492 6

FEB 22 1988

Unit: AECL Theratron 80:
Ellis Fischel State Cancer Center
115 Business Loop 70 West
Room 141, First Floor West

E. The locations described in Item D are the same as those described in our application dated September 28, 1982 and material license dated April 1, 1983. No changes have been made that affect radiation levels in the surrounding areas other than a routine source change on March 13, 1983 when a 5380 curie source was installed in the AECL Theratron 80. No change has been made that affects the patient viewing system.

F. The electrical and mechanical stops that limit use of the primary beam of radiation are still installed and continue to operate as described in the survey report of March 23, 1983 and letter of June 14, 1983.

G. The current authorizations in items 6 through 9 of the license (regarding radionuclide, description of sealed sources and teletherapy unit, maximum possession limit, and authorized use) are correct.

H. The current list of authorized users in condition 12 includes only Jose M. Sala, M.D.

I. The Radiation Safety Officer is Jose M. Sala, M.D. as shown in amendment No. 30 of October 25, 1985.

J. The following is the information requested in the indicated items:

Item 8: We have adopted the training program described in appendix D of draft regulatory guide FC 414-4.

Item 10.5: A copy of our pertinent operating procedures is attached.

Item 10.6: A copy of our emergency procedure is attached.

K. The following is the information requested in the indicated items:

Item 10.1: We have established and agree to follow written procedures for personnel monitoring that include as requirements the criteria specified in Item 10.1.2 of Draft Regulatory Guide FC 414-4.

Item 10.2: We do have in our possession and available for use the following radiation detection instruments:
2 portable low-range survey meters capable of detecting 0.2 MR/HR.

A beam-on radiation monitor permanently mounted in each teletherapy room that is equipped with an emergency power supply separate from the power supply of the teletherapy unit. The beam-on monitor provides a visible indication of an exposed or partially exposed source. This visible indicator is observable by a person entering the teletherapy room.

2 dosimetry systems consisting of ionization chambers and electrometers for making full calibration and spot-check measurements.

An instrument of sufficient sensitivity to count leak-test samples consisting of eberline mini scaler model MS-2 and remote detector model RD-15.

2 high-range portable survey meters capable of reading at least 1 MA/HR.

Item 10.3: We will calibrate our survey meters in the manner described in appendix G of Draft Regulatory Guide DG 414-4.

L. We verify that there have been no changes in the information previously submitted to NRC regarding other aspects of our radiation protection program or our teletherapy program.

M. The Radiation Safety Committee includes an authorized user for the type of use permitted by the license, the Radiation Safety Officer, a representative of the nursing service and a representative of management who is neither an authorized user nor a Radiation Safety Officer. The Committee's duties and responsibilities have been amended to include teletherapy. Records on the membership of the Radiation Safety Committee will be maintained until the NRC terminates our teletherapy licenue and these records will demonstrate that, if the membership is changed, the Committee will continue to include the individuals specified in Paragraph 35.11(b).

N. Our alara program has been previously submitted and approved.

O. The required survey report has been submitted after our last source change.

In addition to the items presented above, we are pleased to provide the information described in your draft regulatory guide, items 13, 14, and 15. These include the following:

Item 13: This letter is signed by Ronald G. Vincent, M.D., who is the Director of the Ellis Fischel State Cancer Center.

Item 14.b: The number of employees at Ellis Fischel State Cancer Center for the period ended January 31, 1988, was 213.

Item 15: Number of beds is 110.

It is our understanding that we are exempt from renewal fee per Reference CFD 170.11(a)(9). We look forward to your review of our applications. If you have technical questions associated with the application, please contact Jose M. Sala, M.D., Director of the Radiation Therapy Department. For administrative questions, please contact Ronald G. Vincent, M.D., Director, Ellis Fischel State Cancer Center.

Thank you for your consideration of this application. We look forward to your response.

Very sincerely,

Ronald G. Vincent

Ronald G. Vincent, M.D.
Director

RGV:nh

S:	Code No.
CHEL STATE CANCER CENTER PROCEDURE MANUAL	SECTION: RADIATION THERAPY SUBJECT: Radioactive Material for Radiation Therapy
BY: KAY GLASS R.T.T CHIEF TECHNOLOGIST	ADMINISTRATION APPROVAL:

1. Use of isotopes are noted in handling instructions. The use of telecobalt therapy units is governed by License# 24-00481-04 from the Nuclear Regulatory Commission.

2. Other x-ray equipment for therapy and localization will follow recommended lines of the National Council of Radiation Protection and Measurements and the Division of Health, State of Missouri .

3. Survey for radiation protection will be preformed as required by the Radiation Safety Officer as per NRC regulation, or as needed. Need will be defined as any change or orientation. operation, shielding change, occupancy that could affect radiation exposure to the environs.

The Medical Physicist Division serves in conjunction with the team-effort of the treatment concer with ionizing radiation.

The radiation therapy treatment planning conference will be attended by at least one of the medical physicist. No treatment plans will be initiated without a prescription signed by a licenses physician practicing radiation therapy.

Supersedes:

Code No.

ELLIS FISCHEL STATE CANCER CENTER

SECTION: RADIATION THERAPY

POLICY & PROCEDURE MANUAL

SUBJECT: Calibration Standards

Initiated By: KAY GLASS R.T.T
CHIEF TECHNOLOGIST

Administrative Approval:

Secondary standards that have been recently calibrated(within the past eighteen months) are to be used in calibrating of therapy devices at the appropriate energy. Instruments will be sent to the Regional Calibration Laboratories or the National Bureau of Standards, at intervals not to exceed eighteen months and at other times when the system seems to be in error by checking with radioactive decay measurements.

Page 1 of 1

Date: 3-1-86

Supersedes: Code No.

ELLIS FISCHEL STATE CANCER CENTER — RADIATION THERAPY

POLICY & PROCEDURE MANUAL — Cobalt area

Initiated by: KAY GLASS R.T.T.
CHIEF TECHNOLOGIST

Administrative Approval:

The first floor area of the department will be known as the cobalt area.

It must be remembered that the doors of the two rooms to the cobalt machines are to be locked at all times, when not in use. This is a step for safety, nothing else.

Date: 3-1-86

EDES:	Code No.
FISCHEL STATE CANCER CENTER	SECTION: RADIATION THERAPY
& PROCEDURE MANUAL	SUBJECT: Quality Control for the Cobalt-60 units & Linear Accelerator
TED BY: KAY GLASS R.T.T CHIEF TECHNOLOGIST	ADMINISTRATION APPROVAL:

I. Co-60 External Beam Treatment Units.

Daily, monthly adn yearly shecks shall be performed on the CO-60 units for radiation therapy treatments.

A. Daily Checks will be performed by the radiotherapy technologist and will include:

1. An optical distance indicator versus mechanical distance indicator check.
2. An interlock system check.
3. A radiation monitoring unit check.

B. Monthly Checks (spot checks) will be performed by a physicist at intervals not exceeding one month. Spot-checks measurements will include determination of :

1. " timer accuracy"
2. The congruence between the radiation field and the dield indicated by the light beam localizing device;
3. The accuracy of all distance measuring devices used for treating humans;
4. The exposure rate, dose rate, or a quanity related in a known manner to these rates for one typical set of operating conditions; and
5. The difference between the measurement made in paragraph (B) (4) of this section and the anticipated output, (i.e., the value obtained at last full calibration corrected mathematically for physical decay)."

C. Yearly checks will be performed by a qualified physicist.

1. This check will be considered as "full calibration measurements" and will be performed at yearly intervals, and:

a. " whenever spot-check measurements indicate that the output value differs by more than five percent from the value obtained at the last full calibration corrected mathematically for physical decay:

b. Following replacement of the radiation source or following reinstallation of the teletherapy unit in a new location;

c. Following any repair at the teletherapy unit that includes removal of the source or major repair of the components associated with the source exposure assembly." (NRC 10 CFR 35.21)

2. Full calibration measurements will include determination of:

a. "The exposure rate or dose rate to an accurary within + three percent for the range of distances (or for the axis distance) used in radiation therapy:

b. The congruence between the radiation field and the field indicated by the light beam localizing device;

c. The uniformity of the radiation field and its dependency upon the orientation of the useful beam;

d. Timer accuracy; and

e. The accuracy of all distance measuring devices used for treating humans.

3. Full calibration measurements will be made in accordance wit the procedures recommended by the Scientific Committee on Radiation Dosimetry of the American Association of Physicist in Medicine (Physics in Medicine and Biology, Vol. 16, No. 3, 1971, pp. 379-396)." (NRC 10 CFR 10 35.21)

D. For further information regarding Co-60 teletype calibration measurements see NRC 10 CFR 35.

II. Linear Accelerator:

Daily, weekly, monthly, quarterly and yearly checks will be performed on the linear accelerator on the routine basis. Any variations will be judged on the professional ground by qualified physicist and/or accelerator engineer.

A. Daily checks will be performed by the radiotherapy technologist or accelerator engineer under the supervision of the physicist and will include:

1. An optical distance indicator versus a measured distance check (technologist).

2. A relative output consistency check to verify that the relative output for a given set up does not vary from day to day. (technologist)

3. Machine operating parameters check(accelerator engineer)

B. Weekly checks will be performed by the physicist. This will include:

1. A light versus radiation field coincidence check to assure that the light field used to set up a patient is within the acceptable limits to the actual radiation field used to treat a patient.

2. A field flatness check to assure that the radiation dose across the entire field selected is essentially uniform, and within the acceptable limits.

3. A dosimeter factor check to assure that the dosimeter factors of some standard set up of the unit have not varied more +3% of those from the yearly complete calibration.

C. Monthly checks will be performed by the physicist. These checks will include:

1. A check of the general condition of the unit and the treatment room and the control console.

2. A check of the safety aspects of the unit and the treatment room which will include, proper functioning of the interlock system, warning lights, intercom system, closed circuit TV monitoring systems and emergency stops of the unit.

3. A beam energy check. This check will include realtive depth dose checks of selected energies and at one or several selected depths.

D. Quarterly checks will be performed by the physicists and will include:

1. An intercomparison of chambers to be used in calibration of the unit to assure that the calibration factors of these chambers have not changed over the acceptable limits of +2.

2. An output calibration at the selected field sizes besides the standard 10 x 10 field for the photon beam and selected energies of electron beam.

3. A percentage depth dose spot check for the photon beam and selected energies of electron beam.

E. Yearly checks will be performed by the physicist and this will be considered a complete calibration of the unit. This calibration will include:

1. A verification of the blocking tray transmission factor.

2. A verification of isodose curves fro 7, up to 19 MeV electron beams and 25 MeV photon beam.

3. An inverse square law-virtual source position check.

4. An output check as a function of gantry angle.

5. A verification of percent depth dose curves for 7, up to 19 MeV electron beams as well as 25 MeV photon beam.

6. A verification of the field size dependence curves.

7. A check of the mechanical versus radiation isocenter.

8. A monitoring check and linearity check.

III. Records

All the above checks will be recorded on the appropriate forms and filed in the physicist office. Copies of these records will be available upon request by the Radiation Safety Officer, or the administrative authorities.

DES:	Code No.
ISCHEL STATE CANCER CENTER	SECTION: RADIATION THERAPY
& PROCEDURE MANUAL	SUBJECT: Radiation Protection
ED BY: KAY GLASS R.T.T CHIEF TECHNOLOGIST	ADMINISTRATION APPROVAL:

DESCRIPTION:

This subject is discussed at length in the Policy and Procedure of the Physics Division. What is discussed here are general policies involving personnel within the vicinity of radioactive materials or radiation producing machines.

Policy and Procedure:

1. Everyone rendering a full eight hours work day in the Department of Radiation Therapy will wear a film badge which is supplied by the Radiation Safety Officer.

2. Everyone handling radioactive materials in addition to wearing a film badge will wear a finger ring badge.

3. It will be the responsibility of the Division of Medical Physics to monitor the entire department periodically for any unusual amount of background radiation.

4. The Radiation Safety Officer has the sole authority to determine follow up procedures for anyone recieving any excessive amounts of radiation as registered from his film budge.

5. It will also be the responsibility of the Radiation Saftey Officer to inquire and investigate why such an excessive amount of radiation has been registered on a particular film badge.

6. Whenever the monitors in the cobalt-60 rooms are no functional the radiation technologist in charge of the room should report this at once to the Radiation Safety Officer.

7. Any abnormal sounds or function within the head of the cobalt-60 units should be reported at once to the Radiation Therapy Technologist supervisor, Radiation Safety Officer, and Division of Medical Physics by the radiation technologist who notices it.

8. Whenever a radioactive implant is performed in the operating room or other places outside the Department of Radiation Therapy, all personnel concerned will wear a film badge and extremity (ring) badge.

9. It will be the responsibility of the radiotherapuist and the medical physicist to be sure that all the radioactive materials (radium, cesium, irridium, radioactive gold seeds, and radioactive iodine seeds) are all accounted for before leaving the operating room or other places where the procedures has been performed. If all the radioactive materials are accounted for, the room will be monitored routinely once the patient leaves the room to insure that no oversight has occured in the routine accounting of the radioactive materials. If all the radioactive materials are not accounted for, no one will leave the room and no material will be taken out of the room until the medical physicist has made an adequate search of the vicinity and until all of the radioactive materials are accounted for.

10. If a liquid radioactive material is used (radioactive gold or Colloidal chromic phosphate, ect.), no one will leave the room and no material will be removed from the theater where the procedure was performed until the Division of Medical Physics has monitored the room and the material for any spillage of radioactivity.

11. It will be the responsibility of the Division of Medical Physics to dispose of any objects contaminated with radioactive materials.

12. Patients with radioactive materials, e.g. intracavitary or interstitial implants are to be placed in a private room for intracavitary implants, not more than two in one room.

    ALL THE RULES IN THE YELLOW SHEET "RADIATION SAFETY INSTRUCTIONS" MUST BE STRICTLY OBSERVED AND THE YELLOW SHEET WILL BE POSTED ON THE DOOR OF THE PATIENT'S ROOM. (example yellow sheet)

13. Whenever a patient containing radioactive materials is isolated, all personnel in the ward serving the patient will wear a film badge.

14. It will be the responsibility of the Division of Medical Physics to monitor the adjoining rooms and corridors of a room isolating a patient with radioactive materials for any excessive amount of radiation.

15. It will be the prerogative of the Radiation Safety Officer to modify the rules and regulations in the Yellow Sheet.

16. If the radioactive materials administered to a patient is removable (radium, cesium, irridium) ,the number of needles, capsules, or seeds will be completely accounted for during the removal of the radioactive materials. In case of irridium seeds where the ribbons are used and completely covered by coagulated blood, the ribbons will be brought to the handling area with Potassium Citrate or Hydrogen Peroxide to decoagulate the blook so that all the seeds in the ribbon are accounted for. If all the radioactive seeds in the ribbons are not accounted for, no one will leave the room where the mater-al was removed and no material will be taken out of the room until the Radiation Safety Officer and physicist have made an adequate search of the vicinity and until the radioactive materials are accounted for.

17. After the removal of a removable radioactive material, all patients will be monitored prior to leaving the room to make sure that no radioactive materials have been inadvertently left within the patient. Once the patient leaves the room, the room will also be monitored.

18. For permanent implants (radioactive gold and radioactive iodine seeds), no patient will be relaesed from the hospital until a full radiation survey has been made by the medical physicist and a full radiation survey report has been made stating the extent of emission of the radioactive materials on the surface at one meter and that this is within the normal allowable limits.

19. All radiation survey records will be kept in the department available for inspection by the Nuclear Regulatory Commission for a period of no less than five years.

EDES:	Code No.
ISCHEL STATE CANCER CENTER & PROCEDURE MANUAL	SECTION: RADIATION THERAPY SUBJECT: Radiation Protection
KAY GLASS R.T.T ED BY: CHIEF TECHNOLOGIST	ADMINISTRATION APPROVAL:

General:

1. All hospital staff that are exposed to radiation or near radiation areas will be placed on appropriate radiation monitoring service.

2. All of these employees are to be trained as to general hazards of radiation and protection. The NCRP report #39 (Basic Radiation Protection Criteria) will be used.

3. All license changes or applications must go through the office of the Radiation Safety Officer.

4. The Radiation Safety Officer will be a physician.

5. An isotope committee is defined in the by-laws of the professional staff and must meet as required.

6. The exposure levels, surveys of limitations and use of licensed radioactive material are contained in Title 10 of the Federal, specifically parts10 and 20 and our license. These are all available for inspection during working hours in the office of the Radiation Safety Officer.

Code No.

Supersedes: Code No.

ELLIS FISCHEL STATE CANCER CENTER | SECTION: RADIATION THERAPY

POLICY & PROCEDURE MANUAL | SUBJECT: Film Badges

Initiated By: RAY GLASS R.T.T
CHIEF TECHNOLOGIST

Administrative Approval:

DESCRIPTION:

A film badge system has been established in accordance with the NRC regulations (10-CFR) to monitor employees of the hospital working with or around radioactivity. The purpose of this system is to monitor and record monthly exposures to these individuals and to try to assure that no one exceeds either the National Regulations Commissions quartely or yearly limits, or the hospitals standards which are more conservative.

Policy and Procedure:

1. Anyone working with or around the linear accelerator will be issued an H-1 whole body film badge, that not only detects gammas, x-rays and betas but also detects neutrons that could be produced by interactions of high energy gamma rays and electrons. Futhermore, anyone who handles radioactive material or who worked in such a manner with x-ray machines that their hands could recieve a high dose of radiation will be issued a U-3 ring dosimeter to determine their extremity dose. Finally, anyone except those previously monitored for H-1 whole body badges, working with radiation, isotope machines, x-ray machines or working with or around radioactive patients will be issued a G-1 whole body badge.

2. The badges are divided up by the departments. The following departments are the only ones to recieve film badges. As of Feb. 1986:

a. Anesthesiology and operating room
b. Diagnostic radiology
c. Maxillofacial
d., Nuclear Medicine
e. Nursing
f. Radiation therapy
g. Pathology
h. Maintenance

3. The new badges are recieved from Landauer around the 25th of the month and will be delivered to or picked up by each department by the 4th of the month. At this time, any deletions will be reported by each department on the forms provided. It is important that complete information(social security number, birthdate, and sex) is included

No one under 18 years will be badged or allowed to work around radiation. If an individual will be badged for two months or less, he/she will be considered temporary and will recieve spare badges and individual exposure records will be kept on them.

4. The "old" badges will be collected by the fifth of the month. Each department's badges will be checked against those issued to assure that all badges have been turned in. If any badges are missing, the representative of that department will be contacted to locate this missing badge. If it is determined that an individual's badge was lost or damaged, that individual will be given a cover letter and a lost or damaged film badge report to fill out. From this, the physicist will estimate the individual's exposure for that month.

5. These "old" badges will be sent to Landeaur by the 10th of the month. This shipment will include:

a. All the badges issued for the previous month along with control badges supplied by the company.

b. The forms supplied by the company for additional and deletions. Any new permanent personnel to recieve a badge will be added on the back side of the form. It is important to include the individual's social security number, date of birth, and sex. Any individual no longer requiring a badge will be deleted by placing a 'D' next to their name in the space provided on the front of the sheet.

6. A list of the spares given out each month will be kept. This will include the spare badges number and series along with the name and department of the individual to whom it was given. Again, before a spare can be issued anaddition form will be filled out.

7. When the film badge report is recieved from the company, aroung the 28th of the month, the individual exposures will be reviewed by the Radiation Safety Officer and the physicist in charge of the film badge system. The names of those who wore spares for the month reported will be written on the report next to the spare they wore.

8. If anyone recieved more than the hospital standards for a particular month, calendar quarter or year, a form will be filled out to that effect, and the individual will be notified personally by the physicist or Radiation Safety Officer to limit future exposures to acceptable standards. If an individual recieves doses that axceed the NRC quarterly or yearly limits, a form will be filled out to the effect. A letter will be sent to the NRC regarding this individual's exposure for that period as soon as possible and the individual will be notified both in writing and personally by the Radiation Safety Officer or by the physicist as directed by the Radiation Safety Officer.

The personal notification will include an interview with the individual to determine the cause of the excessive exposure. A plan will be established to restrict and reduce the individual's exposure in the future. The interview will be written up and given to the individual, as well as the Radiation Safety Officer keeping a copy, with a copy going to the hospital administrator.

9. Copies will be made of each report from Landeaur, or current film badge company under contract, and posted in each department where all individual's wearing badges will be able to see it. The master copy will be retained by the Radiation Safety Officer.

10. There are certain rules that apply to all individuals wearing a film badge:

A. No one is to wear another's badge for any reason.

B. Badges issued will be worn at all times while on duty with the exception of those individuals on the special temporary film badge system.

C. Badges will be cared for properly. This includes preventing them from getting wet or being exposed to light due to tearing. They will also be kept away from excess heat.

D. It is the responsibility of the individual to report any lost or damaged film badge or ring dosimeters to the physicist immediately so that a new badge can be issued and a dose assessed for the missing perior of time.

E. No badges are to be taken out of the hospital.

F. All badges are to be turned in by the 5th of the month.

G. If an individual is employed concurrently at another institution where he/she is also exposed to detectable levels of radiation, it is that individual's responsibility to assure that the combined totals of his/her exposures from the two or more institutions do not exceed the NRC regulations on quarterly or yearly limits:

Area	Quarterly Limits	Yearly Limits
Whole Body		5000 mRem
Extremities		75,000mRem

H. It is also the responsibility of all pregant women to notify the physicist or the Radiation Safety Officer that they are pregnant so that proper precautions can be taken regarding the dose to the fetus.

11. Pregnant women will notify personally the physicist or Radiation Safety Officer of the possible risks to the embryo or fetus due to radiation. Every attempt will be made to assure that pregnant women do not recieve over 200mRem whole body exposure during their gestation period.

12. The specific action levels per person established by this institution are as follows:

Supersedes:

Code No.

ELLIS FISCHEL STATE CANCER CENTER
POLICY & PROCEDURE MANUAL

SECTION: RADIATION THERAPY

SUBJECT: Film Badges

Initiated by: KAY GLASS R.T.T CHIEF TECHNOLOGIST

Administrative Approval:

Kind or Class Of Operation	Action Level (whole body)
1. Nursing 2nd, 4th, 7th Floors	500mRem/yr.
2. Radiotherapy technologist	1000mRem/yr
3. Radiotherapist and physicist	2000mRem/yr
4. Nuclear Medicine	2000mRem/yr
5. Diagnostic Radiology	500mRem/yr
6. Pathology	500mRem/yr
7. O.R., Anesthesiology& recovery	500mRem/yr
8. Maintenance	500mRem/yr
9. Pregnant women	200mRem/gestation period

The nuclear regulatory commission (NRC) regulations, however, require that occupationally exposed persons not exceed 5000mRem/yr. The National Council of Radiation Protection (NCPR) recommends that pregnant women recieve less than 500mRem/gestation period. Therefore, the standards set by this institutions are more conservative than the national limits.

CONTROL NO 84926

Date: 3-1-86