KUAKINI MEDICAL CENTER
347 NORTH KUAKINI STREET / HONOLULU, HAWAII 96817
TELEPHONE 536-2236

May 1, 1986

Ms. Beth A. Riedlinger
Health Physicist (Licensing)
Materials Radiation Protection
Inspection & Licensing Section
U. S. Nuclear Regulatory Commission
Region V
1450 Maria Lane, Suite 210
Walnut Creek, CA 94596

Log May 1 V
Remitter
Check No. 100173
Amount $120
Fee Category 7C
Type of Fee Amendment
Date Check Rec'd. 5/19/86
Date Completed 5/20/86
By: Mesin

NRC License No.: 53-17797-01
Docket No.: 030-13337

Dear Ms. Riedlinger:

We wish to amend our Materials license by making the following changes:

1. Delete I - We did not possess the Cobalt-60 source.

2. Increase L - Increase I-125 sealed sources to 30 sources.

3. Add to M - Add to Gd-153 sealed sources the Lunar GD Series and increase to 5 sources or a maximum possession limit of 4.5 Ci.

4. Under Item 19 - We submit the enclosed complete revision of Item 19 (Therapeutic Use of Radiopharmaceuticals).

5. Under Item 20 - We submit the enclosed complete revision of Item 20 (Therapeutic Use of Sealed Sources).

6. Under Item 23 - We submit the enclosed complete revision of Item 23 (Procedures and Precautions for Use of Bone Mineral Analyzers).

Enclosed is a check for $120 to cover the license amendment fee. We appreciate your prompt consideration of this amendment.

Sincerely,

Masaichi Tasaka

Masaichi Tasaka
President

ek
Enclosures
cc Richard Wasnich, M.D.

PROCEDURES AND PRECAUTIONS FOR USE OF I-125 AND Gd-153 SEALED SOURCES IN BONE MINERAL ANALYZERS

A total of three (3) bone mineral devices are planned: Two (2) stationary and one (1) mobile.

1. Procedures for Ordering and Receiving Packages Containing Sealed Sources For Use in Bone Mineral Analysis Equipment.

a. The Supervisor of the Osteoporosis Center will place all orders for sealed sources to be used for bone mineral analysis and will ensure that the requested materials and quantities are authorized by the license and that possession limits are not exceeded;

b. During normal working hours, carriers will be instructed to deliver packages containing sealed sources directly to the Nuclear Medicine area;

c. During off-duty hours, security personnel, or other designated individuals, will accept delivery of packages containing sealed sources in accordance with the procedures outlined in the attached memorandum;

d. Monitoring for contamination on packages containing sealed I-125 or Gd-153 sources shall be performed in accordance with 10 CFR 20.205 and the facility procedures for opening packages containing radioactive material. Records of the results of the monitoring shall be kept;

e. Sealed sources will remain in lead or original shipping containers until the source is installed in the scanner;

f. Prior to disposal of the empty package and packaging materials, all labels and signs will be removed or obliterated;

g. A receipt log will be maintained and the following entries made for each source received: date of receipt, manufacturer, model number, serial number, isotope, activity and date of assay, date installed, date removed, and disposition.

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M E M O R A N D U M

FOR: Security Personnel

FROM: Masaichi Tasaka, President

RE: RECEIPT OF PACKAGES CONTAINING RADIOACTIVE MATERIAL

Any packages containing radioactive material that arrive outside normal working hours (7:00 a.m. to 4:30 p.m., Monday through Friday and 7:00 a.m. to 12:00 Noon on Saturdays) shall be signed for by the Security Guard on duty and taken immediately to the Nuclear Medicine Department. Unlock the door, place the package on top of the counter, and relock the door.

If the package is wet or appears to be damaged, immediately contact the Radiation Safety Officer or alternate. Ask the carrier to remain at the building until it can be determined that neither he nor the delivery vehicle is contaminated.

RADIATION SAFETY OFFICER:	Richard Wasnich, M.D.
OFFICE PHONE:	536-2236
BEEPER:	533-3877 X5462
RADIATION SAFETY CONSULTANT:	Don Tolbert, Ph.D.
OFFICE PHONE:	536-2774
HOME PHONE:	947-7457
BEEPER:	525-9086 (After beep, enter number to be called then "#")

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2. **Installation/Removal of Sealed Sources in Bone Mineral Analyzer**

a. Only Authorized Users of Groups I, II, and III defined in 10 CFR 35.100, or personnel under the direct supervision of one (or more) of these individuals will conduct these procedures;

b. The installation/removal procedures provided by the manufacturers will be followed. These procedures will include the use of remote handling tools for any operation involving an unshielded source.

3. **Source Disposal**

a. I-125 and/or Gd-153 sources too weak for use in bone mineral analyzers will be removed from the device as per manufacturer's instructions and temporarily stored in the long half-life decay area designated in Item 11-6 of the approved amendment application dated 1/30/85.

b. Sources that are no longer usable shall be either shipped back to manufacturer, shipped to a licensed waste disposal site, transferred to another licensed facility for use in an analyzer requiring a lower activity source or held for decay. If transferred, records of certification of shipping containers shall be kept in accordance with DOT regulations. If the sealed sources are returned to the manufacturer, they will be shipped in the original shipping containers. The requirements of 10 CFR 49 shall be followed with regards to packing, labeling, marking, and surveying of the package and filling out the shipping documents. If held for decay, sources will be stored for at least 10 half-lives and surveyed with a low-level thin window GM detector to make sure the activity is indistinguishable from background before disposal. All radiation precaution labels will be removed before disposal into the normal trash.

4. **Radiation Safety Program - Overall**

a. A low-level thin window GM detector will be used for all radiation surveys;

b. A radiation survey shall be performed on the bone mineral analyzer for each new source that is placed in the machine. The results of the survey shall be documented;

c. A radiation survey shall be performed in the storage area each time an additional source is placed in the storage area for long-term storage. The results of these surveys shall be documented;

d. Leak tests and inventories will be performed as per the requirements of 10 CFR 35.14. Leak test analysis will be performed in-house using procedures whose minimum detectable activity satisfies the requirements set forth in 10 CFR 35.14 (e);

e. Exposures will be kept ALARA as per the license requirement and institution policy;

f. Records to be kept will include those of radiation surveys, receipt, transfer and/or disposal, leak tests, inventories, and personnel exposure;

g. An audit of the records required to demonstrate satisfaction of the requirements of this license will be made at least semi-annually;

h. All personnel working with the bone mineral analyzers will wear personnel monitors.

5. Emergency Procedure

a. The low energy gamma and x-rays emitted from the I-125 sources are completely absorbed by the brass source holder.

If for any reason the source is dropped when the cap is off, pick up the source by the end opposite the threaded end, being careful not to point the hole from the source window towards you. Pick up the brass source holder cap in your other hand and screw it on the source holder. This will totally shield any radiation coming from the source.

In Case of Emergency, contact:

RADIATION SAFETY OFFICER: Richard Wasnich, M.D.
OFFICE PHONE: 536-2236
BEEPER: 533-3877 X5462

RADIATION SAFETY CONSULTANT: Don Tolbert, Ph.D.
OFFICE PHONE: 536-2774
HOME PHONE: 947-7457
BEEPER: 525-9086 (After beep, enter number to be called then "#")

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6. **Duties and Responsibilities of the Authorized User**

   a. Receipt of sources and logging in the source receipt log.

   b. Storage of sources received in the radioactive materials storage area.

   c. Source replacement in the bone mineral analyzers.

   d. Packaging of sources for shipping and delivering to a carrier for shipment to the manufacturer.

   e. Leak testing of sources in use over six months.

7. **Duties and Responsibility of the Radiation Safety Officer**

   a. Assuring that materials possessed conform to the materials listed on the license.

   b. Assuring that use of the device is only by individuals authorized by the license.

   c. Assuring that all users wear personnel monitoring equipment when required.

   d. Assuring that the sources are properly secured against unauthorized removal at all times when not in use.

   e. Serving as a point of contact to give assistance in case of an emergency, and assuring that proper authorities are notified in case of any emergency.

   f. Assuring that the terms and conditions of the license are met and that required records are periodically reviewed for compliance with NRC regulations and license conditions.

8. **Additional Radiation Safety Precautions for Mobile Unit**

   a. The bone mineral analyzer unit may on occasion be placed on a cart and transported to other locations within the Kuakini Medical Center grounds;

   b. The unit will not be left unattended;

   c. The exposure levels on the unrestricted outside surface of the unit will be maintained in accordance with the requirements of 10 CFR 20.105 (b) when moving to locations outside the Osteoporosis Center.

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PROCEDURES FOR THERAPEUTIC USE OF RADIOPHARMACEUTICALS

The following are procedures which must be followed for handling patients containing therapeutic amounts of unsealed radioactive materials in excess of 8 mCi. The procedures shall apply until the body burden has been reduced to less than 8 mCi, at which point no further precautions are required.

1. The patient's room must be posted with (1) a "Caution Radioactive Materials" sign containing the magenta or purple radiation propeller symbol on a yellow backing.

2. A survey of the patient's room and surrounding areas will be conducted as soon as practicable after administration of the treatment dose. Exposure rates will be measured at the patient's bedside after administration and at the entrance to the room. The Radiation Safety Officer or his designate will then determine how long a person may remain at these positions and will post these "stay times" in the Chart Form in the patient's chart. The maximum exposure rate at 3 feet from the midline of the patient will be measured after administration of the dose. The stay time for this exposure rate will also be posted on the Chart Form. Several measurements at 3 feet from the midline of the patient will be made in order to determine when the activity will reach 30 mCi.

3. The Chart Form will be completed immediately after administration of the treatment dose and placed in the front of the patient's chart.

4. Radiation levels in unrestricted areas (areas adjoining the patient's room where radioactive materials are not present) will be determined and maintained in compliance with 10 CFR 20.105(b).

5. All linens, disposables and non-disposables will be checked for contamination by the Radiation Safety Officer or his designate before they leave the room. Materials whose activity show exposure levels greater background will be placed in a properly labeled storage area until exposure levels are indistinguishable from background levels as determined with a low-level thin window G-M survey instrument.

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6. Patients may be released from the hospital with greater than 8 mCi but less than 30 mCi of activity, if the instructions enclosed are given to the patient. These instructions shall be given by the Radiation Safety Officer or his designate. A time period of two weeks will be specified on the last page of the enclosed pamphlet entitled "Guidelines for Patients Receiving Radioiodine Treatment."

7. The Radiation Safety Officer or his designate shall be consulted before surgery is performed on a patient with therapeutic levels of radionuclides. He shall also be consulted before an autopsy is performed on a deceased patient with therapeutic levels of radionuclides.

8. Hospital staff who will render care to patients containing therapeutic levels of radionuclides will be furnished copies of Hospital Staff Instructions for Handling Patients with Therapeutic Doses of Radiopharmaceuticals.

9. The Chart Form will be removed from the patient's chart following the final survey and become the Radiation Safety Officer's record.

HOSPITAL STAFF INSTRUCTIONS FOR HANDLING PATIENTS WITH THERAPEUTIC LEVELS OF IODINE-131

Introduction:

The following procedures refer to patients who have received therapeutic doses of non-sealed radioactive sources. These doses are usually administered in liquid form, either by injection or orally. The radioactive material will remain in the patient until it either decays or is excreted (e.g. urine, perspiration, etc.).

Specific Procedures:

1. Place the I-131 patients in private rooms with a toilet. The bed should be placed near an outside wall to maximize the distance to other patients.

2. Nurses should spend only that amount of time near the patient required for ordinary nursing care. Special restrictions may be noted on the patient's Chart Form. Nurses should read these instructions before administering to the patients. Call the physician in charge or the Radiation Safety Officer with questions concerning patient care.

3. "Stay times" at various distances from the patient will be posted in the Chart Form. These stay time restrictions should be observed. Custodial, utility, maintenance, and food service personnel should not enter the room until they have first checked at the nursing station.

4. Nurses attending patients will be provided with personnel monitoring (badges, pocket dosimeters, etc.).

5. Unless forbidden by the physician (see Chart Form), the patient may receive visitors who are over the age of 18 and not pregnant. Patients must remain in bed while visitors are present and the visitors must stay at least 6 feet away from the patient. Under these conditions, the visitor may stay with the patient up to two hours per day unless otherwise specified in the patient's chart.

6. Patients are to be confined to their room except for special medical or nursing procedures approved by the physician in charge.

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7. No nurse, visitor, or attendant who is pregnant should be permitted in the room of a patient who has received a therapeutic amount of radioactivity until the patient no longer presents a radiation hazard. Female visitors should be asked if they are pregnant.

8. Attending personnel must wear rubber or disposable plastic gloves when handling urinals, bedpans, emesis basins or other containers having any material obtained from the body of the patient. Wash gloves before removing and then wash hands. The gloves must be left in the patient's room in the designated waste container. These gloves need not be sterile or surgical in type.

9. If the patient's clinical condition requires constant observation, rotate personnel required to perform adequate nursing care in order to minimize personnel exposure. The patient's bed should be approached only when required by nursing duties.

10. Disposable items should be used where possible. In particular, disposable plates, cups, and eating utensils must be used by patients treated with I-131. After use, these items should be placed in a designated waste container. The Radiation Safety Officer, or his designate, should be contacted for proper disposal.

11. All clothes and bed linens used by the patient should be placed in a laundry bag provided and should be left in the patient's room to be checked by the Radiation Safety Officer or his designate before the items are allowed to leave the room.

12. Non-disposable items (e.g. books, magazines, etc.) may be provided for the patient, but these should be left in the room until the Radiation Safety Officer or his designate has determined them to be free of contamination.

13. Surgical dressings should be changed only as directed by the physician. Such dressings should not be discarded, but should be collected in plastic bags and turned over to the Radiation Safety Officer or his designate. Handle these dressings only with tongs or tweezers. Wear disposable gloves.

14. Necessary contamination control measures are:

(a) The patient must wear hospital pajamas;

(b) Ambulatory patients will use the commode in their room, flushing at least three times after use;

(c) All patients will use the commode in the sitting position;

(d) Items used for patient care (e.g. thermometer, bedpan, etc.) will be kept in the patient's room;

(e) Diagnostic samples of blood, urine, and feces should be obtained only when authorized by the physician in charge;

(f) Urine and vomitus can be radioactive. In case of any accident involving spillage of urine or a patient who vomits, notify the Radiation Safety Officer or his designate. Wear gloves to clean up the spill and place clean-up rags in the designated container.

15. If a nurse, attendant, or anyone else knows or suspects that his skin, or clothing, including shoes is contaminated, notify the Radiation Safety Officer. This person should remain in the patient's room and not walk about the hospital.

16. If the patient dies, notify the physician who administered the radionuclide. The body must not be removed from the room until the physician advises on appropriate measures.

17. The room will not be returned to general use until a radiation safety survey of the room and it's contents have been done.

CAUTION RADIOACTIVE PATIENT

The following is a Chart Form for patients containing therapeutic levels of Iodine-131. Instructions for hospital staff involved in the care of this patient are on file at the nursing station. All exposure rates are in mR/hr.

Patient: _____ Room: _____ Dose (mCi): ____

Physician: _____ Date & Time of Admin.: _____

Max. Exp. Rate in Adjacent Room: _____ Init.: _____

Exposure Rate & Stay Times* (in minutes)

Date/Time	Bedside	3 Feet	Room Entrance
_____	_____	_____	_____
_____	_____	_____	_____

Date/Time at which 30 mCi is achieved:

Special Instructions: Nurses must wear personnel monitoring, i.e. badges or pocket dosimeters; Dietary items should be disposable; All linen and trash must be kept in the room in plastic bags until surveyed by the Radiation Safety staff; No pregnant or below 18 years of age visitor; A visitor should stay at least six feet from the patient; A visitor should not stay for longer than two hours per day; and, A final survey is required before another patient is admitted to the room.

Additional instructions: _____

Final Survey Results: _____ Date: _____ Init.: _____

EMERGENCY INFORMATION

Radiation Safety Officer: Don Tolbert, Ph.D. (or designate)
Office Phone: 536-2774
Home Phone: 947-7457
Beeper: 525-9086 (After beep, enter number to be called, then "#")

Attending Physician: _____
Office Phone: _____
Beeper: _____

* A "stay time" is the time per 8-hour shift to acquire an average daily permissible exposure.

Item 19-6
Date: _____

INSTRUCTIONS TO HOSPITAL STAFF FOR PATIENTS CONTAINING THERAPEUTIC AMOUNTS OF P-32

1. The Patient is not required to be in a private room.

2. Portable radiation shields are not required.

3. A CAUTION RADIATION AREA sign may or may not be required. This determination will be made by the Radiation Safety staff.

4. Radioactive material (P-32) will not appear in the urine. Urine does not, therefore, emit radiation.

5. The only possibility for contamination is at the instillation site. An initial survey will determine the extent of the potential for this but in any case, plastic gloves must be worn when changing bandages. Gloves and bandages **must** be placed in a plastic bag. The bag **must** remain in the room until a radiation survey shows that radiation levels are indistinguishable from background.

6. Other trash and linen need not be saved for radiation survey.

7. Personnel monitoring (picket dosimeters, badges, etc.) is not required.

8. A Chart Form will be completed immediately after administration of the treatment dose and placed in the front of the patient's chart.

9. The Radiation Safety Officer or his designate shall be consulted before surgery is performed on a patient with therapeutic levels of P-32. The RSO shall also be consulted before an autopsy is performed on a deceased patient with therapeutic levels of radionuclides.

10. In the case of an emergency or questions, call:

Radiation Safety Officer: Don Tolbert, Ph.D. (or designee)
Office Phone: 536-2774
Home Phone: 947-7457
Beeper: 525-9086 (After beep, enter number to be called, then "#")

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CAUTION RADIOACTIVE PATIENT

The following is a Chart Form for patients containing therapeutic levels of Phosphorus-32. Instructions for hospital staff involved in the care of this patient are on file at the nursing station. All exposure rates are in mR/hr.

Patient: _____ Room: _____ Dose (mCi): _____

Physician: _____ Date & Time of Admin.: _____

Max. Exp. Rate in Adjacent Room: _____ Init.: _____

Exposure Rate & Stay Times* (in minutes)

Date/Time	Bedside	3 Feet	Room Entrance
_____	_____	_____	_____
_____	_____	_____	_____

Special Instructions: Nurses need not wear personnel monitoring, i.e. badges or pocket dosimeters; Portable shields are not required; CAUTION RADIATION AREA signs may or may not be necessary (the results of the initial survey will determine this); Plastic gloves must be worn during bandage changes; Keep gloves and bandages in the room in plastic bags until surveyed by the Radiation Safety staff; Other trash and linen need not be saved for survey; No restrictions on visitors; and, A final survey is required before another patient is admitted to the room.

Additional instructions: _____

Final Survey Results: _____ Date: _____ Init.: _____

EMERGENCY INFORMATION

Radiation Safety Officer: Don Tolbert, Ph.D. (or designate)
Office Phone: 536-2774
Home Phone: 947-7457
Beeper: 525-9086 (After beep, enter number to be called, then "#")

Attending Physician: _____
Office Phone: _____
Beeper: _____

* A "stay time" is the time per 8-hour shift to acquire an average daily permissible exposure.

Item 19-8
Date: _____

Guidelines for Patients Receiving Radioiodine Treatment

This pamphlet is for you—the patient—who will be treated with radioiodine, a radioactive form of iodine. It includes special instructions for you to follow when you go home after your treatment.

Why will you receive radioiodine treatment?

You will receive radioiodine because you and your doctor have agreed that it is the most appropriate treatment for your thyroid condition. Most of the radiation from the radioiodine will be absorbed by your thyroid gland and will interfere with the function of the thyroid cells. This is the desired and beneficial medical effect of the treatment. However, some of the radiation will leave your body, and individuals who are in close physical contact with you may be exposed to small amounts. There is no evidence that such exposure has ever caused any harm. Nevertheless, efforts should always be made to avoid unnecessary exposure to radiation.

Ask your doctor

The best source of additional information on your treatment is your doctor. This pamphlet lists some guidelines for you to follow for a short time immediately after your treatment (usually no more than 2 to 5 days, depending on your treatment and your doctor's instructions). You may decide, or your personal situation may require, that you will want to follow all or only some of the suggested guidelines. Remember, these are only suggestions to help you make more informed decisions as

This pamphlet was prepared by David V. Becker, M.D. and Barry A. Siegel, M.D. of the Publications Committee of The Society of Nuclear Medicine, Inc. in cooperation with Deborah A. Bozik, Health Physicist, and Carol A. Peabody, Technical Writer, of the Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission.

you discuss your questions and concerns with your doctor.

You and your doctor should complete the checklist at the back of this pamphlet. It will explain what steps you can take in your situation to reduce radiation exposure to others from the radioiodine you receive.

How does radioiodine work?

The thyroid gland accumulates the iodine that enters the body in food and uses this iodine to perform its normal function, which is to make thyroid hormone. Radioiodine is similarly collected by the thyroid gland. The radiation given off by this form of iodine decreases the function of the thyroid cells and inhibits their ability to grow. This is the desired medical effect and the reason you will be given this medication. Radioiodine treatment is a common, well accepted form of treatment that has been used all over the world for more than 30 years.

Most of the radiation from the radioiodine will be received by your thyroid gland. However, the other tissues in your body will receive some incidental radiation. This small amount of radiation has **not** been shown to produce any adverse effect.

How long does the radioiodine stay in your body?

The radioiodine from your treatment will remain in your body only temporarily. Most of the radioiodine not collected by your thyroid gland will be eliminated during the first 2 days after your treatment. Radioiodine leaves your body primarily in your urine, but very small amounts may leave in your saliva, sweat, and feces. The amount of radioiodine remaining in your thyroid tissue is responsible for the desired medical effect. However, this amount also decreases rapidly. This means that the possibility of radiation exposure to you and others is reduced with time. At the end of treatment, no radioiodine remains in your body.

How can others be exposed to radiation from the radioiodine given to you?

Exposure to radiation from the radioiodine in your body may occur if other people remain very close to you for long periods of time. The radiation received is very simil to the radiation from medical and dental X-rays, which a the most common and familiar sources of external radiat exposure.

Contamination with radioiodine can occur if it is deposited in any place where other people may have contact with it. For instance, if some of the radioiodine in your saliva gets on the bathroom sink as you brush your teeth and then on to someone's hands, contamination ha occurred. If this radioiodine is then taken into someone's body from the hands or from food that has been touched it will cause a small amount of radiation exposure to that person.

Radioiodine disappears by itself as part of the physica processes that make it radioactive. For example, it will no remain on the sink indefinitely because its quantity is reduced by one-half every 8 days. This is what is meant when it is said that the "half-life" of radioiodine is 8 days.

How can you reduce radiation exposure to others?

The amount of radioiodine in your body during the treatment is small. Although there is no evidence that the radiation from this amount of radioiodine will cause any problem, it makes sense to take steps to minimize exposure, no matter how small. If you take some simple precautions during the first few days after your treatment (as explained below), you can reduce or eliminate the possibility of radiation exposure to others.

There are three **basic principles** to remember:

1. **Distance**—the greater the distance you are from others, the less radiation they will receive. Even an increase in distance of a few feet will greatly reduce the exposure. So try not to remain in close contact with others for longer than is necessary.

2. **Time**—radiation exposure to others depends on *how long* you remain close to them. You should try to minimize the time spent in close contact with others.

3. **Hygiene**—good hygiene minimizes the possibility that other people will be contaminated with the radioiodine that leaves your body. Since most of the radioiodine leaves your body in your urine, good toilet hygiene and careful and thorough washing of your hands will reduce the possibility of contamination.

Important guidelines to help you apply these basic principles:

Your doctor can best recommend which guidelines are important for you and how long you should follow them. Do not hesitate to ask your doctor for more information.

- *Sleep alone for the first few days* after your treatment. During this period avoid kissing or sexual intercourse. Also avoid prolonged physical contact, particularly with children and pregnant women; the thyroid glands of children and fetuses are more sensitive to the effects of radioiodine than those of adults.

- *If you have a baby*, or you are taking care of one, your doctor can best instruct you on how to follow the guidelines. You probably can do all the things necessary to care for your baby. However, it is preferable not to have the baby too close, such as sitting in your lap, for more than a short time during the first 2 days after treatment.

- *If you have been breast feeding* your baby, you **must** stop because radioiodine is secreted in breast milk. Discuss with your doctor when you can resume breast feeding.

- *If you are pregnant*, or think you could be, tell your doctor because radioiodine treatment should not be given during pregnancy. Also, if your are planning to become pregnant, ask your doctor how long you should wait after treatment.

- *Wash your hands* with soap and plenty of water each time after you go to the toilet.

- *Keep the toilet especially clean*. Flush it 2 or 3 times after each use.

- *Rinse the bathroom sink and tub* thoroughly after you use them. Clean bathroom practices will reduce the chances of others becoming contaminated from the radioiodine in your saliva and sweat.

- *Drink plenty of liquids* such as water or juices. This will make you urinate more frequently and help the radioiodine to leave your body more rapidly, thus lowering the amount in your body.

- *Use separate (or disposable) eating utensils* for the first few days and wash them separately. This will reduce the chance of contaminating other family members with the radioiodine in your saliva.

- *Use separate towels and washcloths*. Launder your bath towels, bed linens, and underclothing separately.

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Important—Note that these guidelines are only carried out for the **first few days** after treatment. Your doctor will give you specific details as to how long you should follow these precautions.

A checklist for you and your doctor

Ask your doctor to help you decide which guidelines are most important for you and how long you should follow them.

	How long?
☐ Try to keep the time you spend in close contact with others to a minimum.	_____
☐ Try particularly to minimize time spent with pregnant women and young children.	_____
☐ Sleep alone, if possible.	_____
☐ Discuss how long you should wait before becoming pregnant after your treatment.	_____
☐ If you are breast feeding, ask when it may be resumed.	_____
☐ Use good hygiene habits. Wash your hands thoroughly after each toilet use.	_____
☐ Drink plenty of liquids.	_____
☐ Use separate bath linens (and launder these and underclothing separately).	_____
☐ Use separate (or disposable) eating utensils.	_____

PROCEDURES FOR ADMINISTERING I-131 DOSES

1. Personnel administering therapeutic doses of I-131 should wear their personnel dosimeters, including ring dosimeters, with detector towards the palm of the hand.

2. Never handle a therapeutic dose of I-131 directly with the hands. use forceps or other remote handling devices. Whenever possible, keep the dose in a shielded container.

3. Always wear disposable gloves and a lab coat or other protective clothing when administering a therapeutic dose. After the administration is complete, dispose of the gloves as waste and monitor hands and clothing for contamination.

4. Liquid doses of I-131 may release vapors to the atmosphere when they are opened. Whenever opening a liquid dose, do so in the fume hood with a face velocity of at least 0.5 m/sec so that vapors will be drawn away from you. Capsules do not release vapors and do not need to be handled in this manner unless they are crushed.

5. The number of personnel present in an area where administration of a therapeutic dose of I-131 is performed should be minimized. All personnel present where administration of a greater than 1.0 mCi of liquid I-131 must have bioassays performed of their burden before and after the administration.

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BIOASSAY FOR I-131

1. Bioassay for I-131 will be required for all personnel who handle unsealed sources of more than 10 mCi of I-131 in a fume hood, or more than 1 mCi of I-131 on an open bench. In addition, all personnel who are within 6 feet of operations involving more than the above mentioned quantities shall also participate in bioassays.

2. Bioassays shall be performed at the following frequencies:

   a. Prior to employment or beginning work with I-131 to establish a baseline level and annually thereafter to reconfirm the baseline levels.

   b. Between 24 and 72 hours after exposure to I-131 in the quantities mentioned above.

   c. Within 2 weeks after the last possible exposure to I-131 when the employee is terminating activities involving I-131.

3. Bioassays shall consist of a determination of the individual's thyroid burden. The equipment used for this determination shall have a minimum detectable activity of 0.01 uCi of I-131, as determined with a standard thyroid phantom.

4. If the measure thyroid burden exceeds 0.04 uCi I-131, the following action shall be taken:

   a. An investigation of the operations involved, including air and other inplant surveys, shall be carried out to determine the causes of exposure and evaluate the potential for further exposures.

   b. The bioassay must be repeated within two weeks.

   c. If continued work in the area might cause the limits for air concentration in 10 CFR 20 to be exceeded, the worker will be restricted from such work.

   d. Actions shall be taken to reduce the potential for further exposures.

   e. Any reports of exposure required by 10 CFR 20 will be furnished to the employee.

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5. If the measured thyroid burden exceeds 0.14 uCi I-131, the following actions shall be taken in addition to the steps outlined in 4 above:

   a. Refer the employee to appropriate medical/health physics consultation.

   b. Determine thyroid burden at one-week intervals until the thyroid burden is less than 0.04 uCi I-131. If there is a possibility of other organs of the body containing I-131 that require evaluation, make measurements to determine the level of exposure to the other organs.

NOTE: Exposure to I-125 to volatile form in quantities greater than the levels given for I-131 would also require bioassay for I-125. However, the quantity of I-125 normally handled in a laboratory working with commercially supplied RIA kits is less than 100 uCi. In addition, the I-125 in these kits is normally bound to a non-volatile agent and does not disperse as readily.

I-131 in capsules are considered sealed sources unless the capsules are crushed or broken; consequently, no bioassays are required for personnel administering less than 100 mCi in a capsule.

THERAPEUTIC USE OF SEALED SOURCES

1. Sealed sources are stored in the Cobalt Teletherapy Treatment Room (See Figure 1). Entry to the Cobalt Room is restricted as per 10 CFR 20.207.

2. The sources will be stored on a shielded work station which is designed for maximum protection and ease of handling. The work station is illustrated in Figure 2.

3. Sealed sources will be stored in lead containers that are at least 2.5 cm thick so that radiation levels will be less than 2 mR/hr at the edges of the steel table in the work station. The walls of the room are made of concrete several inches thick and are designed as primary and secondary barriers for a Cobalt-60 teletherapy unit containing approximately 6000 curies of Cobalt-60. Radiation levels in unrestricted areas on the other sides of these barriers will not exceed levels such that an individual continuously present in these areas would not receive more than 2 millirem in any one hour or more than 100 millirem in any seven consecutive days.

4. The storage room shall be kept locked when not physically attended by authorized users of the teletherapy unit or authorized users of sealed sources.

5. The teletherapy room door is interlocked in such a way that no one would be permitted to enter while the Cobalt-60 source was exposed.

6. The storage room is posted in accordance with 10 CFR 20.203 and the source containers are labeled according to 10 CFR 20.203 (f).

7. Attached is the form used to maintain running inventories of Iridium sealed sources. (The Group VI limit is 500 mCi). The columns are self-explanatory.

   Quarterly inventories will be performed in compliance with 10 CFR 35.14.

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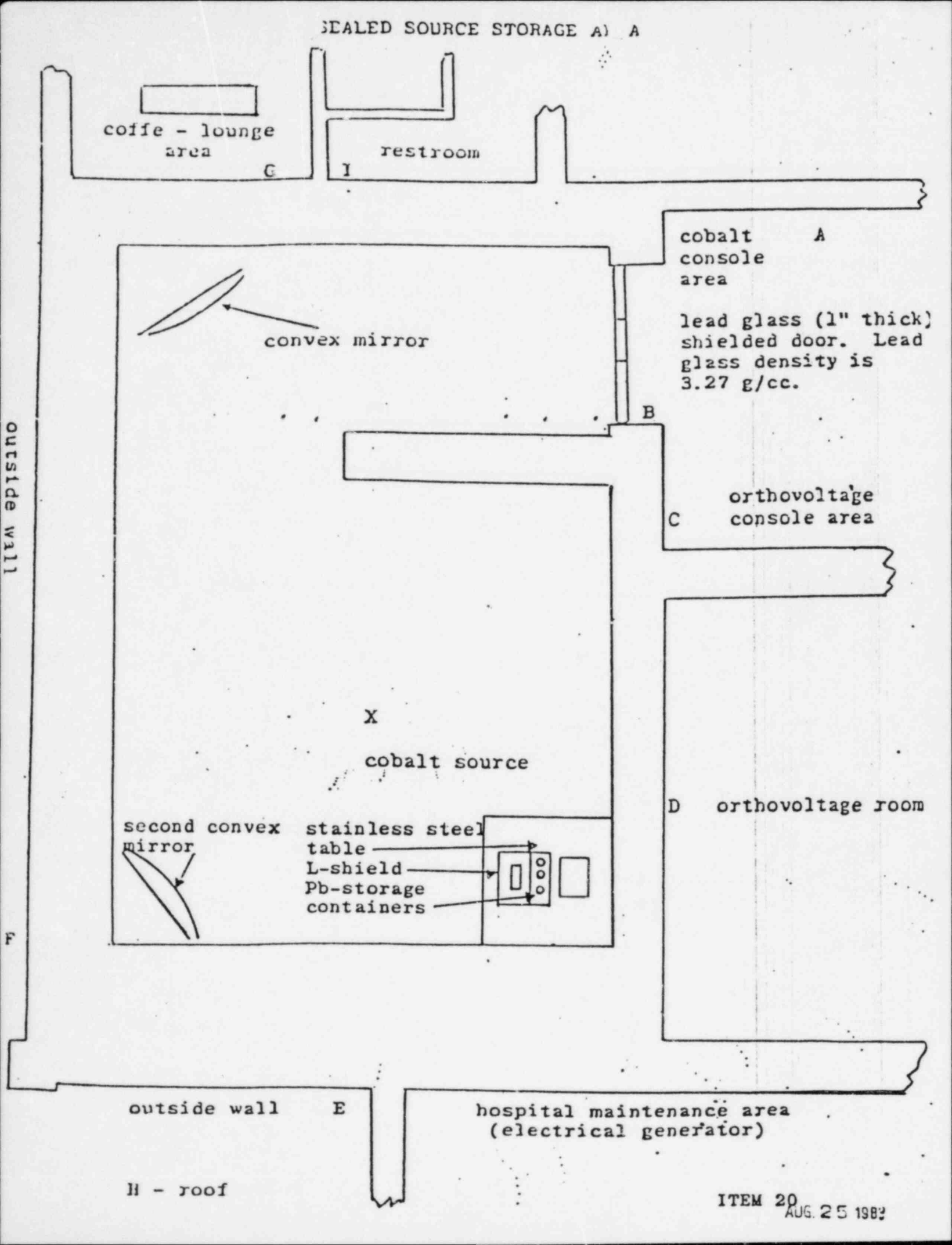

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PROCEDURES FOR THERAPEUTIC USE OF SEALED SOURCES

The following are procedures which must be followed for handling brachytherapy patients containing sealed sources.

1. The patient's room must be posted with a "Caution Radioactive Materials" sign containing the magenta or purple radiation propeller symbol on a yellow backing.

2. A survey of the patient's room and surrounding areas will be conducted as soon as practicable after administration of the treatment dose. Exposure rates will be measured at the patient's bedside, at 3 feet from the beside, and at the entrance to the room following source implantation. The Radiation Safety Officer or his designate will then determine how long attending staff may remain at these positions and will post these "stay times" in the Chart Form in the patient's chart.

3. The Chart Form will be completed immediately after implantation of the sources and placed first in the patient's chart.

4. Radiation levels in unrestricted areas (areas adjoining the patient's room where radioactive materials are not present) will be measured and maintained in compliance with 10 CFR 20.105(b).

5. At the conclusion of treatment, a survey will be performed in accordance with paragraph 35.14(b)(5)(vii) of 10 CFR Part 35 to ensure that all sources other than permanent implants have been removed from the patient and that no sources remain in the patient's room or in any other area occupied by the patient. At the same time, all radiation signs will be removed.

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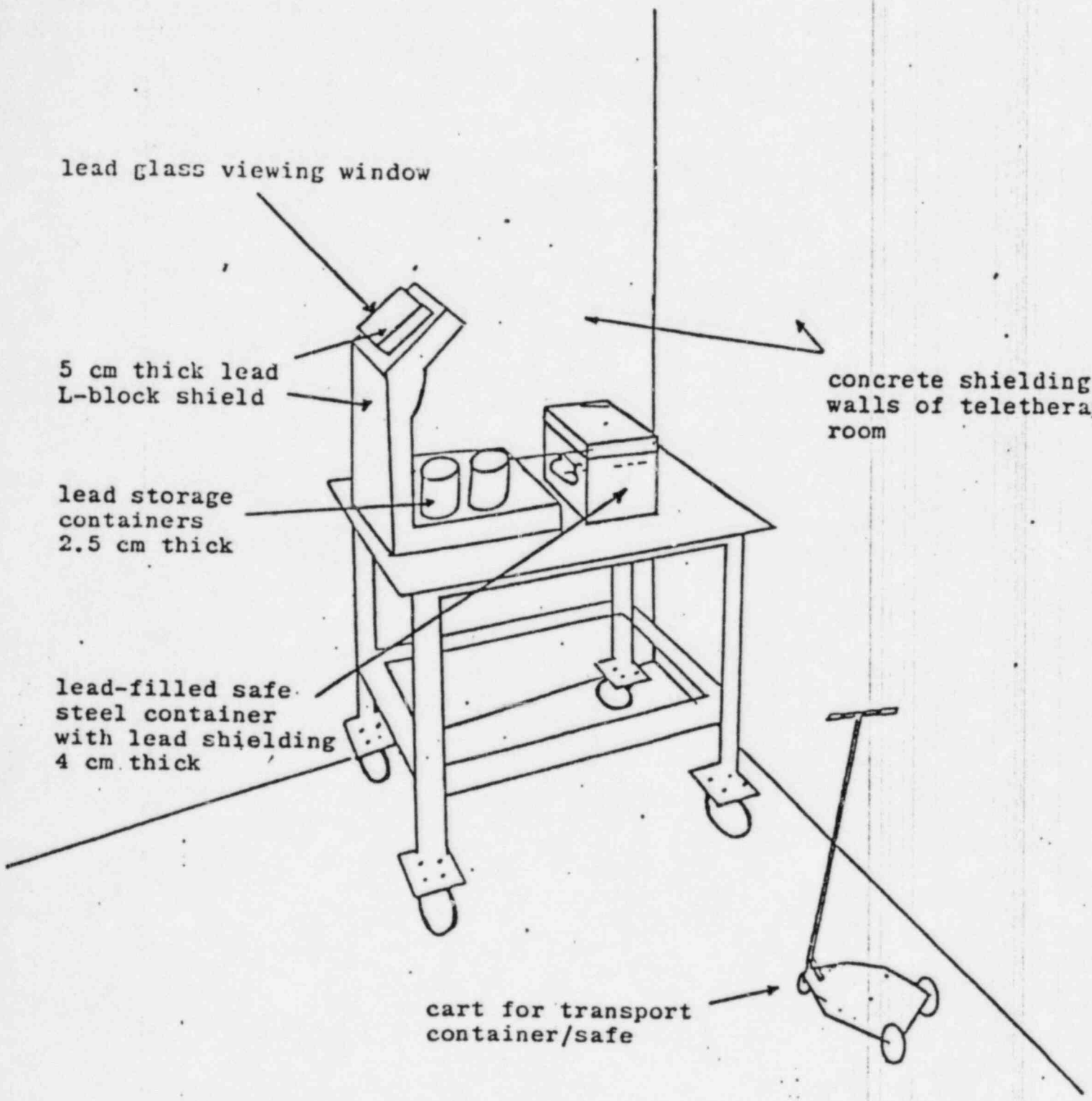
FIGURE 2

DETAIL OF SHIELDED WORK STATION



ITEM 20

HOSPITAL STAFF INSTRUCTIONS FOR HANDLING PATIENTS WITH THERAPEUTIC LEVELS OF SEALED SOURCES

Introduction:

The following procedures refer to patients who contain sealed radioactive sources. These sources may be administered via intracavitary (e.g. cervix) or interstitial (e.g. needles in floor of the mouth carcinoma) applications. The radioactive material is inside sealed capsules, in the patient, and will remain there until the physician removes it. The use of sealed sources is referred to as a brachytherapy procedure. As the radioactive material is sealed inside the source capsules, surface contamination is not a problem.

Specific Procedures:

1. Place the brachytherapy patients in private rooms with a toilet. The bed should be placed near an outside wall to maximize the distance to other patients.

2. Nurses should spend only that amount of time near the patient required for ordinary nursing care. Special restrictions may be noted on the patient's Chart Form. Nurses should read these instructions before administering to the patients. Call the physician in charge or the Radiation Safety Officer (or designate) with questions concerning patient care.

3. "Stay times" at various distances from the patient will be posted in the Chart Form. These stay time restrictions should be observed. Custodial, utility, maintenance, and food service personnel should not enter the room until they have first checked at the nursing station.

4. Nurses, attending patients will be equipped with personnel monitoring (badges, pocket dosimeters, etc.).

5. Unless forbidden by the physician (see Chart Form), the patient may receive visitors who are over the age of 18 and not pregnant. Patients must remain in bed while visitors are present and the visitors must stay at least 6 feet from the patient. Under these conditions, the visitor may stay with the patient up to two hours per day.

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6. Patients are to be confined to their room except for special medical or nursing procedures approved by the physician in charge.

7. No nurse, visitor, minor or attendant who is pregnant should be permitted in the room of a brachytherapy patient until the patient no longer presents a radiation hazard. Female visitors should be asked if they are pregnant.

8. Never touch needles, capsules, or containers holding brachytherapy sources. If a source becomes dislodged, use long forceps and put it in the corner of the room or in the shielded container provided; contact the physician in charge of the brachytherapy treatment and the Radiation Safety Officer at once.

9. If the patient's clinical condition requires constant observation, rotate personnel required to perform adequate nursing care in order to minimize personnel exposure. The patient's bed should be approached only when required by nursing duties.

10. Bed baths given by the nurse should be omitted while the sources are in place.

11. All clothes and bed linens used by the patient must be placed in a laundry bag provided and must be left in the patient's room to be checked by the Radiation Safety Officer (or designate) before the items or the patient is allowed to leave the room.

12. All trash must be placed in a plastic bag provided and must be left in the patient's room to be checked by the Radiation Safety Officer (or designate) before the patient is allowed to leave the room.

13. Perineal care is not given during gynecologic treatment; the perineal pad may be changed when necessary unless orders to the contrary have been written.

14. Surgical dressings and bandages used to cover the area of needle insertion may be changed only by the attending physician or radiologist and MAY NOT BE DISCARDED until directed by the radiologist. Dressings should be kept in a basin until checked by the Radiation Safety Officer or his designate.

15. Special orders will be written for oral hygiene for patients with oral implants.

Date:_____

16. These patients must stay in bed unless orders to the contrary are written. In any event, patients will remain in their assigned rooms during the treatment period.

17. Emergency Procedures

(1) If an implanted source becomes loose or separated from the patient, or

(2) If the patient dies, or

(3) If the patient requires emergency surgery, immediately call: **Don Tolbert, Ph.D.**

Telephone No. (days): 536-2774
(nights): 947-7457
(Beeper): 525-9086 (After beep, enter number to be called, then "#")

CAUTION RADIOACTIVE PATIENT

The following is a Chart Form for patients containing therapeutic levels of Ir-192. Instructions for hospital staff involved in the care of this patient are on file at the nursing station. All exposure rates are in mR/hr.

Patient: _____ Room: _____ Activity: _____

Physician: _____ Date & Time of Admin.: _____

Max. Exp. Rate in Adjacent Room: _____ Init.: _____

Exposure Rate & Stay Times* (in minutes)

Date/Time	Bedside	3 Feet	Room Entrance
_____	_____	_____	_____
_____	_____	_____	_____

Special Instructions: Nurses must wear personnel monitoring, i.e. badges or pocket dosimeters; All linen and trash must be kept in the room in plastic bags until surveyed by the Radiation Safety staff; No pregnant or below 18 years of age visitor; A visitor should stay at least six feet from the patient; A visitor should not stay for longer than two hours per day. After sources are removed, the patient (and room) must be surveyed and all sources accounted for before patient may be discharged.

Additional instructions: _____

Final Survey Results: _____ Date: _____ Init.: _____

EMERGENCY INFORMATION

Radiation Safety Officer: Don Tolbert, Ph.D. (or designate)
Office Phone: 536-2774
Home Phone: 947-7457
Beeper: 525-9086 (After beep, enter the number to be called, then "#")

Attending Physician: _____
Office Phone: _____
Beeper: _____

* A "stay time" is the time per 8-hour shift to acquire an average daily permissible exposure.

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INSTRUCTIONS FOR HANDLING SEALED SOURCES

1. Make sure your ring badge is on.

2. Make sure Cobalt Room is not occupied.

3. Plan ahead all steps, making sure that the sources are exposed without shielding for the least possible time.

4. Sources should be handled with the long-handled forceps. Avoid applying excessive pressure to the sources as this may result in damage and hence leaking. When threading needles or tubes, use the tool which protects the fingers by distance the most.

5. As much as possible, keep the L-block protective barrier between you and the source.

6. All steps possible in the preparation and assembly of an applicator should be carried out before the insertion of the source.

POST IN COBALT ROOM

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KUAKINI MEDICAL CENTER - RADIATION THERAPY DEPARTMENT

SHIPMENT CODE:_____ RECEIVED ON:_____ BY:_____

RIBBONS:_____ TOTAL SEEDS:_____ TOTAL ACTIVITY:_____ mgRaeq

POSSESSION ON RECEIPT (LIMIT = 290):_____ mgRaeq

RETURNED ON:_____ BY:_____

DATE	PATIENT/ROOM	NUMBER OF SEEDS				STAFF	PHYSICIAN	COMMENTS
		TOTAL	OUT	IN	REMAINING			

Item : 20-8
Date:_____