TIPTON COUNTY MEMORIAL HOSPITAL

1000 South Main Street

TIPTON, INDIANA 46072

PHONE 317-675-8500

March 2, 1979

John E. Bowyer
Regional Licensing Section
License Management Branch
Division of Fuel Cycle and Material Safety
Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Bowyer:

The following additional information is provided in support of our application for renewal of license number 13-01719-02, as requested in your letter of December 11, 1978 (Control No. 01025):

1. Iodine-131 has been and will be obtained in capsule form whenever possible, including quantities necessary for the treatment of hyperthyroidism. In the event that a cancer therapy (Group V) quantity is required, the Iodine-131 will be obtained from Squibb (their NaI is provided with a neutral pH, thus minimizing volatilization). Gloves will be worn when handling the bottle and the thyroids' of all potentially exposed personnel will be checked with our thyroid uptake system at approximately 24 hours after exposure.

2. In the event that a therapy procedure involves sufficient activity to require hospitalization of the patient, the procedures outlined in Appendix K of the Medical Licensing Guide will be followed except that urine from Iodine-131 patients will not be collected for storage. These procedures will be infrequent (none in last five years) and the handling and storage of the contaminated urine would present more of a hazard than allowing the urine to be diluted in the hospital waste water. For information purposes, I am enclosing a copy of a form that will be placed on the patients door that summarizes the special instructions to nurses. I am also enclosing special precautions for handling bodies containing radionuclides.

3. Please delete our request for Xenon-133 from our renewal application. This request will be resubmitted as an amendment in the near future.

4. There are no physicians specializing in hematology on the staff of Tipton Hospital. However, Dr. Clarence Cobb, already a member of the Medical Isotopes Committee, is a Pathologist with extensive training in hematology.

I hope this is sufficient information to answer your questions.

Sincerely,

TIPTON COUNTY MEMORIAL HOSPITAL

James C. Talley

James C. Talley, Administrator

JCT/bc

Enclosures: 2

RADIATION SAFETY REPORT FOR PATIENTS
WHO HAVE RECEIVED THERAPEUTIC (> 30 mCi) AMOUNTS OF RADIOIODINE

PATIENT'S NAME _____ ROOM NO. _____ RADIONUCLIDE _____

TOTAL ACTIVITY ADMINISTERED _____ DATE AND TIME ADMINISTERED _____

EXPOSURE RATE @ ONE METER:

Date	Time	Exposure Rate
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

RECOMMENDED NURSING ATTENDANCE TIMES:

Date	Within 2 feet	Within 6 feet

SPECIAL NURSING INSTRUCTIONS:

1. The patient must be confined to this room.
2. Hospital personnel entering the room must wear a radiation monitoring device (film badge or pocket dosimeter) and gloves.
3. Pregnant nurses are not to be assigned to this patient.
4. There are to be no visitors for the first 24 hours.
5. There are to be no visitors who are pregnant or under 18 years of age. Other visitors are limited to 30 minutes per day and must stay at least 6 feet from the patient.
6. The patient is to use disposable eating utensils.
7. Linen should be placed in a plastic bag and kept in the patient's bathroom or at the foot of the bed. Gloves and other disposable items should be placed in a separate plastic bag. Do not remove these bags from the room until they are checked by the Radiation Safety Officer.
8. Flush toilet (or rinse bedpan) several times after each use.
9. In the event of an emergency (vomiting, accidental spillage, etc.), contact the Radiation Safety Officer immediately. Cleanup should be performed only under the supervision of the Radiation Safety Officer.
10. Contact Radiation Safety Officer as soon as patient is discharged. Before this room is reassigned to another patient, it must be surveyed for contamination and decontaminated, if necessary.

13.0 HANDLING OF BODIES CONTAINING RADIONUCLIDES [a]

13.1 General

1. The identification of a particular patient as radioactive is the responsibility of the physician in charge of the case. The radioactive patient shall be properly identified at all times.

2. Although the situation will be encountered only rarely, deceased patients containing large amounts of radionuclides administered shortly before death may present a radiation hazard to the pathologist and the undertaker. Upon the death of a radioactive patient in a hospital, the physician who pronounces him dead should attach a radioactivity precautions tag (Fig. 1) to the body and shall notify the physician in charge of the case and the Radiation Safety Officer. An autopsy on such a body should not be carried out until the Radiation Protection Officer has been consulted. If no autopsy is to be conducted a radioactivity precautions tag (Fig. 1) should be affixed to the death certificate and the body may be released to the funeral director with the approval of the Radiation Safety Officer.

3. If an autopsy is to be performed on a patient that died outside the hospital, the same recommendations should be observed as would apply for a patient who dies in a hospital.

4. In general no appreciable hazard exists unless the body is to be opened. Since most radionuclides used therapeutically are strong beta as well as gamma emitters, the opening of a body may constitute a hazard to the skin and eyes of the surgeon or pathologist due to beta absorption. Use of material interposed between the source of the beta radiation and the operator will reduce the beta dose.

5. Table 1 lists typical dose reductions for the hands due to the use of gloves as a protective measure. Table 2 lists the approximate time that the hands may remain in the peritoneal cavity before receiving 1.5 rem, the average permissible weekly dose. It is further recommended that goggles or safety glasses be worn to shield the eyes. Table 3 provides a criteria for consideration before autopsy or surgery.

[a] Excerpted from NCRP Report No. 37, Precautions in the Management of Patients who have received Therapeutic Amounts of Radionuclides, Oct., 1970.

TABLE 1[a]

Radiation dose to hand in peritoneal cavity

Radionuclide	No Gloves	Single Surgical Gloves	Double Autopsy Gloves
	rem/m Ci-h	rem/m Ci-h	rem/m Ci-h
Au-198[b]	0.7	0.4	0.1
P-32 or Y-90[c]	0.8	0.6	0.3

[a] Reprinted from NCRP Report No. 37, Precautions in the Mangement of Patients who have received Therapeutic Amounts of Radionuclides, Oct., 1970.

[b] The Au-198 values include a factor for the gamma rays.

[c] The same values are given for P-32 and for Y-90. These values would also be applicable for any other beta-ray emitter whose radiation energies are 1.5 MeV or greater. For beta radiation of lower energy the dose rate will be markedly less, especially when gloves are used.

TABLE 2[a]

Approximate time for hands in peritoneal cavity to receive 1.5 rem[b]

Total Activity on Surface	Au^{198}		Y^{90} or P^{32}	
	Single Surgical Gloves	Double Autopsy Gloves	Single Surgical Gloves	Double Autopsy Gloves
mc	min.	min.	min.	min.
10	21	64	17	32
20	11	32	8	16
30	7	21	6	11
40	5	16	4	8
50	4	13	3	6
60	4	11	3	5
70	3	9	2	5
80	3	8	2	4
90	2	7	2	4
100	2	6	2	3

[a] Taken from NCRP Report No. 37, Oct. 1, 1970.

[b] For occupationally exposed personnel, 25 rems is permissible if the procedure is not expected to occur oftener than once in any 13 consecutive weeks, and no other exposure is to be received in this period. The time for 25 rems is approximately 15 times that listed in the table.

TABLE 3[b]

PROBABLE RADIOACTIVE CONTENT OF BODY AT VARIOUS TIMES

AFTER ADMINISTRATION OF VARIOUS ACTIVITIES

(A guide for consideration before autopsy or surgery. For values below the horizontal lines the wearing of surgical gloves is the only mandatory precaution. For values above the lines consultation with the Radiation Safety Officer is indicated).

Radionuclide	Activity Administered mCi	Days Elapsed Since Administration													
		1	2	5	10	15	20	40	60	100	150	200	250	300	350
		mCi remaining in injected cavity or tissue—no elimination													
Gold-198 or Yttrium-90	100	77	60	28	8	2									
	75	58	45	22	6	1									
	50	39	30	15	4	1									
	25	19	15	8	2	1									
		mCi remaining in cavity or tissue—no elimination													
Phosphorus-32	40	38	36	32	24	20	16	8	4						
	20	19	18	16	12	10	8	4	2						
	10	10	9	8	6	5	4	2	1						
		mCi remaining in implant													
Chromium-51	100	98	95	88	78	69	61	37	23	8	2				
	75	74	72	66	59	53	45	27	18	6	2				
	50	49	48	41	39	35	30	18	12	4	1				
	25	25	24	22	20	18	15	9	6	2	1				
		mCi remaining in implant													
Iodine-125	100	99	98	94	91	84	80	61	50	31	18	10			
	75	75	73	70	67	63	60	48	37	24	14	7			
	50	50	49	47	45	42	40	32	25	16	9	5			
	25	25	24	23	22	21	20	16	12	8	5	2			
		mCi remaining in functioning thyroid tissue or metastasis assuming 50% uptake and 6 day effective half-life													
Iodine-131	100	45	39	29	16	9	5	2							
	75	34	30	22	12	6	4	1							
	50	23	20	15	8	4	2	1							
	25	11	10	8	4	2	1	1							
		mCi remaining in implant													
Radon	60	50	42	24	10	6	2								
	40	33	28	16	8	4	1								
	20	16	14	8	4	2									
	10	8	7	4	2	1									
		mCi remaining in implant													
Iridium-192*	60	60	60	58	55	52	50	45	34	25	16	9	6	4	2
	40	40	40	38	36	35	34	28	23	16	10	6	4	3	2
	20	20	20	19	18	17	16	14	12	8	5	3	2	2	1
	10	10	10	9	9	9	8	7	6	5	3	2	1		
		mCi remaining in implant													
Tantalum-182*	40	40	40	38	37	36	35	31	28	22	16	12	9	7	5
	20	20	20	19	18	18	17	16	14	11	8	6	4	3	2
	10	10	10	9	9	9	8	8	7	5	4	3	2	2	1

b Taken from NCRP Report No. 37.

13.2 Surgery and Autopsy Precautions

The main precautions required for bodies containing large doses of radionuclides in the case of surgery or autopsy are listed below.

1. General Precautions

a) Surgical or heavier rubber gloves must be worn to prevent contamination of skin and nails with material difficult to remove.

b) If the combined beta and gamma dose rate is high enough to deliver more than the occupational permissible dose to the hands or whole body the work should be shared by two or more individuals working in relay.

c) Tissues and organs removed should be handled with long-handled forceps and scissors. Specimens should be refrigerated or fixed in closed containers and suitably labelled including the date at which they may be safely handled.

2. Intracavitary Au-198

a) Autopsy:

1. As much cavity fluid as possible should be removed by suction before the body is opened. This material is to be collected in a jar or trap, and can either be stored or washed down the drain according to the instructions of the Radiation Safety Officer. When the cavity is opened, the remaining fluid should be soaked up in sponges and deposited in a waste container for disposal by the Radiation Safety Officer.

2. The body and viscera should be monitored by the Radiation Safety Officer and treated in accordance with the findings.

3. Small tissue specimens should be placed in shielded vessels and labelled with the following information:

Date

Name and Hospital Number of Patient

Radionuclide and Radiation Level (or activity) at stated date

Date when radiation level will be below permissible level for disposal or handling without precautions (for Au-198 this will be approximately 3 weeks)

b) Emergency Surgery

1. An experienced surgeon should perform the operation since speed is essential.

2. Glasses or goggles should be worn by the surgeon and his assistants for eye protection from beta radiation and from possible splashing of contaminated foreign material.

3. The hands should not remain in the peritoneal cavity in excess of that listed in Table 2.

3. I-131, Orally or Intravenously Administered

a) Autopsy

1. When a large dose of I-131 has been administered the autopsy procedure should be based on the recommendations of the Radiation Safety Officer as a result of appropriate step-by-step monitoring.

2. Urine should be drained away and blood disposed of properly.

b) Surgery

1. Precautions are essentially the same as for autopsy. The first day after administration the blood will probably contain considerable radioactivity and care should be taken to avoid accumulation on gloves or gowns.

2. Tissue specimens stored for appropriately 2 months can be considered non-radioactive.

4. P-32 Intracavitary

The same precautions for intracavitary Au-198 apply to intracavitary P-32 in both the case of autopsy and surgery. However the half-life of P-32 (14.3 days) is much longer than that of Au-198 and approximately 4 months must elapse before the activity will have fallen to less than 0.4% of the initial value. It is highly desirable, therefore, to remove small specimens for study. These specimens should be monitored by the Radiation Safety Officer who will describe limits in working time and special handling techniques.

13.3 Preparation for Burial or Cremation Without Autopsy

1. Embalming will be by the injection method.

2. Rubber gloves shall be worn by all involved in the procedures.

3. Tag affixed to the death certificate should be consulted prior to any manipulations of the body.

4. Since in intracavitary therapy ascitic or pleural fluid may contain significant radioactive material, the embalming should be carried out in the hospital autopsy room under the direction of the Radiation Safety Officer. Fluid should be removed by means of a trocar and tubing. The fluid is to be disposed of according to the recommendation of the Radiation Safety Officer. There should be no appreciable activity in the urine or blood, and these may be disposed of without special precautions.

5. During the first 24 hours after administration of I-131, the blood and urine may contain considerable radioactivity. These fluids should be removed into closed systems and may later be flushed into the sewer.

6. Prior to cremation any radioactive implants shall be removed. (This removal is to be done under the supervision of the Radiation Safety Officer.)

7. Each crematorium should keep records of the type and amount of radioactivity in all bodies received containing radionuclides.

FIG. 1[a]

RADIOACTIVITY REPORT

Report on Radioactivity to Funeral Director from Radiation Safety Officer or Delegate.

( ) This body does not contain significant amounts of radioactive materials. No special precautions are required if standard embalming procedures are employed.

( ) This body contains a significant amount of radioactive material. The following precautions are to be observed.

_____

_____

_____

_____

_____

Radiation Safety Officer or Delegate

_____

Date

a Taken from NCRP Report No. 37.