302 Kensington
Flint, Michigan 48502

Phone 313-762-8000

St. Joseph Hospital

U.S.N.R.C.
REGION III.
MATERIALS LICENSING SECTION
799 ROOSEVELT RD.
GLEN ELLYN, ILLINOIS 60137

'88 APR -1 P2:59

RECEIVED
'87 DEC 21 A9:25

DEAR SIRS:

IN AN ATTEMPT TO UPDATE OUR PROCEDURES AND IMPROVE DOCUMENTATION WE SUBMIT TO YOU THE ENCLOSED MATERIAL AS AN AMENDMENT TO OUR LICENSE # 21-01103-04. (THE MATERIAL ENCLOSED IMPACTS ON THE AREAS DESCRIBED IN THE OUTLINE ON THE NEXT PAGE.) IF YOU HAVE ANY QUESTIONS OR REQUIRE CLARIFICATION OF ANY OF THE ABOVE STATED INFORMATION PLEASE CONTACT:

JAMES SPICKA, PHYSICIST RSO
ST JOSEPH HOSPITAL
302 KENSINGTON
FLINT, MI 48502

ENCLOSED IS A CHECK FOR $120.00 TO COVER THE COST OF AMENDMENT.

SINCERELY,

Young S. Suh

YOUNG SUH
PRESIDENT

Dec - 21 - III
22402
$120
Amd
12/21/87
12/22/87
Region

RECEIVED
DEC 14 1987
REGION III

CONTROL NO 84584

8903070118 880324
REG3 LIC30
21-01103-04 PNU

DEC 14 1987

* LEAK TESTS
* NURSING INSTRUCTIONS FOR BRACHYTHERAPY PATIENTS
* PERSONNEL MONITORING IN NUCLEAR MEDICINE
* WASTE DISPOSAL IN NUCLEAR MEDICINE
* BRACHYTHERAPY ACCOUNTABILIY AND SURVEY RECORDS
* INSTRUCTIONS TO HOUSKEEPING PERSONNEL
* LOG OF INDIVIDUALS HANDLING BRACHYTHERAPY SOURCES
* SURVEY METER ACCOUNTABILITY RECORDS
* RADIOACTIVE SOURCE INVENTORY RECORDS
* SURVEY METER CALIBRATION
* DOSE CALIBRATOR PROCEDURES
* ALARA PROGRAM

LEAK TESTS

LEAK TESTS -- ATOMIC PRODUCTS MULITCHANNEL ANALYSER
OPERATIONAL OUTLINE WITH COMPARITIVE VALUES
AND MACHINE SPECIFIC DATA

DATE_____

* SET SELECTOR SWITCH ON BACK OF UNIT TO WELL COUNTER
* CALIBRATE THE WELL WITH A CESIUM STANDARD (.09 MICROCURIES)
PEAK THE WELL AT CHANNEL 150
* MOVE FROM CALIBRATE TO COUNT CESIUM
OPEN THE WINDOW FROM CHANNEL 20 TO MAXIMUM
CHECK BGD APPROX. = 1050 CTS/MIN
CHECK CTS FOR .09 MICROCURIE CESIUM (APPROX 52,000 GROSS CTS/MIN)
* NET COUNTS/MIN PER NANOCURIE APPROXIMATELY = 550
* 5 NANOCURIES YIELDS APPROX. (2,800 + 1000) = 3,800 GROSS CTS/MIN
* MINIMUM DETECTABLE ACTIVITY IS DEFINED AS THAT ACTIVITY WHICH IS EQUAL TO TO A NET COUNT RATE 3 STANDARD DEVIATIONS ABOVE BGD. FOR A ONE MINUTE COUNT THIS IS APPROXIMATELY 100 NET CTS/MIN OR THE EQUIVALENT OF 0.2 NANOCURIES
* MEASURED COUNTING EFFICIENCY FOR CS-137 = 20 %.
* MEASURED COUNTING EFFICIENCY FOR I-131 = 33 %
* 2,000 DPM YIELDS A NET COUNT RATE WITH CS-137 OF 400 CTS/MIN. FOUR TIMES HIGHER THAN THE MINIMUM DETECTABLE ACTIVITIES NET COUNT RATE OF 100 COUNTS/MIN.

1. RECORD GROSS COUNTS FOR 1 MINUTE BGD WITH OPEN WINDOW

(1050) _____=A

2. RECORD GROSS COUNTS FOR OPEN WINDOW AND 1 MINUTE FOR .09 MICROCURIE SOURCE

(52000) _____=B

3. CALCULATE GROSS COUNTS NECESSARY TO SHOW LEAKAGE OF 5 NANOCURIES IN A 1 MINUTE COUNT.

C = A + 5((B - A)/90) = _____

_____

PHYSICIST

SAMPLE LABEL	GROSS COUNTS	NO LEAK GROSS CTS < C	LEAK GROSS CTS > C

NURSING INSTRUCTIONS FOR BRACHYTHERAPY PATIENTS

NURSING INSTRUCTIONS FOR PATIENTS RECEIVING

CS-137 IMPLANTS

GENERAL DESCRIPTION

1. RADIOACTIVE CESIUM IS ENCAPSULATED IN SOLID STAINLESS STEEL TUBES. EACH TUBE IS 2 CM LONG AND 2 MM IN DIAMETER AND HAS A SERIES OF NUMBERS ENGRAVED IN ITS SIDE.
2. THE CESIUM TUBES ARE PLACED IN HOLDERS AND EACH HOLDER IS PLACED IN AN APPLICATOR INSIDE THE PATIENT. A VARIETY OF APPLICATORS AND HOLDERS ARE USED WHICH MAY BE STAINLESS STEEL OR PLASTIC.
3. APPLICATORS ARE PLACED IN THE PATIENT IN SURGERY OR RADIATION THERAPY. , AFTER THE PATIENT HAS RETURNED TO THEIR ROOM APPROPRIATE SOURCES ARE SELECTED AND LOADED INTO HOLDERS. THESE HOLDERS ARE THEN TRANSPORTED TO THE PATIENTS ROOM AND THE SOURCES ARE INSERTED INTO THE PATIENT BY THE PHYSICIAN.
4. IN GENERAL ONLY A SMALL PORTION OF THE APPLICATOR IS VISIBLE HOLDING THE SOURCES DEEP INSIDE THE PATIENT. THERE SHOULD BE NO LOOSE OR UNSECURED PARTS OF THE APPLICATOR IN THE BED.
5. RADIOACTIVE CESIUM EMITS VERY HIGH ENERGY RADIATION. ORDINARY MATERIALS (CLOTHING, BLANKETS, DOORS AND EVEN WALLS) AFFORD LITTLE IF ANY PROTECTION FROM THE RADIATION.
6. REDUCING PERSONNEL RADIATION EXPOSURE IS BEST ACCOMPLISHED BY:
   A. LIMITING THE TIME SPENT IN THE ROOM (BY TRYING TO PROVIDE ADEQUATE CARE IN THE MINIMUM TIME POSSIBLE)
   B. REMAINING BEHIND THE INCH THICK LEAD (ABSORBS 90 %) BEDSIDE SHIELD WHENEVER POSSIBLE
   C. INCREASING THE DISTANCE WHEN POSSIBLE BETWEEN YOURSELF AND THE PATIENT (DOUBLING THE DISTANCE REDUCES EXPOSURE 75 %)
   D. ROTATING PERSONNEL DAILY IN EVERY SHIFT

RADIATION PRECAUTIONS

1. A PRIVATE ROOM IS REQUIRED AND THE PATIENT MUST REMAIN IN BED AS LONG AS THE APPLICATORS ARE IN PLACE.
2. A BEDSIDE SHIELD WILL BE PROVIDED WHENEVER POSSIBLE. WHILE ATTENDING THE PATIENT ATTEMPT TO STAND BEHIND THE SHIELD AS MUCH AS YOU CAN.
3. PERSONNEL SHOULD AVOID SPENDING UNNECESSARY TIME IN CLOSE PROXIMITY TO THE PATIENT. UNLESS OTHERWISE NOTED THE MAXIMUM TIME ALLOWED IN THE ROOM IS 45 MINUTES PER SHIFT.
4. PREGNANT PERSONNEL OR THOSE UNDER THE AGE OF 18 YEARS ARE TO BE EXCLUDED FROM THE PATIENTS ROOM.
5. IN RARE CIRCUMSTANCES RADIOACTIVE APPLICATORS, HOLDERS OR SOURCES MAY BECOME DISLODGED. DO NOT REPLACE THEM. CONTACT THE ATTENDING PHYSICIAN OR THE RADIATION SAFETY OFFICER IMMEDIATELY.
6. HOSPITAL ANCILLARY STAFF AND HOUSEKEEPING STAFF SHOULD NOT NORMALLY ENTER THE ROOM DURING THE IMPLANT.
7. VISITORS 45 YEARS ARE RESTRICTED TO 30 MINUTES PER DAY.
8. VISITORS OVER 45 MAY HAVE UNLIMITED VISITATION PRIVILEGES.
9. NO PREGNANT VISITORS OR VISITORS UNDER 18 YEARS ARE ALLOWED.
10. IN THE UNLIKELY EVENT THE PATIENT SUFFERS A MEDICAL EMERGENCY OR DIES CONTACT THE RADIATION SAFETY OFFICER IMMEDIATELY.

PERSONNEL MONITORING IN NUCLEAR MEDICINE

NUCLEAR MEDICINE TECHNOLOGISTS AND PHYSICIANS
PERSONNEL RADIATION EXPOSURE MONITORING

WE WOULD LIKE TO ESTABLISH THE POLICY OF PROVIDING EACH NUCLEAR MEDICINE TECHNOLOGIST AND PHYSICIAN ONE RING BADGE AND ONE FILM BADGE FOR THE PURPOSE OF MONITORING THEIR INDIVIDUAL RADIATION EXPOSURE.

WASTE DISPOSAL IN NUCLEAR MEDICINE

OVERALL RADIOACTIVE WASTE POLICY

RADIOACTIVE MATERIALS WITH HALF LIVES LESS THAN 65 DAYS

1. WE WILL HOLD MATERIALS FOR DECAY A MINIMUM OF TEN HALF LIVES.

2. WE WILL MONITOR MATERIAL AT THE CONTAINER SURFACE BEFORE DISPOSAL AS TRASH. WE WILL NOT DISPOSE OF ANYTHING THAT REGISTERS A READING ABOVE BACKGROUND AS MEASURED AT THE SURFACE WITH THE METER AT ITS MOST SENSITIVE SCALE WITH NO INTERPOSED SHIELDING.

3. WE WILL REMOVE OR OBLITERATE ALL RADIATION LABELS.

4. ALL GENERATORS WILL BE RETURNED TO THE MANUFACTURER OR EACH GENERATOR COLUMN WILL BE MONITORED INDIVIDUALLY WITH ALL SHIELDING REMOVED.

5. EACH TIME RADIOACTIVE MATERIAL IS PLACED IN STORAGE FOR DEACY OR REMOVED FROM STORAGE FOR DIPOSAL THE FOLLOWING INFORMATION WILL BE RECORDED.

   A. PLACED IN STORAGE
      1. DATE
      2. RADIONUCLIDES INCLUDED
      3. INITIALS OF INDIVIDUAL
   B. MATERIAL DISPOSED OF AS TRASH
      1. DATE
      2. SURVEY METER
      3. BACKGROUND READING ON LOWEST SCALE
      4. SURFACE READING (SAME SCALE)
      5. SIGNATURE OF INDIVIDUAL

6. ALL DISPOSAL RECORDS WILL BE RETAINED FOR TWO YEARS.

OVERALL RADIOACTIVE WASTE POLICY

RADIOACTIVE MATERIALS WITH HALF LIVES LESS THAN 65 DAYS

1. WE WILL HOLD MATERIALS FOR DECAY A MINIMUM OF TEN HALF LIVES.

2. WE WILL MONITOR MATERIAL AT THE CONTAINER SURFACE BEFORE DISPOSAL AS TRASH. WE WILL NOT DISPOSE OF ANYTHING THAT REGISTERS A READING ABOVE BACKGROUND AS MEASURED AT THE SURFACE WITH THE METER AT ITS MOST SENSITIVE SCALE WITH NO INTERPOSED SHIELDING.

3. WE WILL REMOVE OR OBLITERATE ALL RADIATION LABELS.

4. ALL GENERATORS WILL BE RETURNED TO THE MANUFACTURER OR EACH GENERATOR COLUMN WILL BE MONITORED INDIVIDUALLY WITH ALL SHIELDING REMOVED.

5. EACH TIME RADIOACTIVE MATERIAL IS PLACED IN STORAGE FOR DEACY OR REMOVED FROM STORAGE FOR DIPOSAL THE FOLLOWING INFORMATION WILL BE RECORDED.

   A. PLACED IN STORAGE
      1. DATE
      2. RADIONUCLIDES INCLUDED
      3. INITIALS OF INDIVIDUAL
   B. MATERIAL DISPOSED OF AS TRASH
      1. DATE
      2. SURVEY METER
      3. BACKGROUND READING ON LOWEST SCALE
      4. SURFACE READING (SAME SCALE)
      5. SIGNATURE OF INDIVIDUAL

6. ALL DISPOSAL RECORDS WILL BE RETAINED FOR TWO YEARS.

RADIOACTIVE WASTE OVERVIEW OF

DEPARTMENT PROCEDURES

RADIOACTIVE WASTES HANDLED AT ST. JOSEPH HOSPITAL ARE DIVIDED INTO FOUR CATAGORIES

A. TECHNETIUM GENERATORS
B. SHORT LIVED WASTE CONSISTING OF:
   1. TC-99M -- 6 HR.
   2. I-123 --- 1 DAY
C. MEDIUM LIVED WASTE CONSISTING OF:
   1. I-131 --- 8 DAYS
   2. GA-67 --- 3 DAYS
   3. IN-111 -- 3 DAYS
   4. XE-133 -- 5 DAYS
   5. TL-201 -- 3 DAYS
D. LONG LIVED WASTE CONSISTING OF:
   1. CR-51 -- 27 DAYS
   2. I-125 -- 60 DAYS

THE FOLLOWING WILL BE THE DISPOSITION PROCEDURE FOR THE ABOVE GROUPS:

A. TECHNETIUM GENERATORS -- ALL GENERATORS WILL BE RETURNED TO THE MANUFACTURER FOR DISPOSAL. RECORDS WILL BE KEPT OF THE DISPOSITION OF THE GENERATORS.

GROUPS B, C, & D WILL BE HELD FOR DECAY. EACH GROUP WILL BE HELD FOR DECAY FOR AT LEAST 10 HALF LIVES OF THE LONGEST LIVED ISOTOPE IN THE GROUP.

GROUP A (1 DAY TIMES 10) 10 DAYS
GROUP B (8 DAYS TIMES 10) 80 DAYS
GROUP C (60 DAYS TIMES 10) 600 DAYS

ALL ITEMS PLACED IN STORAGE FOR DECAY WILL BE DATED AND INDENTIFIED AS TO CONTENTS AND LOGGED INTO STORAGE RECORDING THE FOLLOWING ITEMS.

1. DATE
2. RADIONUCLIDES INCLUDED
3. INITIALS OF THE INDIVIDUAL PLACING THE ITEMS IN STORAGE

AT THE TIME OF DISPOSAL ALL ITEMS BEING DISPOSED OF WILL BE MONITORED WITH A SENSITIVE G.M. METER. ANY ITEMS SHOWING ACTIVITY ABOVE BACKGROUND WILL BE RETAINED. ALL WASTE SHOWING NO OBSERVABLE ACTIVITY WILL BE DISPOSED OF VIA INHOUSE INCENERATION. THE FOLLOWING ITEMS WILL BE RECORDED AT TIME OF DISPOSAL.

1. DATE
2. SURVEY METER USED
3. BACKGROUND READING
4. SURFACE READING
5. SIGNATURE OF INDIVIDUAL DISPOSING OF WASTE

BRACHYTHERAPY ACCOUNTABILITY INVENTORY
AND SURVEY RECORD

BRACHYTHERAPY INVENTORY

DATE REMOVED FROM SAFE	TIME REMOVED FROM SAFE	DATE RETURN TO SAFE	TIME RETURN TO SAFE	PATIENT NAME	PATIENT ROOM NUMBER	PATIENT BEDSIDE 1 M	PATIENT DOOR HALL	PATIENT ADJ. ROOM	SOURCES USED IN IMPLANT NUMB.	SOURCES USED IN IMPLANT ACTIVITY	SOURCES REMAINING 18 MG. (4)	SOURCES REMAINING 16 MG. (1)	SOURCES REMAINING 14 MG. (3)	SOURCES REMAINING 10 MG. (7)	SOURCES REMAINING 7 MG. (7)	SOURCES REMAINING 1 MG. (1)	TOTAL LEFT IN SAFE (23)	INITIALS SOURCE INVENTORY	SURVEYS INITIAL/FINAL I/F	SURVEYS INITIAL/FINAL DATE	SURVEYS INITIAL/FINAL TIME	SURVEYS INITIAL/FINAL METER	SURVEYS INITIAL/FINAL INIT.

INSTRUCTIONS TO HOUSKEEPING PERSONNEL

WORKING IN RADIATION ENVIRONMENTS

HOUSEKEEPING PERSONNEL

DESCRIPTION OF RADIATION HAZARDS AND SPECIAL
CLEANING REQUIREMENTS IN THE NUCLEAR MEDICINE DEPARTMENT

ROOM L632-A -- DESCRIPTION OF HAZARD

.ROOM L632-A HAS A RADIATION SIGN ON THE DOOR LABELED -- RADIOACTIVE MATERIALS-. IN THIS ROOM NUCLEAR MEDICINE TECHNOLOGISTS PREPARE AND STORE RADIOACTIVE MATERIALS USED IN DIAGNOSTIC TESTS AND THERAPEUTIC PROCEDURES. SMALL CONTAINERS OF RADIOACTIVE MATERIALS ARE STORED IN VARIOUS SHIELDED LOCATIONS IN THE ROOM. RADIATION LEVELS IN THIS ROOM ARE LOW AND PRESENT NO DANGER TO HOUSEKEEPING PERSONNEL.

ROOM L632-A -- CLEANING REQUIREMENTS

DO NOT DISCARD ANYTHING IN THIS ROOM UNLESS IT HAS BEEN PLACED IN THE WASTE BASKET. PLEASE RESTRICT CLEANING TO EMPTYING THE WASTE BASKET WIPING THE COUNTER, AND CLEANING THE SINK AND FLOOR.

ROOM L632 AND L619 -- DESCRIPTION OF HAZARD

THESE ARE ROOMS IN WHICH RADIOPHARMACEUTICALS ARE ADMINISTERED TO PATIENTS DURING NORMAL 7:30 TO 4:30 WORKING HOURS. THE QUANTITIES OF RADIOACTIVE MATERIAL USED ARE SMALL AND THE EXPOSURE TO HOUSEKEEPING STAFF WORKING IN THIS AREA DURING THIS TIME PERIOD WOULD BE VERY LOW. NO RADIOACTIVE MATERIALS ARE STORED IN THESE ROOMS. THERE WOULD BE NO EXPOSURE TO HOUSEKEEPING PERSONNEL IN THESE ROOMS AFTER NORMAL WORKING HOURS.

ROOM L632 AND L619 -- CLEANING REQUIREMENTS

BOTH THESE AREAS ARE HIGH TRAFFIC AREAS WITH HEAVY VISITOR USAGE AND SHOUD BE KEPT AS CLEAN AS POSSIBLE. THE ONLY SPECIAL CONCERN IS THAT HOUSKEEPING PERSONNEL NOT UNPLUG ANY OF THE EQUIPMENT. EQUIPMENT MAY BE MOVED WHENEVER NECESSARY BUT IF IT IS NECESSARY TO UNPLUG THE EQUIPMENT ONE OF THE NUCLEAR MEDICINE TECHNOLOGISTS SHOULD BE CONTACTED PRIOR TO UNPLUGGING SINCE IT MAY BE NECESSARY TO SCHEDULE TIME FOR UNIT RECALIBRATION BEFORE ITS NEXT USE.

ROOM L602 -- DESCRIPTION OF HAZARD

THIS ROOM IS USED AS A STORAGE AREA FOR VARIOUS RADIOACTIVE MATERIALS.

ROOM L602 -- CLEANING REQUIREMENTS

WE ASK THAT NO HOUSEKEEPING SEVICES BE PROVIDED IN THIS ROOM.

ROOM L621 -- DESCRIPTION OF HAZARD

THIS PHOTOGRAPHIC DARK ROOM CONTAINS NO RADIOACTIVE MATERIALS BUT DOES HAVE SPECIAL CLEANING REQUIREMENTS.

ROOM L621 -- CLEANING REQUIREMENTS

BECAUSE OF THE UNDEVELOPED X-RAY FILM STORED IN THIS ROOM WE ASK THAT HOUSEKEEPING PERSONNEL NEVER OPEN ANY CABINETS OR DRAWERS.

HOUSEKEEPING PERSONNEL

DESCRIPTION OF RADIATION HAZARDS IN
THE RADIATION ONCOLOGY CENTER

ROOM R035 -- DESCRIPTION OF HAZARD

ROOM R035 HAS A RADIATION SIGN ON THE DOOR LABELED -- RADIOACTIVE MATERIALS--. IN THIS ROOM WE STORE THE RADIOACTIVE SOURCES WE USE IN TREATING SOME SPECIALIZED TYPES OF CANCER. THE SOURCES ARE IN THE FORM OF SMALL METAL TUBES AND RODS. THE SOURCES ARE STORED IN TWO SMALL SAFES LOCATED IN THE ROOM. AS LONG AS THE SOURCES REMAIN IN THE SHIELDED SAFES THEY PRESENT NO HAZARD TO PERSONNEL.

ROOM R035 -- CLEANING REQUIREMENTS

WE REQUEST ONLY MINIMAL CLEANING IN THIS ROOM. THERE IS NO WASTE BASKET AND WE REQUEST YOU CONTACT DEPARTMENT PERSONNEL BEFORE DOING ANY DAMP MOPPING OR OTHER ACTIVITIES IN THE ROOM. THIS WILL ALLOW US TO DOUBLE CHECK THAT ALL SOURCES ARE SECURED BEFORE ANYTHING IN THE ROOM IS DISTURBED.

ROOMS R047, R049, R053 AND R056 DESCRIPTION OF HAZARD

THESE ROOMS ALL CONTAIN X-RAY EQUIPMENT USED IN RADIATION THERAPY. RADIATION IS PRODUCED ONLY WHEN THE X-RAY UNITS ARE OPERATED BY AN INDIVIDUAL IN THE ADJOINING CONTROL AREA. NORMAL OPERATIONAL HOURS ARE 8:00 AM TO 4:30 PM. WHEN A UNIT IS OFF THERE IS NO RADIATION OR RADIOACTIVITY IN THE ROOM..

R047, R049, R053 AND R056 CLEANING REQUIREMENTS

THESE ROOMS ARE ALL HIGH TRAFFIC AREAS WITH HEAVY VISITOR USAGE. THE ROOMS SHOULD BE KEPT AS CLEAN AS POSSIBLE. HOUSEKEEPING PERSONNEL SHOULD HAVE FREE ACCESS TO THESE ROOMS AFTER NORMAL OPERATIONAL HOURS. IF ACCESS IS NECESSARY FROM 8:00 TO 4:30 PERSONNEL SHOULD CHECK WITH THE OPERATORS TO MAKE SURE THE ROOM IS FREE AND THAT THE OPERATORS KNOW THAT THEY ARE IN THE ROOM.

LOG OF INDIVIDUALS HANDLING BRACHYTHERAPY SOURCES

NAMES OF INDIVIDUALS PERMITTED TO HANDLE
BRACHYTHERAPY SOURCES

NAME AND CERTIFICATIONS

J Sucha, Physicist
Dr. Oh, Radiotherapist
" "
Dr Kuan
L Beyer AART (RT)
L Potts ARRT (RT)
J Blight ARRT (NM)
J Carruthers ARRT (RT)
L Vaughn RN

DATE 8/26/87

J Sucha
R.S.O.

B7

SURVEY METER ACCOUTABILITY

RECORD

BRACHYTHERAPY ACCOUTABILITY INVENTORY

LIST OF CODES FOR SURVEY METERS

CODE	MANUFACTURER		SERIAL NUMBER
K	KEITHLEY		333 31
V	VICTOREEN	OUT OF SERVICE 9/1/87	68611
L	LUDLUM		959904/
B	BICRON		AIIBA

RADIOACTIVE SOURCE INVENTORY RECORDS

* PHYSICAL LOCATION DRAWINGS
* OVERALL INVENTORY PROCEDURE
* SAMPLE INVENTORY LOG
* SAMPLE AMBIENT LEVEL SURVEY

SOURCE PHYSICAL LOCATIONS

THE FOLLOWING DRAWINGS MAY BE USED TO IDENTIFY THE LOCATIONS PERTINENT TO RADIOACTIVE SOURCE STORAGE AT ST JOSEPH HOSPITAL.

DRAWING 1

SHOWN IN THIS DRAWING IS AN OVERALL VIEW OF THE HOSPITAL LOCATED AT 302 KENSINGTON IN FLINT, MICHIGAN. ALL RADIOACTIVE SOURCE STORAGE AREAS ARE LOCATED ON THE LOWER LEVEL OF THE HOSPITAL. THE LETTER A MARKS THE LOCATION OF THE NUCLEAR MEDICINE DEPARTMENT AND THE LETTER B MARKS THE LOCATION OF THE RADIATION THERAPY DEPARTMENT.

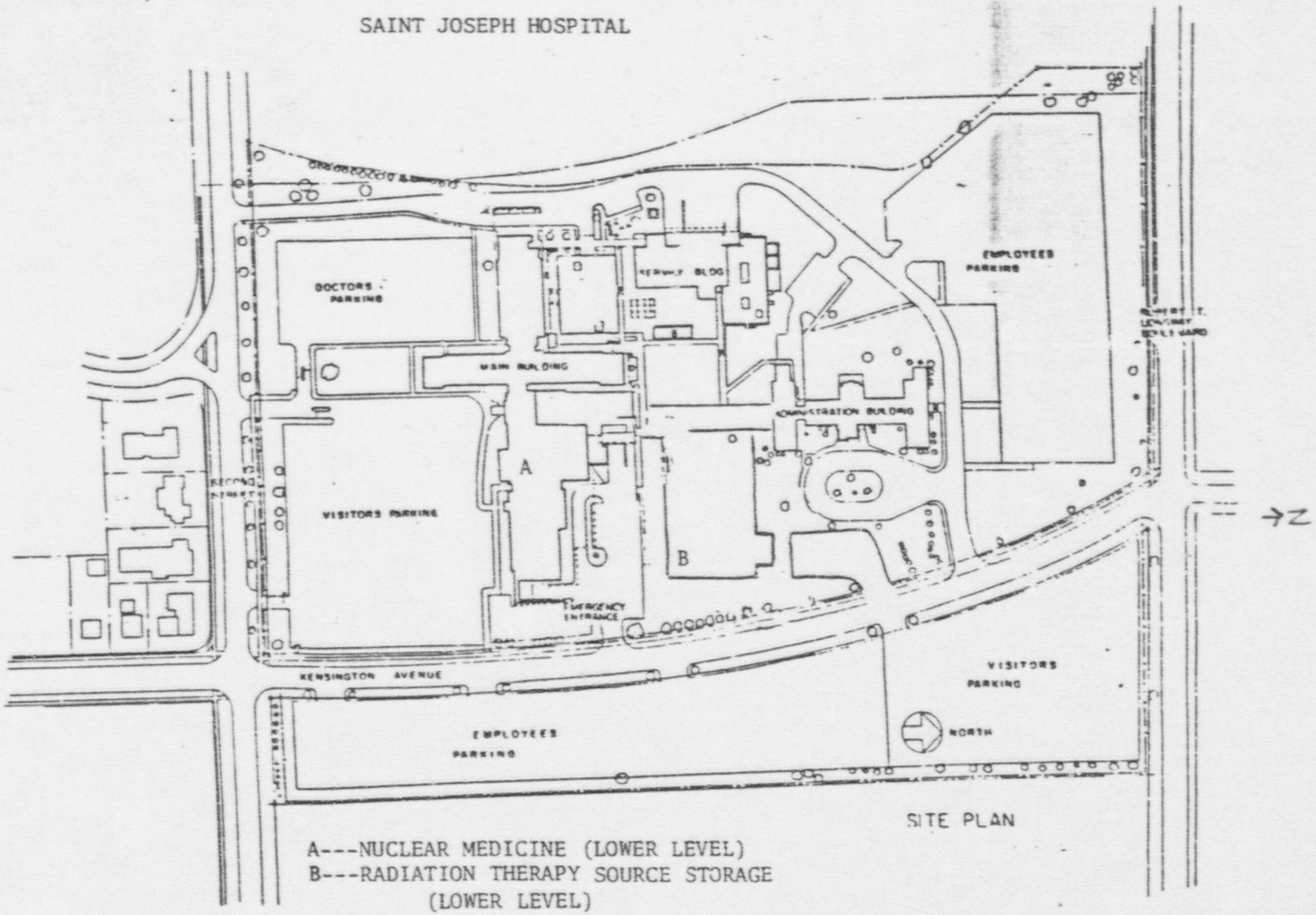
DRAWING 2

DRAWING 2 SHOWS THE FLOORPLAN OF THE NUCLEAR MEDICINE DEPARTMENT. RADIOACTIVE SOURCES CURRENTLY IN USE ARE STORED IN ROOM L-621 THE HOT LAB. RADIOACTIVE SOURCES BEING HELD FOR DECAY ARE BEING STORED IN ROOM L-602.

DRAWING 3

DRAWING 3 SHOWS THE FLOOR PLAN OF THE SOUTH EAST CORNER OF THE RADIATION THERAPY DEPT. RADIOACTIVE SOURCES ARE STORED IN RADIOACTIVE MATERIALS STORAGE ROOM R-035 IN THIS DEPARTMENT/

SAINT JOSEPH HOSPITAL



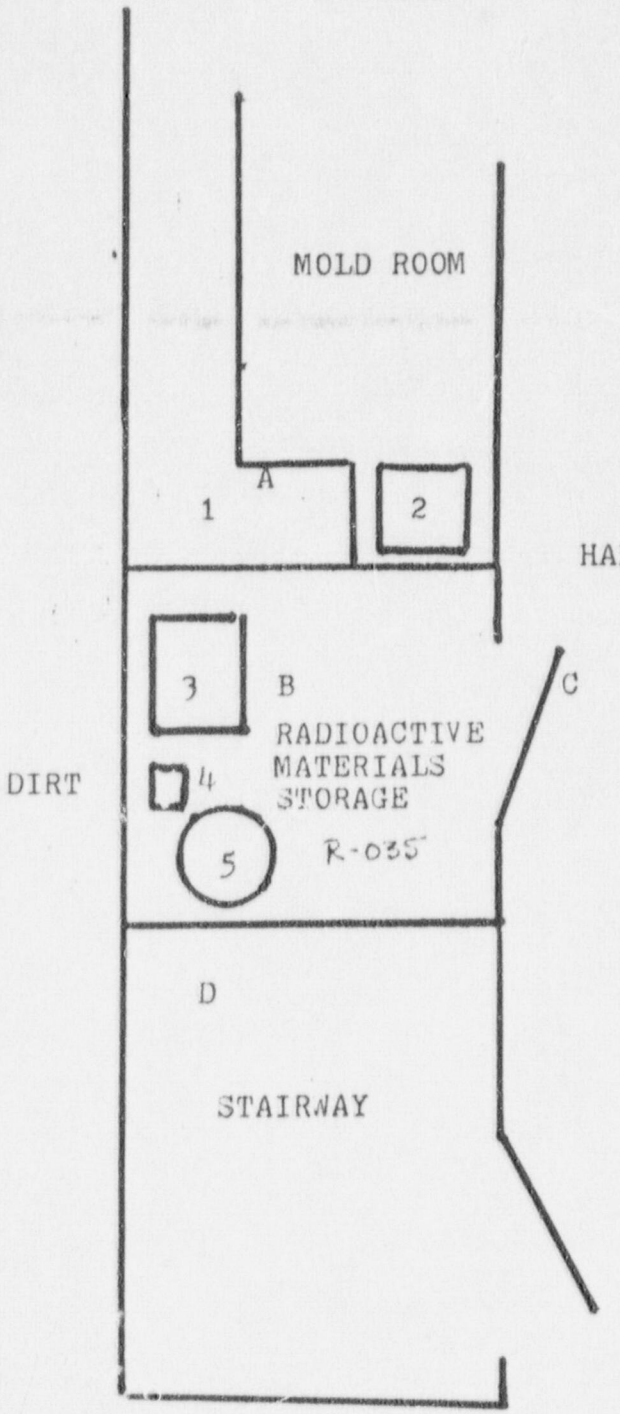
SITE PLAN

A---NUCLEAR MEDICINE (LOWER LEVEL)
B---RADIATION THERAPY SOURCE STORAGE
(LOWER LEVEL)

(3)

NEW RADIATION THERAPY DEPARTMENT
RADIOACTIVE MATERIALS STORAGE AREA

LOCATION --- S.E. CORNER NEW DEPT.



READINGS IN MR/HR

A	.4
B	.5
C	.3
D	.4
ROOF	.1

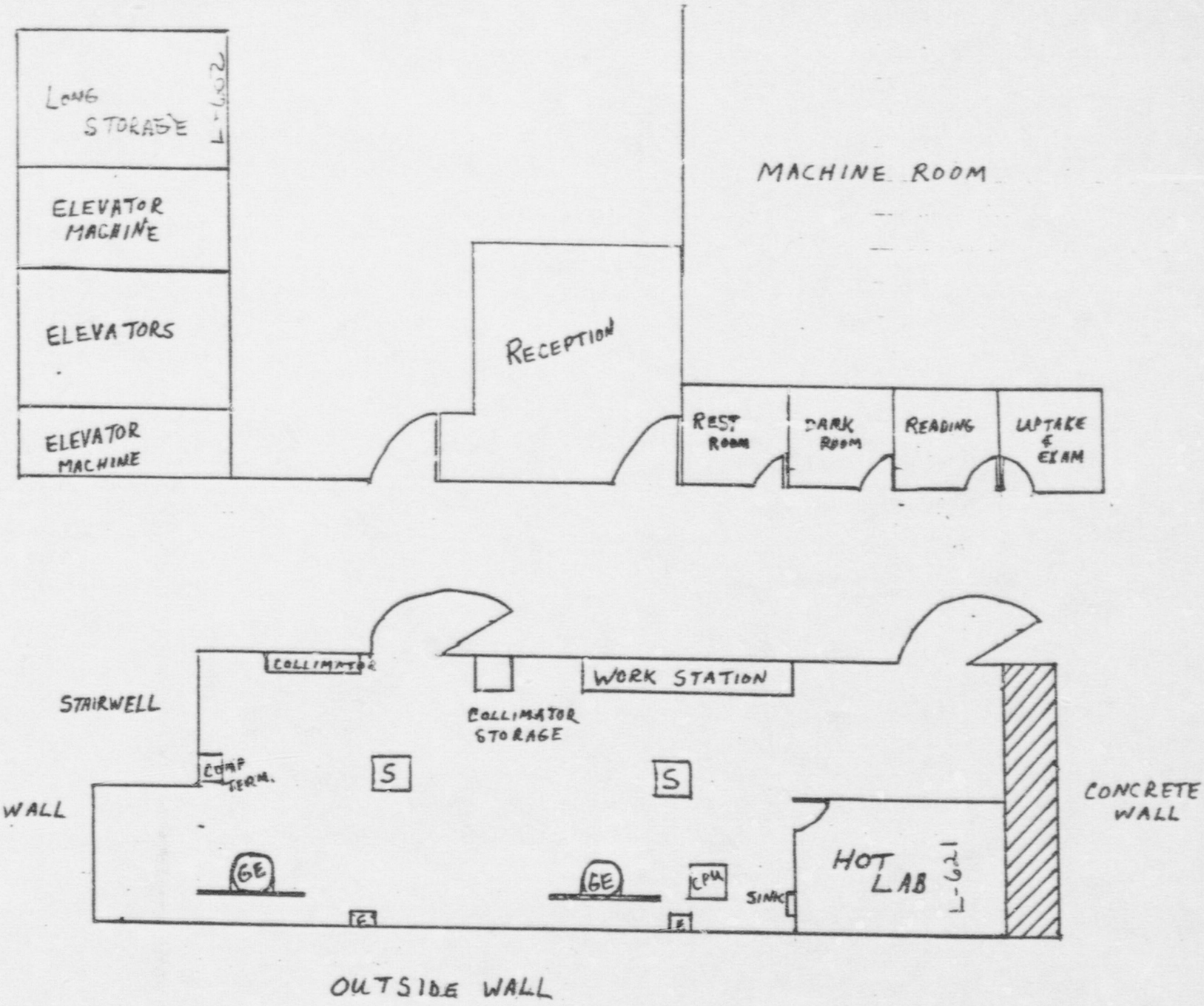
KEYED ITEMS

1. Work counter
2. Hot wire cutter
3. Cesium safe #1
4. Survey meter calibrator
5. Cesium safe #2

10/21/86

Jpucha

ST. JOSEPH HOSPITAL
NUCLEAR MEDICINE DEPARTMENT
(revised) 8/18/87



OVERALL SOURCE INVENTORY

THE SOURCE INVENTORY INVOLVES A QUARTERLY ACCOUNTING OF ALL SEALED SOURCES USED IN BRACHYTHERAPY AND NUCLEAR MEDICINE. THIS ACCOUNTING WILL BE DONE ON THREE FORMS. THE FIRST FORM CONTAINS A 'DETAILED INFORMATION DESCRIBING SOME OF THE SOURCES CHARACTERISTICS. INCLUDED IN IT ARE THE FOLLOWING:

1. SOURCE CODE NAME--USED FOR QUICK IDENTIFICATION
2. SOURCE MODEL NUMBER
3. SOURCE SERIAL NUMBER
4. SOURCE INITIAL ACTIVITY AND DATE OF CALIBRATION

ALL THE ABOVE INFORMATION IS RECORDED ONCE FOR EACH SOURCE AND NEED NOT BE UPDATED.

THE SECOND PART OF THE INVENTORY CONSISTS OF THE WORKING INVENTORY WHICH MUST BE UPDATED TO REFLECT CHANGES ON LOCATION OF SOURCES. IN THIS PART OF THE INVENTORY THE ACTUAL ACCOUNTABILITY CHECKS ARE TO BE RECORDED. AS PART OF THIS PROCEDURE THE FOLLOWING ITEMS ARE LOGGED:

1. SOURCE CODE NAME-USED FOR QUICK IDENTIFICATION
2. ISOTOPE
3. SOURCE LOCATION
4. 1ST QUARTER CHECK
5. 2ND QUARTER CHECK
6. 3RD QUARTER CHECK
7. 4TH QUARTER CHECK

RECORDED ALSO ARE THE DATE OF THE CHECK AND THE INITIALS OF THE INDIVIDUAL PERFORMING THE CHECK.

THE THIRD PART OF THE INVENTORY IS DESIGNED TO RECORD THE AMBIENT EXPOSURE LEVELS IN SEVERAL LOCATIONS IN THE ROOMS WHERE THE SOURCES ARE STORED. RECORDED ALSO ON THIS FORM ARE THE METER USED, THE SIGNATURE OF THE PERSON MAKING THE MEASUREMENT, THE DATE OF THE MEASUREMENT, THE LOCATIONS SURVEYED AND THE ROOM NUMBERS OF THE ROOMS SURVEYED.

SOURCE INVENTORY

SOURCE CODE NAME	ISOTOPE	LOCATION	YEAR 87 3/20 1 QUART	4/8 2 QUART	7/15 3 QUART	10/27 4 QUART
THERAPY						
CESIUM TUBES (22)	CS-137	RO35	✓	✓	✓	✓
MICRAD (18)	CS-137	RO35	✓	✓	✓	✓
RADIUM TUBE (1)	RA-226	RO35	✓	✓	✓	✓
SURV. M. CAL. S447	CS-137	RO35	✓	✓	✓	✓
NUCLEAR MEDICINE — CALIBRATION AND FLOOD SOURCES CURRENTLY IN USE						
CDC.V1-DOSE CAL	CS-137	L-621	✓	✓	✓	✓
BDC.V1-DOSE CAL	BA-133	L-621	✓	✓	moved to	L-602 5/18/87
CS#8027-WELL CAL	CS-137	L-621	✓	✓	✓	✓
CO57-150676	CO-57	L-621	✓	✓	moved to	L-602 5/18/87
CS137-27325	CS-137	L-621	✓	✓	✓	✓
FL.CO57-392078	CO-57	L-621	✓	✓	✓	✓
GOLD BAR PHANTOM	Au-195	L-621	✓	✓	moved to	L-602 5/18/87
CO57-MOL01-27572	Co-57	L-621	—	acquired 5/?/87	✓	✓
NUCLEAR MEDICINE — CALIBRATION AND FLOOD SOURCES BEING HELD FOR DECAY						
FL.CO57-06079	CO-57	L-602	✓	✓	✓	✓
CS-REF-RO344	CS-137	L-602	✓	✓	✓	✓
CS-BUTTON-BAIRD	CS-137	L-602	✓	✓	✓	✓
CS REF-87340K	CS-137	L-602	✓	✓	✓	✓
ICN-R35B	I-129	L-602	✓	✓	✓	✓
ICN-BA+CS	BA133+CS137	L-602	✓	✓	✓	✓
CO-BUTTON #1	Co-57	L-602	✓	✓	✓	✓
CO-BUTTON #2	CO-57	L-602	✓	✓	✓	✓
CS-STAND-103.8	CS-137	L-602	✓	✓	✓	✓
CS-STAND 110.8	CS-137	L-602	✓	✓	✓	✓
INST. ✓ SOURCE	CO-57	L-602	—	✓	✓	✓
BDCV1-DOSE CAL	Ba-133	L-602	—	—	✓	✓
CO57-150676	CO-57	L-602	—	—	✓	✓
GOLD BAR PHANTOM	Au-195	L-602	—	—	✓	✓
CO57 4013MA	CO-57	L-602	—	—	✓	✓
CO57 ICN 5.2	Co-57	L-602	✓	✓	✓	✓
CS137 NEISLER	CS-137	L-602	✓	✓	✓	✓
CS 137 NEW 4	"	L-602	✓	✓	✓	✓
" " " 165	"	L-602	✓	✓	✓	✓
" " " 3.7	"	L-602	✓	✓	✓	✓
		INITIALS	JTS	JTS	JTS	JTS

DETAILED SOURCE INVENTORY DATA

SOURCE CODE NAME	MODEL NUMBER	SERIAL NUMBER	ACTIVITY
CDC.VI - DOSE CAL	CDC.VI	3003 MA	[illegible] µCi [illegible]
BDC.VI - " "	BDC.VI	2003 MA.	210 µCi [illegible]
CS 8027 - WELL "	80207	NONE	.121 µCi [illegible]
CO57 150676	79540	150676	5.4 mCi 5/1/84
CS 137 - 77325	77325	—	560 nCi [illegible]
FL CO57	NES 392	3920786A-04	10 mCi 7/15/86
GOLD BAR PHANTOM	NES 387	3870782A-04	10 mCi [illegible]/82
CO57 - MDL01 - 275272	ICN MLD-01	275272	5.2 mCi 5/[illegible]/87
FL CO57 - 0679	TRC AMERSHAM	0679 MF	3.9 mCi 8/10/79
CS - REF - R0344	R03-4483-51	NONE	11.93 µCi 3/1/69
CS - BUTTON - BAIRD	BAIRD ATOMIC BUT	NONE	10 µCi 5/87
CS - REF - 8834DK	8834DK SQUIB	NONE	7.5 µCi 6/1/80
ICN - R35B	R35B ICN	NONE	.1 µCi 10/17/78
ICN - BA - CS	ICN PLASTIC BOTTLE	NONE	550 µCi 10/16/78
CO - BUTTON #1	NUCLEAR CHIC. BUT	NONE	7.5 µCi —
CO - BUTTON #2	188041	NONE	9.5 µCi 8/7/67
CS - STAND - 103.8	IN TEST TUBE GLASS	NONE	103.8 µCi NONE
CS - STAND - 110.8	NEW ENG. NUC VIAL	NONE	110.8 µCi NONE
INST. Y SOURCE	UNION CARBIDE	NONE	20 µCi 6/30/6[illegible]
CO57 - CALIB SOURCE	4013 MA	NONE	5 mCi —
CO-57 " "	ICN PLASTIC BOTTLE	NONE	[illegible] mCi —
CS-137	NIESLER	NONE	20 µCi —
CS-137	NEW ENG NUC	NONE	4 µCi —
"	"	"	11.5 µCi —
"	"	"	3.5 µCi —

J. SPICKA, RSO

DETAILED SOURCE INVENTORY DATA

SOURCE CODE NAME	MODEL NUMBER	SERIAL NUMBER	ACTIVITY (NOMINAL)
CESIUM (1)	6503 6D6C-CA	2375	51.9 mCi 6/8/81
(2)	"	2411	52.0 mCi "
(3)	"	2413	52.0 mCi "
(4)	"	2415	52.1 mCi "
(5)	"	1380	27 mCi 10/29/73
(6)	"	1466	" "
(7)	"	1469	" "
(8)	"	1483	" "
(9)	"	1503	" "
(10)	"	1507	" "
(11)	"	1518	" "
(12)	"	0659	41 "
(13)	"	0660	" "
(14)	"	0663	" "
(15)	"	0676	" "
(16)	"	0677	" "
(17)	"	0686	" "
(18)	"	0691	" "
(19)	"	0485	" "
(20)	"	0505	" "
(21)	"	0509	" "
(22)	"	1390	50 mCi 12/13/78
MICRAD (1)	67-602	GI06B	50 mCi 12/21/78
(2)	"	GI07B	" "
(3)	"	GI08B	" "
(4)	"	GI09B	" "
(5)	"	GI10B	" "
(6)	"	GI11B	" "
(7)	"	GI12B	" "
(8)	"	GI13B	" "
(9)	67-601	GI01B	25 mCi "
(10)	"	GI02B	" "
(11)	"	GI98A	" "
(12)	"	[illegible]	" "
(13)	"	GI65B	" "
(14)	"	GI90A	" "
(15)	"	GI92A	" "
(16)	"	GI93A	" "
(17)	"	GI96A	" "
(18)	"	GI97A	" "
RA 226	NONE	NONE	—
DURU M CAL 447	773, SN 140	S-447	.0158 Ci

J. Spicka

J. SPICKA, RSO

SOURCE INVENTORY AMBIENT LEVEL SURVEY

AT TIME OF SOURCE INVENTORY THE FOLLOWING AMBIENT RADIATION LEVELS ARE NOTED. FOR EACH ROOM IN WHICH SOURCES ARE STORED RADIOACTIVE EXPOSURE LEVELS ARE RECORDED FOR SEVERAL LOCATIONS.

LOCATION	1 QUART	2 QUART	3 QUART	4 QUART
DATE	3/20/87	4/8/87	7/15/87	10/27/87
INSTRUMENT	BICRON	BICRON	BICRON	BICRON
SIGNATURE	[signature]	[signature]	[signature]	[signature]
ROOM R035	mR/hr	mR/hr	mR/hr	mR/hr
DOOR	.03	.03	.02	.04
ISOTOPE PREP AREA	.2	.25	.15	.15
CENTER OF ROOM	.15	.1	.10	.10
ROOM L-621 (changed to (L-632A))				
DOOR	.02	.02	.02	.02
LEFT SIDE PREP AREA	.06	.05	.04	.04
RIGHT SIDE PREP AREA	.08	.07	.10	.10
CENTER PREP AREA	.05	.03	.04	.05
ROOM L-602				
DOOR	.06	.07	.08	.06
LT SIDE OF ROOM	.4	.5	.5	.4
RT SIDE OF ROOM	.2	.3	.3	.2
CENTER OF ROOM	.2	.3	.3	.3

SURVEY METER CALIBRATION

* OVERVIEW

* SAMPLE CALIBRATION FORM

SURVEY METER CALIBRATION PROCEDURE OVERVIEW

THE SURVEY METERS WILL BE CALIBRATED ANNUALLY. THE CALIBRATION FORM WILL BE USED TO ASSIST WITH ANNUAL INSTRUMENT CALIBRATION SINCE IT PROVIDES A FORMAT FOR COMPUTING SURVEY METER CALIBRATION FACTORS. IN ADDITION THE FOLLOWING PROCEDURE WILL BE ADOPTED.

1. ALL SCALES WITH READINGS UP TO 1000 MR WILL BE CALIBRATED.

   A. CORRECTION FACTORS OF UP TO 20 % WILL BE TOLERATED ON EACH SCALE AND RECORDED PROMINENTLY ON THE METER.

   B. IF CORRECTION FACTORS OF OVER 20 % ARE INDICATED THE UNIT WILL BE RETURNED FOR REPAIR

2. TWO SEPARATE READINGS ON EACH SCALE WILL BE CALIBRATED.

3. NOTED ON EACH INSTRUMENT WILL BE THE APPARENT EXPOSURE RATE FROM A DEDICATED CHECK SOURCE AS DETERMINED AT THE TIME OF CALIBRATION.

4. CALIBRATION RECORDS WILL BE RETAINED FOR TWO YEARS.

GAMMA SURVEY INSTRUMENT CALIBRATION--CALCULATON SHEET

Keithley 36100
Ser # 8331

CALIBRATION DATE: 9/29/87
CALIBRATED BY [signature]

INSTRUMENT TYPE = TECH CPS SURVEY METER CALIBRATOR
INSTRUMENTATION MODEL = 773 SERIAL NUMBER = 140

SOURCE IDENTIFICATION NUMBER = S-447
SOURCE STRENGTH = .162 CURIES CALIBRATION DATE 9/29/83
ISOTOPE = CS-137 DECAY FACTOR .913
SOURCE OUTPUT AS OF 9/29/83 = .0518 R/HR @ 1 METER

DISTANCE CALCULATION EQUATION

DISTANCE (METERS) = $\sqrt{\text{(DECAY FACTOR)(SOURCE OUTPUT)/(DESIRED MR/HR)}}$

DEDICATED CHECK SOURCE Top of Cs SAFE (place end window against ...)
OBSERVED MR/HR FROM DEDICATED SOURCE 10.0 mR/hr

SCALE	DISTANCE METERS	CALCULATED MR/HR	OBSERVED MR/HR	CORRECTION FACTOR(<20%)
200	.544	160	170	.94 } .94
	1.09	40	43	.93

DOSE CALIBRATOR

* OVERALL SAFETY PROCEDURAL OUTLINE
* LINEARITY CHECK
* GEOMETRIC VARIANCE CHECK
* CONSTANCY CHECK PARAMETER LOG
* CONSTANCY CHECK TEST PROCEDURE
* CALIBRATION PROCEDURE

DOSE CALIBRATOR OVERALL

THE FOLLOWING DESCRIBES THE TESTS, THEIR FREQUENCY, THE ACTION LIMITS FOR THE TEST RESULTS AND THE ACTION TO BE INITIATED TO ASSURE PROPER OPERATION OF THE DOSE CALIBRATOR.

LINEARITY--INITIAL THEN QUARTERLY OR UPON REPAIR--10 % ACTION LIMIT
CORRECTIVE ACTION DERIVE CORRECTION FACTOR OR REPAIR.

ACCURACY--INITIAL THEN ANNUAL OR UPON REPAIR--10 % ACTION LIMIT
CORRECTIVE ACTION REPAIR ONLY

GEOMETRY--INITIAL THEN KEEP RECORD--10 % ACTION LIMIT
CORRECTIVE ACTION DERIVE CORRECTION FACTOR OR REPAIR.

CONSTANCY--DAILY CHECK--ACTION LIMIT 10 %
CORRECTIVE ACTION REPAIR ONLY

DOSE CALIBRATOR QUARTERLY LINEARITY CHECK

THE LINEARITY OF THE DOSE CALIBRATOR SHOULD BE ASCERTAINED OVER THE ENTIRE RANGE OF ACTIVITIES EMPLOYED. THIS TEST, TO BE DONE QUARTERLY, WILL USE A VIAL OF TC-99M WHOSE ACTIVITY IS EQUIVALENT TO THE MAXIMUM ANTICIPATED ACTIVITY TO BE ASSAYED.

1. ASSAY THE VIAL IN THE DOSE CALIBRATOR USING AUTOMATIC BACKGROUND SUBTRACTION AND LOG RESULTS.
2. REPEAT STEP 1 AT INTERVALS OF 6, 24, 30, AND 48 HOURS AFTER THE INITIAL ASSAY.
3. USING THE 30 HR. ACTIVITY MEASUREMENT AS A STARTING POINT, CALCULATE THE PREDICTED ACTIVITIES AT 0, 6, 24, AND 48 HRS.

DATE OF INITIATION OF TEST_____

MODEL_____ SERIAL NUMBER_____

ASSAY TIME (HR)	ASSAYED ACTIVITY	ELAPSED TIME	CORRECTION FACTOR	CALCULATED ACTIVITY	PERCENT ERROR
_____	_____	0	31.63	_____	_____
_____	_____	6	15.85	_____	_____
_____	_____	24	1.995	_____	_____
_____	_____	30	1.000	_____	_____
_____	_____	48	0.126	_____	_____
_____	_____	--	_____	_____	_____

4. COMPARE THE CALULATED ACTIVITY WITH THE ASSAYED ACTIVITY. A PERCENT ERROR OF MORE THAN 10 % IS NOT TOLERATED. IF THE PERCENT ERROR IS GREATER THAN 10 % THE UNIT WILL BE REPAIRED OR CORRECTION FACTORS ADOPTED.

_____

J. SPICKA, RSO

DOSE CALIBRATOR GEOMETRIC VARIANCE

THE DOSE CALIBRATOR MUST HAVE THE ABILITY TO CORRECTLY ASSAY ISOTOPES INDEPENDENT OF GEOMETRICAL VARIATIONS IN SOURCE SIZE AND SHAPE OVER THE NORMAL RANGE OF VOLUMES ENCOUNTERED CLINICALLY. THIS TEST WILL BE ACCOMPLISHED BY DRAWING A SMALL VOLUME OF ACTIVITY INTO THE LARGEST SYRINGE TYPICALLY USED. AFTER MONITORING IT IN THE DOSE CALIBRATOR GRADUALLY DILUTE THE ACTIVITY OVER A COURSE OF READINGS AND RECORD IF THE CONTINUED DILUTION RESULTS IN ALTERED READINGS. THE READING MUST REMAIN CONSISTENT WITHIN 10 %. (A SYRINGE OF THE LARGEST VOLUME TYPICALLY USED WILL BE THE CONTAINER OF CHOICE FOR THIS TEST.)

MODEL_____ SERIAL NUMBER_____

SYRINGE VOLUME_____

VOLUME	ASSAYED READING
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

ASSAYED READINGS WITHIN 10 %_____ DATE_____

(IF READINGS ARE NOT WITHIN 10 % A CORRECTION FACTOR MAY BE DERIVED FOR THAT PARTICULAR VOLUME OR THE UNIT SENT OUT FOR REPAIR.)

_____

J. SPICKA, RSO

DOSE CALIBRATOR CONSTANCY

LOGGING CRITICAL PARAMETERS

THE FOLLOWING PARAMETERS NEED NOT BE RECORDEDED DAILY, BUT IN THE EVENT ONE OF THEM IS CHANGED FOR ANY REASON THE APPROPRIATE CHANGE MUST BE LOGGED ALONG WITH THE DATE OF CHANGE AND THE INITIALS OF THE INDIVIDUAL MAKING THE CHANGE.

1. DOSE CALIBRATOR UNIT
   - A. RECORD MODEL NUMBER OF NEW UNIT
   - B. RECORD SERIAL NUMBER OF NEW UNIT
2. CALIBRATION CHECK SOURCE
   - A. RECORD ISOTOPE
   - B. RECORD SOURCE MODEL NUMBER
   - C. RECORD SOURCE SERIAL NUMBER

DOSE CALIBRATOR CONSTANCY TEST

THE DOSE CONSTANCY TEST WILL BE DONE USING THE ICN CESIUM-137 STANDARD CHECK SOURCE AND FOLLOWING THIS PROCEDURE.

1. CHECK THE ZERO AND AUTOMATIC BACKGROUND ARE ADJUSTED PROPERLY AND USE AUTOMATIC BACKGROUND SUBTRACTION FOR THIS TEST.
2. USE THE CS-137 SOURCE, BUT SELECT THE TC-99M PUSH BUTTON AND TAKE THIS MEASUREMENT ON THE MOST COMMONLY USED SETTING.
3. RECORD THE RESULTS.
4. MAKE SURE THE RESULTS ARE WITHIN THE ALLOWED PLUS OR MINUS 10 % LIMITS, IF NOT CALL THE RADIATION SAFETY OFFICER. IF THE RESULTS ARE WITHIN THE 10 % LIMITS CONTINUE NORMAL OPERATION.
5. IN THE EVENT THAT THE DOSE CALIBRATOR OR CHECK SOURCE ARE CHANGED NOTIFY THE RSO.

CALIBRATION OF DOSE CALIBRATOR

DATE _____

UNIT MODEL_____ SERIAL NUMBER_____

***** COBALT-57 *****

MODEL NUMBER----ICN79540 SERIAL NUMBER----SWO-275272
ORIGINAL ACTIVITY = 5.20 MCI
DATE OF CALIBRATION 5/13/87
HALF LIFE = 271 DAYS
ELAPSED TIME TO 1/1/87 = (-133 DAYS)

DECAY CALCULATION

T = NUMBER OF DAYS SINCE 1/1/87 =_____

DECAYED ACTIVITY = (5.4MCI)(EXP((-.693/271)(T-133)))

DECAYED ACTIVITY = _____MCI

MEASURED ACTIVITY = _____MCI

PERCENT ERROR_____

***** CESIUM-137 *****

MODEL NUMBER----AMERSHAMCDC.V1 SERIAL NUMBER----3003MA
ORIGINAL ACTIVITY = .277 MCI
DATE OF CALIBRATION 9/11/79
HALF LIFE = 30 YEARS
ELAPSED TIME TO 1/1/87 = ((19+93)/365)+7 = 7.31 YEARS

DECAY CALCULATION

T = NUMBER OF DAYS SINCE 1/1/87

DECAYED ACTIVITY = (.277MCI)(EXP((-.693/30)(7.31+(T/365))))

DECAYED ACTIVITY = _____MCI

MEASURED ACTIVITY = _____MCI

PERCENT ERROR_____

_____
J. SPICKA, RSO

ALARA

* ALARA OVERVIEW

* ALARA ANNUAL REVIEW

* ALARA QUARTERLY REPORT FORM

ALARA OVERVIEW

THE PURPOSE OF ALARA IS TO KEEP OCCUPATIONALLY EXPOSED INDIVIDUALS EXPOSURE LEVELS AS LOW AS REASONABLY ACHIEVABLE. THIS PAGE SERVES AS A REMINDER OF THE RADIATION SAFETY OFFICERS REQUIRED RESPONSIBILITIES.

1. OVERVIEW OF QUARTERLY FILM BADGE RECORDS WITH REPORTS TO BE PRESENTED AT RADIATION SAFETY COMMITTEE MEETINGS.
2. MAKE SURE THE RADIATION SAFETY COMMITTEE HOLDS AN ANNUAL ALARA REVIEW.
3. MAKE SURE THE NOTICE TO EMPLOYEES DESCRIBING THE EXISTENCE OF ALARA IS SENT OUT TO EACH DEPARTMENT ANNUALLY.

ANNUAL ALARA REVIEW

THE HOSPITAL ALARA PROGRAM WAS REVIEWED BY THE RADIATION SAFETY COMMITTEE ON _____. INCLUDED IN THE REVIEW WAS A DISCUSSION OF:

1. TYPES AND AMOUNTS OF BYPRODUCT MATERIAL USED.
2. OCCUPATIONAL DOSES.
3. CHANGES IN RADIATION SAFETY PROCEDURES AND MEASURES.
4. CONTINUING EDUCATION AND TRAINING FOR PERSONNEL.

THE REVIEW WAS SPECIFICALLY ORGANIZED TO LOOK INTO THE ASPECT OF KEEPING EMPLOYEE EXPOSURE AS LOW AS REASONABLE ACHIEVABLE.

J. SPICKA, RSO

ALARA REPORT

DATE OF REPORT_____

CALENDAR QUARTER UPON WHICH REPORT IS BASED_____

INDIVIDUALS EXCEEDING ALARA LEVEL II (375MR/QTR) FOR THE LAST COMPLETED CALENDAR QUARTER FOR WHICH FILM BADGE REPORTS ARE AVAILABLE

WAIST BADGE

COLLAR BADGE

INDIVIDUALS EXCEEDING ALARA LEVEL I (125MR/QTR) FOR THE LAST COMPLETED CALENDER QUARTERFOR WHICH FILM BADGE REPORTS ARE AVAILABLE

WAIST BADGE

COLLAR BADGE

COMMENTS:

SUBMITTED,

J. SPICKA, RSO

Saint Francis Hospital Center

SISTER MARY HENRITA, O.S.F.
EXECUTIVE DIRECTOR

DON D. HAMACHER
ADMINISTRATOR

August 14, 1980

ADDENDUM TO ST. FRANCIS HOSPITAL'S ALARA PROGRAM

The Model Program for Maintaining Occupational Radiation Exposures at Medical Institutions, ALARA has been adopted for use in our institution with the exceptions listed below:

(1). Under Management Commitment, delete item 1, b.

We feel this independent audit is not necessary as a member of management is on the RSC and all this information is available in the minutes of RSC meetings.

(2). Under Radiation Safety Officer, delete item 3, a, (3) as is, and replace with the following:

The Radiation Safety Officer will review all radiation level surveys performed by Nuclear Medicine personnel quarterly, to determine that all levels are consistent with ALARA.

Surveys about therapeutic facilities will be performed at the frequencies indicated by NUREG-0339, "Draft Licensing Guide for Teletherapy Programs." These surveys will be reviewed by the RSO upon completion.

Enclosure 10-6
February 25, 1988

1600 ALBANY STREET • BEECH GROVE, INDIANA 46107 • (317) 787-3311 • MEMBER GREATER INDIANAPOLIS HOSPITAL DISTRICT

APPENDIX O

MODEL PROGRAM FOR MAINTAINING OCCUPATIONAL RADIATION EXPOSURES AT MEDICAL INSTITUTIONS ALARA

ST. FRANCIS HOSPITAL, RADIATION THERAPY DEPT.

(Licensee's Name)

AUG. 14, 1980

(Date)

1. Management Commitment

a. We, the management of this (medical facility, hospital, etc.), are committed to the program described in this paper for keeping exposures (individual and collective) as low as is reasonably achievable (ALARA). In accord with this commitment, we hereby describe an administrative organization for radiation safety and will develop the necessary written policy, procedures, and instructions to foster the ALARA concept within our institution. The organization will include a Radiation Safety Committee (RSC)[1] and a Radiation Safety Officer (RSO).

c. Modification to operating and maintenance procedures and to equipment and facilities will be made where they will reduce exposures unless the cost, in our judgment, is considered to be unjustified. We will be able to demonstrate, if necessary, that improvements have been sought, that modifications have been considered, and that they have been implemented where reasonable. Where modifications have been recommended but not implemented, we will be prepared to describe the reasons for not implementing them.

d. In addition to maintaining doses to individuals as far below the limits as is reasonably achievable, the sum of the doses received by all exposed individuals will also be maintained at the lowest practicable level. It would not be desirable, for example, to hold the highest doses to individuals to some fraction of the applicable limit if this involved exposing additional people and significantly increasing the sum of radiation doses received by all involved individuals.

[1] Private practice physician licenses do not include an RSC.

2. Radiation Safety Committee (RSC)[2]

a. Review of Proposed Users and Uses

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

(2) When considering a new use of byproduct material, the RSC will review the efforts of the applicant to maintain exposure ALARA. The user should have systematized procedures to ensure ALARA and shall have incorporated the use of special equipment such as syringe shields, rubber gloves, etc., in his proposed use.

(3) The RSC will ensure that the user justifies his procedures and that dose will be ALARA (individual and collective).

b. Delegation of Authority

(The judicious delegation of RSC authority is essential to the enforcement of an ALARA program.)

(1) The RSC will delegate authority to the RSO for enforcement of the ALARA concept.

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

[2] The RSO on private practice physician licenses will assume the responsibilities of the RSC under Section 2.

c. Review of ALARA Program

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

(2) The RSC will perform a quarterly review of occupational radiation exposure with particular attention to instances where Investigational Levels in Table 0-1 below are exceeded. The principal purpose of this review is to assess trends in occupational exposure as an index of the ALARA program quality and to decide if action is warranted when Investigational Levels are exceeded (see Section 6).[3]

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

3. Radiation Safety Officer (RSO)

a. Annual and Quarterly Review

(1) Annual review of the radiation safety program. The RSO will perform an annual review of the radiation safety program for adherence to ALARA concepts. Reviews of specific procedures may be conducted on a more frequent basis.

(2) Quarterly review of occupational exposures. The RSO will review at least quarterly the external radiation exposures of authorized users and workers to determine that their exposures are ALARA in accordance with the provisions of Section 6 of this program

b. Education Responsibilities for ALARA Program

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

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

c. Cooperative Efforts for Development of ALARA Procedures

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

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

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

d. Reviewing Instances of Deviation from Good ALARA Practices

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

4. Authorized Users

a. New Procedures Involving Potential Radiation Exposures

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

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

b. Responsibility of Authorized User to Persons Under His/Her Supervision

(1) The authorized user will explain the ALARA concept and his/her commitment to maintain exposures ALARA to all persons under his/her supervision.

(2) The authorized user will ensure that persons under his/her supervision who are

[3] The NRC has emphasized that the Investigational Levels in this program are not new dose limits but, as noted in ICRP Report 26, "Recommendations of the International Commission on Radiological Protection," serve as check points above which the results are considered sufficiently important to justify further investigations.

subject to occupational radiation exposure are trained and educated in good health physics practices and in maintaining exposures ALARA.

5. Persons Who Receive Occupational Radiation Exposure

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

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

6. Establishment of Investigational Levels In Order to Monitor Individual Occupational External Radiation Exposures

This institution (or private practice) hereby establishes Investigational Levels for occupational external radiation exposure which, when exceeded, will initiate review or investigation by the RSC and/or the RSO. The Investigational Levels that we have adopted are listed in Table 0-1 below. These levels apply to the exposure of individual workers.

Table 0-1

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

*Not normally applicable to nuclear medicine operations except those using significant quantities of beta-emitting isotopes.

The Radiation Safety Officer will review and record on Form NRC-5, "Current Occupational External Radiation Exposures," or an equivalent form (e.g., dosimeter processor's report), results of personnel monitoring not less than once in any calendar quarter as required by § 20.401 of 10 CFR Part 20. The following actions will be taken at the Investigational Levels as stated in Table 0-1:

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

Except when deemed appropriate by the RSO, no further action will be taken in those cases where an individual's exposure is less than Table 0-1 values for the Investigational Level I.

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

The RSO will review the exposure of each individual whose quarterly exposures equal or exceed Investigational Level I and will report the results of the reviews at the first RSC meeting following the quarter when the exposure was recorded. If the exposure does not equal or exceed Investigational Level II, no action related specifically to the exposure is required unless deemed appropriate by the Committee. The Committee will, however, consider each such exposure in comparison with those of others performing similar tasks as an index of ALARA program quality and will record the review in the Committee minutes.

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

The RSO will investigate in a timely manner the cause(s) of all personnel exposures equaling or exceeding Investigational Level II and, if warranted, will take action. A report of the investigation, actions taken, if any, and a copy of the individual's Form NRC-5 or its equivalent will be presented to the RSC at the first RSC meeting following completion of the investigation. The details of these reports will be recorded in the RSC minutes. Committee minutes will be sent to the management of this institution for review. The minutes, containing details of the investigation, will be made available to NRC inspectors for review at the time of the next inspection.

d. Reestablishment of an individual occupational worker's Investigational Level II to a level above that listed in Table 0-1.

In cases where a worker's or a group of workers' exposures need to exceed Investigational Level II, a new, higher Investigational Level II may be established on the basis that it is consistent with good ALARA practices for that individual or group. Justification for a new Investigational Level II will be documented.

The RSC will review the justification for, and will approve, all revisions of Investigational Level II. In such cases, when the exposure equals or exceeds

the newly established Investigational Level II, those actions listed in paragraph 6.c above will be followed.

7. Signature of Certifying Official[4]

I hereby certify that this institution (or private practice) has implemented the ALARA Program set forth above.

Signature

RALPH K. YACKO

Name (print or type)

Associate Administrator

Title

Institution (or Private Practice) Name and Address

[4]The person who is authorized to make commitments for the administration of the institution (e.g., hospital administrator) or, in the case of a private practice, the licensed physician.

RADIATION SAFETY COMMITTE
1988

F. W. SEQUERIA, MD	RADIOLOGY
R. P. HOOKER, M.D.	PATHOLOGY
D. K. LEE, M.D.	FAMILY PRACTICE
J. M. YOON, M.D.	INTERNAL MEDICINE
L. L. LEE, M.D.	OBSTETRICS
T. W. RILEY, M.D.	SURGERY
M. D. VOLLMER	ADMINISTRATION
L. SLEMP	NURSING SERVICE
B. L. STEWART, M.S.	RADIATION SAFETY OFFICER

Note: The membership changes annually, but St. Francis Hospital Center will include the requirements of 35.22(a) 1 of 10 CFR part 35.

Enclosure 10-7
Feb. 25, 1988

ITEM 11

St. Francis Hospital Center will dispose of unneeded sealed sources and/or, teletherapy units by transferring them to an authorized recipient.