Radiation Survey Procedures

How to Perform a Radiation Sweep with a Geiger Counter

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Program Objectives

- Learn what a survey meter is.
- Learn how to operate a survey meter.
- Learn the procedure to survey an area for radiation.
- Learn how to document your findings.

What is a Survey Meter?

A survey meter is a portable handheld, electronic instrument used to detect radiation, often called a “Geiger counter”.

Survey Meter

A survey meter consists of three parts.

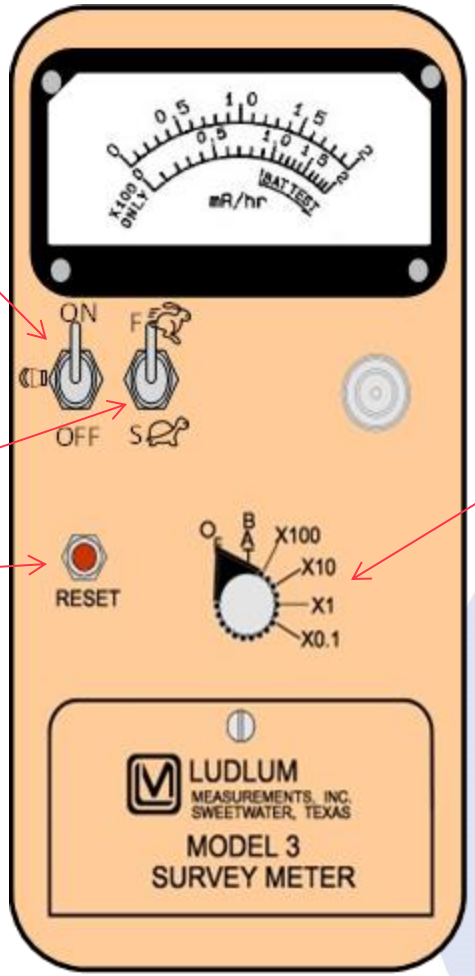
- A probe or detector
  - The device which produces electrical signals when exposed to radiation. It usually has a window through which radiation can penetrate it's cavity.
- The electronic meter and control panel readout
  - The gauge which indicates the amount of radiation exposure present after it gets converted to an electrical signal.
- A speaker
  - Provides an audible indication in addition to the visual gauge.

Survey Meter Probe

- Each survey meter may have a slightly different probe attached.
- Each is easy to use and should be used in the way instructed.

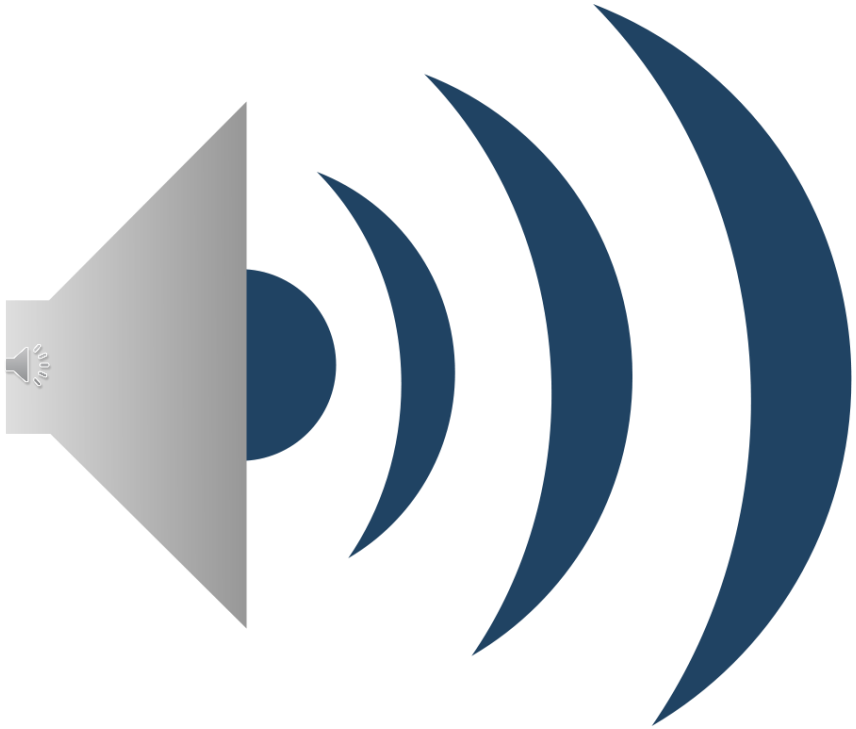
Survey Meter Control Panel

- Audio On/Off
  - Leave this On so you can use the sound to isolate the source of radiation while keeping your eyes on the probe.
- Fast/Slow Switch
  - Leave this on Fast. This does not mean you can survey an area quickly or slowly. This adjusts the rate at which the needle reacts to a signal.
- Reset Button
  - This resets the needle back to the "0" mark and should be used each time you move the probe to a different area.



- Scale Adjustment & On/Off Switch
  - In the first position the meter is off.
  - The second position displays the battery charge. This shows that the meter has an adequate power supply by the needle being in the bat test area. This will be tested for you prior to you receiving the meter.
  - The scale multipliers changes the intensities of how the meter detects radiation. You should always set the meter to the x.1 setting.

Survey Meter Speaker



- The speaker is an audible device that is connected to the survey meter.
- The speaker is in –line with the detector so each count produces an audible click from the speaker

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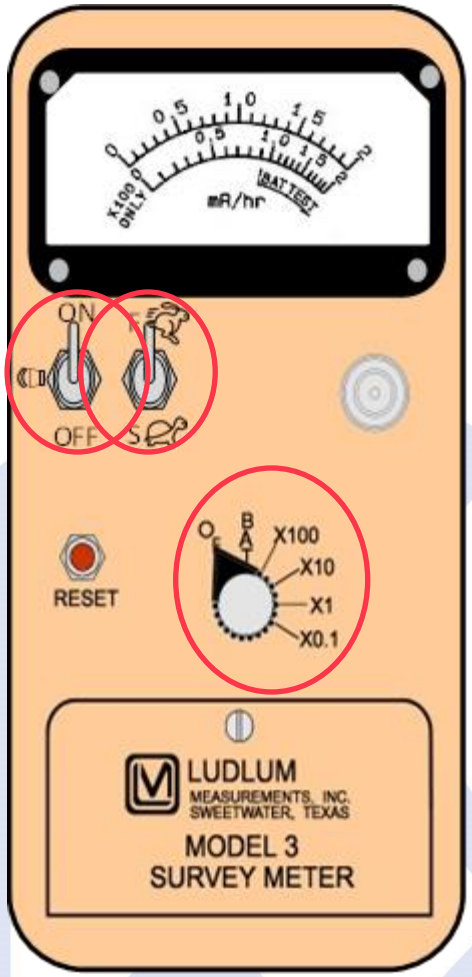
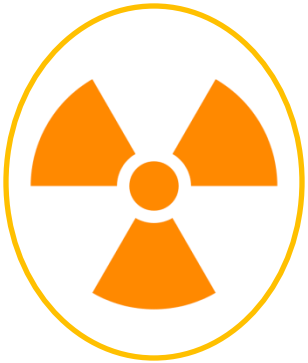
How to Start a Survey

- Turn on the survey meter and set to the the X.1 setting before you get near the area being surveyed.
- Make sure that the audio setting is on.
- Confirm the meter is set to the fast setting.
- Begin your survey.



Radiation Survey



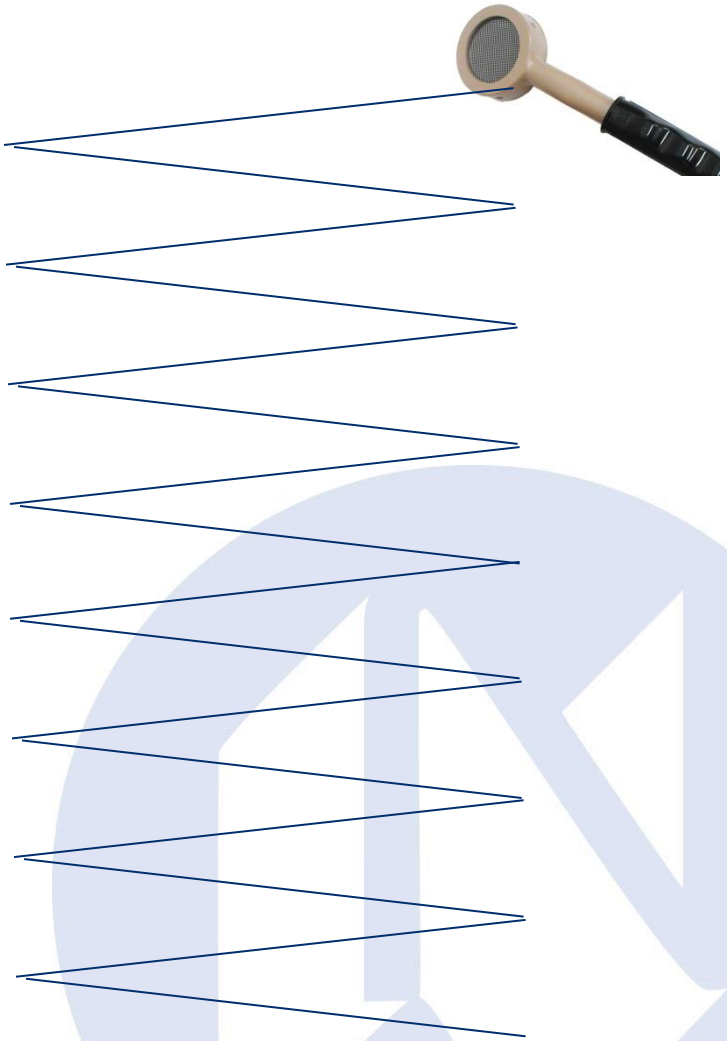
Make sure the probe DOES NOT touch the object you are surveying!

- As soon as the meter is turned on, it may begin to beep or click. This is naturally occurring background radiation.
- Place the probe as close to the area to be surveyed as possible, without actually touching it.
  - If there is any contamination the last thing you want to do is contaminate the survey meter.
- If you are too far away you won't pick up any small amounts of radiation with the probe.

How to Survey or Sweep

- Try to keep the probe within 1 inch of the surface and SLOWLY move it about 1 inch per second.

- Move in a “Z” pattern to be sure that the area is adequately surveyed.



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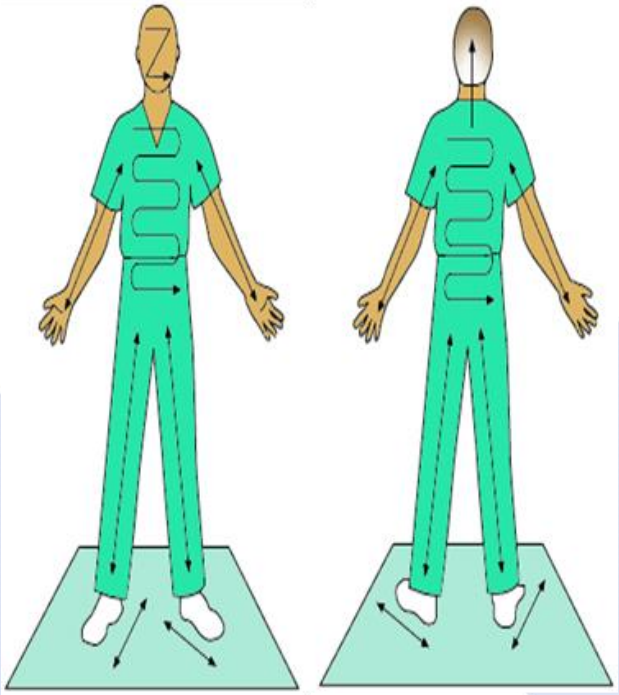
Personnel Monitoring (if needed)

The following procedures are recommended for personnel monitoring:

- Instruct the person to stand straight, feet spread slightly, arms extended with palms up and fingers straight out.
- Survey both hands and arms; then repeat with hands and arms turned over.
- Starting at the top of the head, cover the entire body, monitoring carefully the forehead, nose, mouth, neckline, torso, knees, and ankles.
- Have the subject turn around, and repeat the survey on the back of the body.
- Sweep the soles of the feet.



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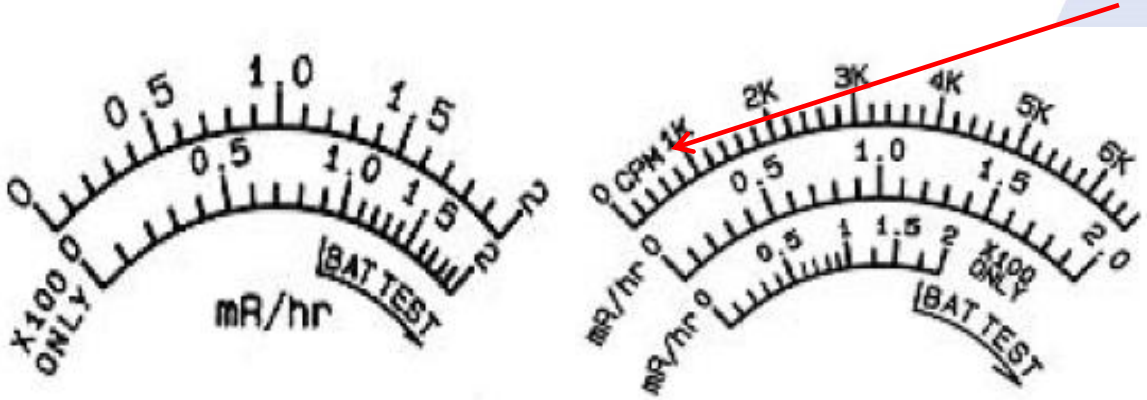
Reading the Meter Face

- Reading the meter face is very important for consistent measurements.

- There may be a variety of meter faces depending on the Survey meter you have.

- Since working with such low doses, you only have to worry about reading the exposure rate at mR/hr not CPM.



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Reading the Meter Face

- A typical dual scale (two arcs) meter face is shown below. The top scale reads 0-2 mR/hr. The bottom scale also reads 0-2 mR/hr and is for ×100 only scale. The ×100 ONLY scale will work correctly when the multiplier switch is in the ×100 range.

- If the needle is pointing as indicated below and the range selection switch is on the ×0.1 scale, then the reading is 0.1 mR/hr.

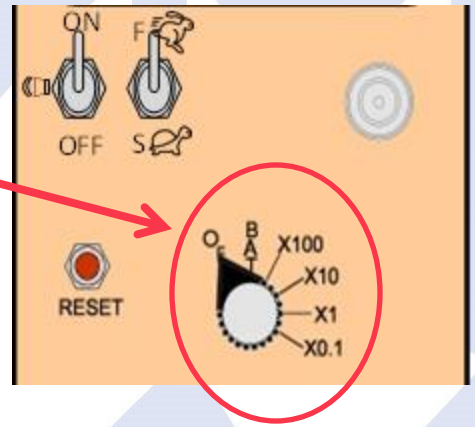
- The same needle indications on all ranges would be:

×0.1 = 0.1 mR/hr

×1 = 1.0 mR/hr

×10 = 10 mR/hr

×100 = 70 mR/hr



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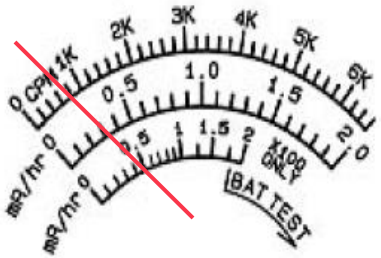
Reading the Meter Face

.1mR/hr



.03mR/hr

.15mR/hr

Above are 3 meters, using the x.1 setting, can you get the correct reading from each?

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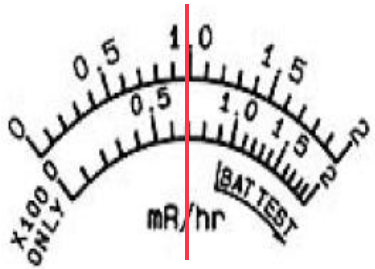
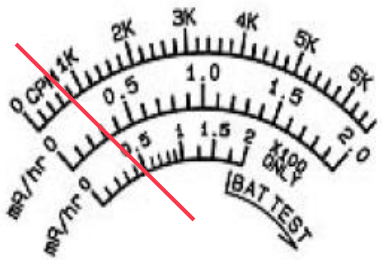
Reading the Meter Face



x10

10mR/hr



x1

3mR/hr

x100

70mR/hr

Now, try again using the scale settings displayed above.

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Recording Your Readings

- Once you have surveyed the area you must record your findings in the appropriate area of the tracking form.

- Each exam and facility has it's own form to document the findings. On the next slides you will find examples of each form and where to document your data.

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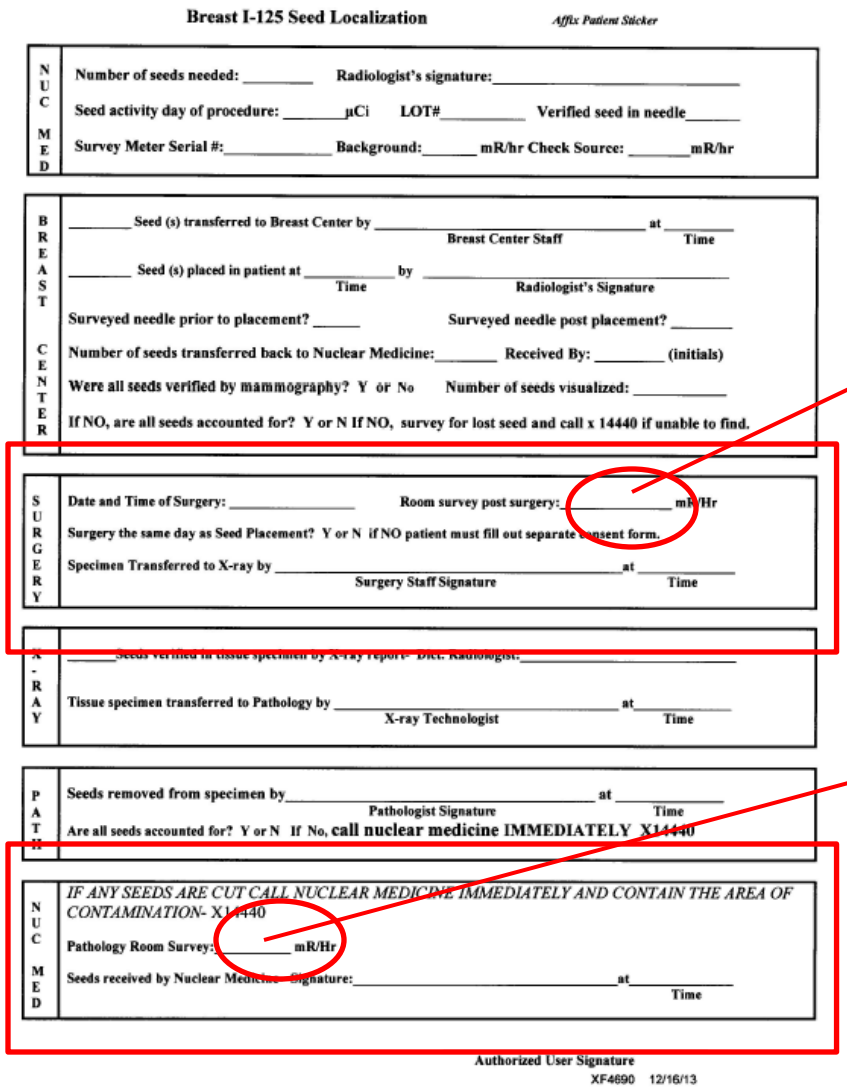
Breast Seed Localization - North Memorial Medical Center



Breast I-125 Seed Localization *Affix Patient Sticker*

NUC MED

Number of seeds needed: _____ Radiologist's signature:_____

Seed activity day of procedure: _____µCi LOT#_____ Verified seed in needle_____

Survey Meter Serial #:_____ Background:_____ mR/hr Check Source: _____mR/hr

BREAST CENTER

_____ Seed (s) transferred to Breast Center by _____ at _____
Breast Center Staff Time

_____ Seed (s) placed in patient at _____ by _____
Time Radiologist's Signature

Surveyed needle prior to placement? _____ Surveyed needle post placement? _____

Number of seeds transferred back to Nuclear Medicine:_____ Received By: _____ (initials)

Were all seeds verified by mammography? Y or No Number of seeds visualized: _____

If NO, are all seeds accounted for? Y or N If NO, survey for lost seed and call x 14440 if unable to find.

SURGERY

Date and Time of Surgery: _____ Room survey post surgery:_____ mR/Hr

Surgery the same day as Seed Placement? Y or N if NO patient must fill out separate consent form.

Specimen Transferred to X-ray by _____ at _____
Surgery Staff Signature Time

X-RAY

_____Seeds verified in tissue specimen by X-ray report- Dict. Radiologist:_____

Tissue specimen transferred to Pathology by _____ at_____
X-ray Technologist Time

PATH

Seeds removed from specimen by_____ at _____
Pathologist Signature Time

Are all seeds accounted for? Y or N If No, call nuclear medicine IMMEDIATELY X14440

NUC MED

IF ANY SEEDS ARE CUT CALL NUCLEAR MEDICINE IMMEDIATELY AND CONTAIN THE AREA OF CONTAMINATION- X14440

Pathology Room Survey:_____ mR/Hr

Seeds received by Nuclear Medicine- Signature:_____ at_____
Time

Authorized User Signature

XF4690 12/16/13

Room survey post surgery:_____ mR/Hr

NO patient must fill out separate consent form.

_____ at _____
gery Staff Signature Time

NUC MED

IF ANY SEEDS ARE CUT CALL NUCLE CONTAMINATION- X14440

Pathology Room Survey:_____ mR/Hr

Seeds received by Nuclear Medicine- Signature

- Hint: the mR/Hr should be close to what was documented under the NUC MED tab on the form.

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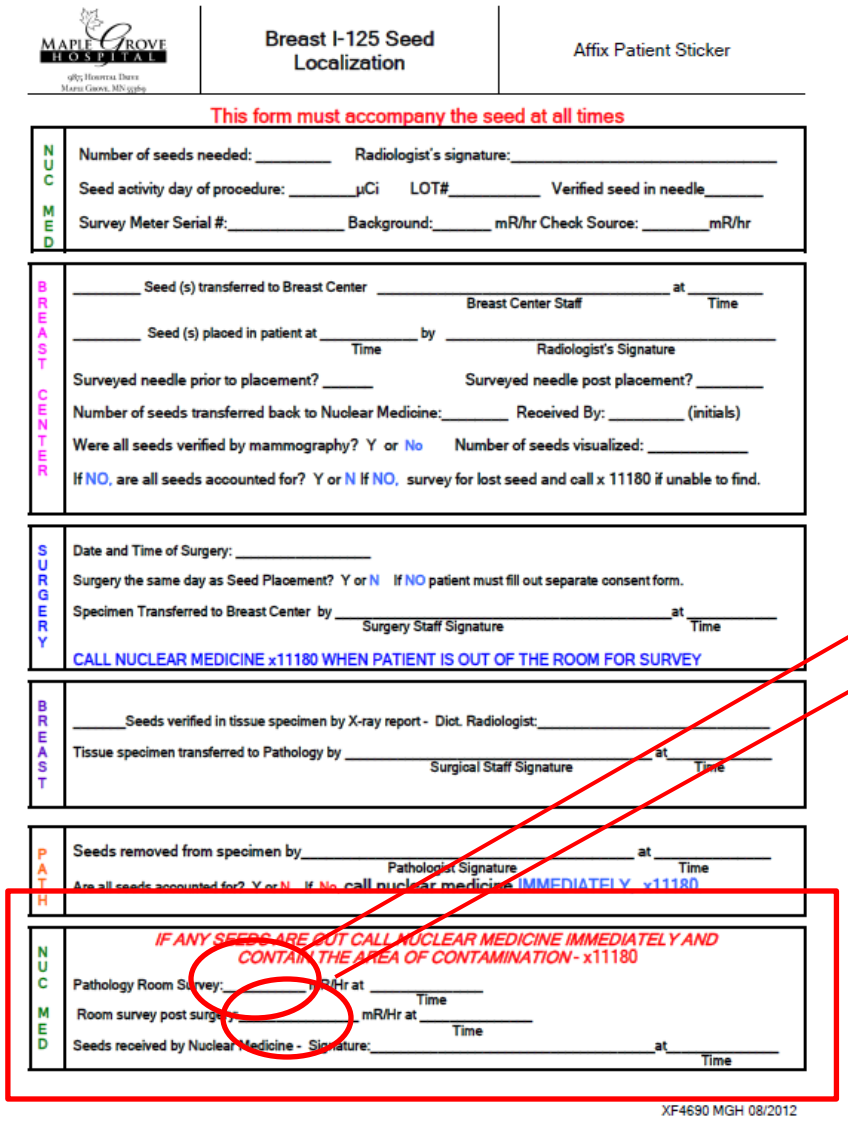
Breast Seed Localization – Maple Grove Hospital



MAPLE GROVE HOSPITAL

Breast I-125 Seed Localization

Affix Patient Sticker

This form must accompany the seed at all times

NUC MED

Number of seeds needed: _____ Radiologist's signature: _____

Seed activity day of procedure: _____µCi LOT#_____ Verified seed in needle_____

Survey Meter Serial #:_____ Background:_____ mR/hr Check Source: _____mR/hr

BREAST CENTER

_____ Seed (s) transferred to Breast Center _____ at _____
Breast Center Staff Time

_____ Seed (s) placed in patient at _____ by _____
Time Radiologist's Signature

Surveyed needle prior to placement? _____ Surveyed needle post placement? _____

Number of seeds transferred back to Nuclear Medicine:_____ Received By: _____ (initials)

Were all seeds verified by mammography? Y or No Number of seeds visualized: _____

If NO, are all seeds accounted for? Y or N If NO, survey for lost seed and call x 11180 if unable to find.

SURGERY

Date and Time of Surgery: _____

Surgery the same day as Seed Placement? Y or N If NO patient must fill out separate consent form.

Specimen Transferred to Breast Center by _____ at _____
Surgery Staff Signature Time

CALL NUCLEAR MEDICINE x11180 WHEN PATIENT IS OUT OF THE ROOM FOR SURVEY

BREAST

_____Seeds verified in tissue specimen by X-ray report - Dict. Radiologist:_____

Tissue specimen transferred to Pathology by _____ at _____
Surgical Staff Signature Time

PATH

Seeds removed from specimen by _____ at _____
Pathologist Signature Time

Are all seeds accounted for? Y or N If No call nuclear medicine IMMEDIATELY x11180

NUC MED

IF ANY SEEDS ARE OUT CALL NUCLEAR MEDICINE IMMEDIATELY AND CONTAIN THE AREA OF CONTAMINATION - x11180

Pathology Room Survey:_____ mR/Hr at _____
Time

Room survey post surgery:_____ mR/Hr at _____
Time

Seeds received by Nuclear Medicine - Signature:_____ at _____
Time

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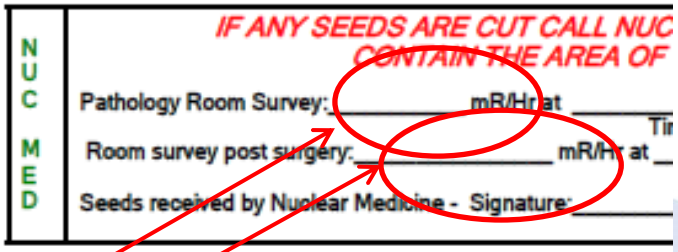

NUC MED

IF ANY SEEDS ARE CUT CALL NUC
CONTAIN THE AREA OF

Pathology Room Survey:_____ mR/Hr at _____
Ti

Room survey post surgery:_____ mR/Hr at _

Seeds received by Nuclear Medicine - Signature:_____

- Hint: the mR/Hr should be close to what was documented under the NUC MED tab on the form.

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Y – 90 Therapy Spheres - North Memorial Medical Center

Guidelines for SIR-Spheres Dose Preparation
And
Post Procedure Dose Verification

Patient Name:_____ Hospital Identifier: _____

Date: _____ Tumor Volume: _____

BSA: _____ Intended Dose: _____(mCi)

Liver Volume: _____ Authorized User:_____

1. Pre-Procedure Dose Vial Measurements

☐ Ion Chamber Readings

ENSURE THAT THE DISTANCE THE READINGS ARE TAKEN IS NOTED SO THE DISTANCE WILL BE THE SAME FOR THE PRE AND POST PROCEDURE

90° (mR/h)	180° (mR/h)	270° (mR/h)	360° (mR/h)

Average _____

2. Post-Procedure Dose Vial Measurements

☐ Ion Chamber Readings

ENSURE THAT READINGS ARE TAKEN FROM THE SAME DISTANCE AS THE PRE-PROCEDURE READINGS WERE TAKEN

90° (mR/h)	180° (mR/h)	270° (mR/h)	360° (mR/h)

Average _____

3. Percent Dose Delivered: 1 – (Avg. Post/Avg. Pre) x 100 _____%

4. Dose Delivered: (Drawn Dose x % Dose Delivered) _____mCi*

*If different from Prescribed Dose: ___ Yes ___ No

Reason:

5. Post Therapy Survey of Staff & Room: _____mR/hr Performed by: _____ Initials
Date: _____

Signed: _____ Signed: _____

Title: _____ Title: _____

5. Post Therapy Survey of Staff & Room: _____mR/hr
Date: _____

Signed: _____ Signed: ___

Title: _____ Title: ___

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Document Your Training

Congratulations!

You have now completed this portion of your Radiation Survey Geiger Counter Training.

To finish, please take the quiz.

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