

Standard Operating Procedure

Personnel Decontamination: Nuclear Medicine Radiation Safety

Purpose

This procedure outlines the steps following a radioactive personnel contamination event to ensure decontamination of personnel is performed in a safe manner, minimizing the impacts to the contaminated individual, staff, public, and the surrounding environment.

Scope

This Standard Operating Procedure is to be followed by all Lower Mainland Medical Imaging (LMMI) Nuclear Medicine departments within Fraser Health Authority (FHA), Providence Health Care (PHC), Provincial Health Services Authority (PHSA) and Vancouver Coastal Health (VCH). Personnel decontamination must only be conducted by trained personnel.

General Considerations

If a worker is injured, proceed immediately with first aid procedures. Life-saving operations should not be prevented or delayed due to radiation exposure considerations.

Contamination incidents do not pose a high risk for the person assisting with decontamination. Where the contamination involves I-125 or I-131, pregnant staff can assist if no one else is available, but should be relieved by another trained worker as soon as possible.

Supplies and Equipment

Spill/Decontamination kit

Supplies	PPE
<ul style="list-style-type: none"> ▪ Tripads, paper towels, absorbent materials ▪ Soap or decontamination solution (eg. Radiacwash, Bind-it) ▪ Marker/felt pen/pen ▪ Plastic garbage bags ▪ Clean scrubs ▪ Shampoo and hair nets ▪ Q-tips ▪ Tongs/forceps ▪ Radioactive barrier tape ▪ Report Form 	<ul style="list-style-type: none"> ▪ Disposable nitrile gloves with extended cuff recommended ▪ Disposable fluid impermeable shoe covers/booties ▪ Fluid impermeable gowns ▪ Disposable face shield

Additional Equipment

<ul style="list-style-type: none"> ▪ Contamination monitor (in cps or cpm setting) – refer to site-specific monitor requirements ▪ Survey meter ($\mu\text{Sv/hr}$) ▪ Dosimeter (personal or electronic)
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1. Immediate Response

As per the [Incident Command Process](#), any injured personnel should seek first aid assistance immediately. Personnel in the immediate area should be notified of the spill and warning signs should be placed in the area to prevent further contamination. Call for additional assistance as applicable, including notification of the Site RSO (SRSO). Care must be taken to ensure further contamination is minimized.

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2. Instruct contaminated individual to stay put and not leave the area

Remind the individual to avoid spreading contamination through touching face or other body parts. If the contaminated individual is on their own, put on clean gloves, gowns and booties to limit the spread of contamination and call for assistance.

3. Don personal protective equipment (PPE)

Don PPE to assist with personnel decontamination:

- Double gloves - extended cuff underneath gown, regular cuff over gown
- Disposable impermeable booties
- Impermeable gown – if there is a splash risk
- Hair net or ponytail for long hair
- Face shield - if there is a splash risk

4. Perform instrument check

- Using Page 1 of the RS Report Form, record the contamination monitor being used.
- Perform battery check.
- Select cps or cpm count rate.
- Record background.

5. Identify the personnel contamination level and extent

5.1. Identify a decontamination location with a sink

- If the background is high, move to a lower background area where the contaminated individual can be surveyed and decontaminated.
- Record the background reading on the RS Report Form
- Tape a clean pad to the floor.

5.2. Position the person to be surveyed

- Instruct the individual to move to the decontamination location taking precautions to limit the spread of contamination (ie. disposable booties and gowns or placing tripads on the ground).
- Instruct the individual to stand upright on the clean pad, feet spread slightly, arms extended from body, palms up, fingers extended from hand.
- Caution the individual not to move or touch their face.
- Assist the individual with removing PPE if applicable; place PPE in a bag then mark the bag as radioactive and remove the bag from the area.

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5.3. Perform body survey and record results

- Hold the contamination meter roughly 1cm from the surface to be surveyed, scan surface slowly at a rate of 2-4 cm per second.
- Survey head to toe, front to back and mark any areas of skin where contamination is found using a waterproof felt/marker as needed.
- Hold the contamination meter over areas showing elevated readings for ~10 seconds to determine the count rate. Record results on the [Report Form: NM Radiation Safety](#). Use a separate copy for each contaminated person.
- Remove any personal contaminated items and place in a bag then mark the bag as radioactive and remove the bag from the area.

5.4. Considerations for widespread contamination

- Consider moving the individual to a decontamination shower.
- Prevent spread of contamination to the eyes, nose or mouth. For example, use disposable hair caps to contain hair contamination and use waterproof band aids for small contaminated areas.
- Proceed with Step 6, and then move to Step 7.5 for widespread contamination.

6. Notify

Notify the Site RSO if contamination is found.

7. Decontamination Steps

Instruct the individual to perform decontamination as follows and assist as needed. Prepare bags for contaminated waste and linen.

7.1. Eyes

- Flush the contaminated eye(s) with copious amounts of water at the sink or at the nearest eyewash station.

7.2. Hands, Face or Uncovered Body Parts:

- Instruct individual to gently wash the contaminated area(s) thoroughly at the sink using soap and tepid (not hot or cold) water, avoiding further contamination.

7.3. Ear nose and mouth

- Rinse the area with tepid (not hot or cold) water.
- Encourage individual to blow their nose.
- If needed, use a moistened Q-tip to gently swab contaminated areas. Monitor the Q-tip and record results.

7.4. Hair

- Instruct the individual to wash their hair thoroughly at the sink or shower using soap or shampoo and tepid (not hot or cold) water, avoiding further contamination from contaminated water.
- Do not use conditioner as it will cause radioactive materials to stick to the hair.
- Dry hair with clean towels and place them in the linen bag.

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7.5. If the contamination is not localized to one area/widespread contamination:

- Remove all clothing, shoes and accessories and place them in a plastic bag for monitoring.
- Instruct the individual to conduct decontamination as follows:
 - Shower using soap and tepid (not hot or cold) water. Take care not to break the skin while scrubbing.
 - If decontaminating hair, do not use conditioner as it will cause radioactive materials to stick to the hair.
- Provide the individual with a set of clean scrubs and clean booties to wear.

8. Reassess the contamination level and extent

- Reassess the individual for contamination using a contamination meter.
- Record results on the [Report Form: NM Radiation Safety](#).
- If contamination is still present, repeat decontamination steps.

9. Decontamination ends

- Decontamination efforts can stop when repeated decontamination cycles no longer reduce the count or when the contamination meter measures less than 2 times the background radiation level.
- If the attempt to remove all contamination from the skin or other area is not successful, the contamination is now fixed:
 - Cover areas of residual radiation contamination with waterproof gloves or dressings.
 - Encourage the individual to sweat by exercising, by wearing gloves for few hours or other activities that promote sweating.
 - Note that some radioactivity may be trapped in outermost layer of skin and will remain until normal sloughing occurs (12-15 days).
 - Seek advice from SRSO and plan for re-monitoring the individual.

10. Remove PPE

Remove booties, outer gloves, disposable gown, and inner gloves then discard them in a plastic waste bag.

11. Monitor individuals for contamination

- Use the contamination meter to monitor all individuals assisting in the decontamination. Record results on the [Report Form: NM Radiation Safety](#).
- If contamination is identified, follow the above decontamination process and notify the site RSO. Take care not to spread contamination.

12. Monitor areas for contamination

- Use the contamination and survey meters to monitor the areas used for decontamination. Record results on the [Report Form: NM Radiation Safety](#).
- If contamination or dose rates above limits for a public or controlled area are found (as applicable for the area used), follow the [Radioactive Spill Clean-up](#) SOP

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13. Handling Personal Items & Waste management:

- Put on a clean pair of gloves.
- Monitor any removed personal items for contamination. Proceed with decontamination as applicable. Place contaminated personal belongings in a separate bag and label the bag with the worker's name, the isotope, and contamination level date and radiation symbol. Items can be returned once they are below public limits (see **Table 1** in [Radioisotope Spill Clean-up SOP](#)).
- Handle all waste as per site procedure.

14. Documenting and Reporting

Use the [Report Form: NM Radiation Safety](#) to complete documentation of the personnel contamination information and provide to SRSO.

The SRSO will estimate the doses for any skin contamination and communicate results to RRSO for verification.

Workers must call the Provincial Workplace Health Call Centre (PWHCC) 1-866-922-9464 to complete an employee incident report if skin dose exceeds:

- 5 mSv for a non-NEW
- 25 mSv for a NEW

Workers can contact the PWHCC for any skin contamination event, even if the dose is less than reporting limits listed above.

15. Arrange for any necessary thyroid monitoring

The SRSO will determine which personnel involved in the decontamination efforts must receive thyroid monitoring.

16. Incident Follow-up

The SRSO, RRSO and Workplace Health will facilitate any investigation and submission of reports to the CNSC and/or WorkSafeBC as needed.

Note: An immediate report to CNSC must be submitted by the RRSO in the case of a major spill or if the skin doses are found to be as follows:

- If a Nuclear Energy Worker (NEW) was calculated to have received a skin dose above 50mSv.
- If a non-NEW was calculated to have received a skin dose above 5mSv.

17. Restock decontamination supplies and equipment as necessary

Replenish any supplies/equipment.

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References/Associated Documents:

- US Department of Health & Human Services. Radiation Emergency Medical Management: Procedures for Radiation Decontamination. March, 2019.
https://www.remm.nlm.gov/ext_contamination.htm#photo
- https://www.remm.nlm.gov/ext_contamination.htm
- Centers for Disease Control and Prevention. Emergency Preparedness and Response: Self-Decontamination. April, 2018. https://emergency.cdc.gov/radiation/selfdecon_wash.asp
- [Report Form: NM Radiation Safety](#)
- Radioactive Spill Warning Sign
- [Incident Command Process](#)
- [Radioisotope Spill Clean-Up SOP](#)

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	1.0	30-JUN-2019	Initial Release	Roxana Ralea - RRSO Marjorie Gonzalez – RRSO Rhonda Hollerbaum - RPL Micah Ho - WPH Jackie Ellis - WPH
	2.0	31-DEC-2019	Cleaned-up the wording, replaced Radioactive Spill and Contamination Report with RS Report Form, eliminated hand and body diagram as they are part of the RS Report Form.	Roxana Ralea - RRSO Marjorie Gonzalez – RRSO Rhonda Hollerbaum - RPL Micah Ho - WPH Jackie Ellis – WPH
	3.0	2-AUG-2022	Increased the NEW reportable limit for skin contamination to Provincial Workplace Health Call Center (PWHCC) from 5 mSv to 25 mSv.	Roxana Ralea - RRSO Rhonda Hollerbaum – RPL Erin Dahlen - RRSCo Izaaz Badshah - RRSCo Cindy Wu - WPH Dennis He - WPH Wylie Li - WPH Alina Tepes - WPH

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