Ionising Radiation Regulations 1999

LOCAL RULES

These rules apply to the following areas:-

Lab G 020
Medical Research Facility
Aberdeen Royal Infirmary

Issue date – April 2012

Review date – April 2014

Note If you are readings this document after the review date please check with your RPS that you have the latest version
1. **Radiation protection supervisor is:** Gernot Riedel and Marco Mingarelli

2. **Designated areas – Lab G020**

<table>
<thead>
<tr>
<th>Controlled radiation areas</th>
<th>Supervised radiation areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab G020</td>
<td>N/A</td>
</tr>
</tbody>
</table>

3. **Unsealed Radionuclides used and**

<table>
<thead>
<tr>
<th>Radionuclide</th>
<th>Half Life</th>
<th>Emissions</th>
<th>Contamination monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-18</td>
<td>110 minutes</td>
<td>Gamma and Beta</td>
<td>EP15-FL</td>
</tr>
<tr>
<td>C-11</td>
<td>20.4 minutes</td>
<td>Gamma and Beta</td>
<td>EP15-FL</td>
</tr>
</tbody>
</table>

4. **allocated holding and aqueous disposal limits**

<table>
<thead>
<tr>
<th></th>
<th>Holding limit</th>
<th>Aqueous disposal limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-18</td>
<td>500</td>
<td>90</td>
</tr>
<tr>
<td>C-11</td>
<td>500</td>
<td>0</td>
</tr>
</tbody>
</table>

5. **Radiation Equipment used in the area**

   Series 900 mini monitor with and EP15-FL probe
   PET CT scanner
   Well counter for measuring activity of doses

6. **General Lab arrangements**

   These rules must be posted in each laboratory radioactive materials are handled. A prior risk assessment must be carried out before commencing new work activities and recorded using form on the iso-inventory system.

   **Access to the lab**
   - Access to radiation areas should be restricted to those who have been trained and are directly involved in the experiment unless authorised unless they are under the close supervision of the RPS.

   **General**
   - Experiments should be carefully planned and should only take place if no other equivalent experiment which does not involve radioactive substances exists.
   - Consideration should be always be given to using the least hazardous radionuclide for example P-33 should be used in preference to P-32.
   - Experiments involving radioactive materials should only be carried out by suitably trained staff/students. Any new member of staff or student wishing to under take work with unsealed radioactive substances must first have completed the basic radiation safety course. Additionally the principle investigator/RPS should ensure that all staff or students working on the experiment are proficient in basic laboratory techniques before they start manipulation of radioactive substances unsupervised. It is important that all staff involved in this work are suitably trained in carrying out contamination monitoring.
lab procedures

- Observe all the basic laboratory safety procedures:
  - There must be no eating, drinking or applying cosmetics in the laboratory
  - Never use your mouth to pipette
  - If you see a colleague doing something dangerous, point it out to him/her immediately and if necessary report it to the RPS
  - Work must not be carried out by a person with an undressed cut or abrasion below the wrist

- Lab coats or other suitable protective clothing should be worn at all times when entering a supervised area. Disposable gloves and protective eyeglasses should be worn whenever unsealed sources are being handled or manipulated.

- Work should be carried out over trays wherever possible.

- All apparatus being used with radioactive materials must be labelled using “radioactive” warning tape. The tape must be removed when the apparatus has been washed and found to be clear of contamination.

- Radioactive substances must only be removed from controlled or supervised areas in closed uncontaminated containers.

- Radionuclides emitting penetrating radiations must be adequately shielded. Lead shielding must be used for gamma emitters and perspex shielding for beta emitters.

- Containers for radioactive materials other than Carbon-14 and tritium should not be directly held in the unprotected hand. (Note: the outside of containers of Carbon-14 and H-3 can become contaminated so it is good practice to wear gloves when handling them). Tweezers should be used for handling sealed radioactive sources.

- Contamination must be contained without delay and you must be familiar with the contingency procedures given in section 14.

- Keep the time spent manipulating radioactive substances to a minimum.

- Place any waste items in the appropriate bin as described in section 13.

- Keep all radioactive materials in labelled containers and stored in designated fridge. In general, fridges that are used to store radioactive materials should not be used to stored non active items. If it is necessary to use a fridge for active and non active items there should be clear demarcation and additional containment for the active items.

- At the end of a work session always tidy up and perform a contamination check of the bench, see section 10. If significant contamination is found then follow the contingency procedure.

- Always check your gloves, hands and laboratory coat for radioactive contamination before leaving the laboratory, see below.

- Wash your hands using the hand wash sink before leaving the laboratory.

- In case of emergency remain calm and follow the contingency procedures.
7. **Local arrangements and procedures**

All doses are prepared on a tray behind the lead castle in lab G020 and administered to the subject on the scanner bed. The subjects are handled for a minimum amount of time to reduce the external dose to the operator. The operator keeps the largest reasonable distance between themselves and the subject once the dose has been administered. An interlock on the PET CT scanner ensures that the lead shield surrounding the scanner must be locked into position before the CT scan can start. After the subject has been scanned, their cage is placed behind a second lead shield during their recovery period.

8. **Pregnant and breast feeding females**

Any employee who is, or thinks they may be pregnant should immediately tell the RPS in writing and stop working the in the Lab G 020. Pregnant staff can only continue working in once a suitable risk assessment indicates that the potential dose to the foetus is less than 1mSv. Employees who are who are breast feeding should also stop working in G 020 until a suitable risk assessment has been carried out.

9. **Personal Monitoring**

If you are issued with a personal dose monitor you must wear it and it is your responsibility to look after it. These badges should be worn at hip or waist level. For work with certain isotopes, additional dosimeters may have to be worn on the fingers or at neck level. If you lose your dosimeter or it is damaged (or goes through a washing machine) tell your RPS without delay and arrangements will be made to issue a replacement. You should stop working with radioactive materials until a replacement monitor has arrived.

The contact person in the MRF is Marco Mingarelli who distributes the new dosimeters to staff and collects the old dosimeters and returns them to the Radiation Protection Service for processing.

10. **Dose investigation levels**

The following dose investigation levels apply.

<table>
<thead>
<tr>
<th>Investigation level</th>
<th>Effective whole body dose (mSv)</th>
<th>Equivalent dose to the skin (averaged over &lt;100cm²) (mSv)</th>
<th>Equivalent dose to lens of the eye. (mSv)</th>
<th>Equivalent dose Hands, forearms, feet and ankles (mSv)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.3</td>
<td>7.5</td>
<td>2</td>
<td>7.5</td>
</tr>
</tbody>
</table>

‘wear period will either 1 or 2 months as directed by RPA

If one of these levels is exceeded an immediate investigation should take place to establish why the level has been exceeded and any preventative actions that are required.

11. **Contamination monitoring**
When the work session is completed the dispensing area, work bench, anaesthetic area, recovery area and scanner should be checked for contamination using a series 900 mini monitor with an EP15FL probe. The background level and monitored levels should be recorded in the contamination monitoring form.

Any person involved in the work session should also monitor themselves for contamination at the end of each session or before they leave lab G 020.

12. Ordering radioactive materials
Sealed sources must not be ordered

A stock of F18 is ordered from the PET facility, Aberdeen Royal Infirmary by phone the day before the stock is required. A paper record of the reference details of the stock is kept in lab G 020.

13. Storing radioactive materials

The stock of F18 is stored behind the lead castle in lab G 020
The vial and lead container are labelled with the reference data and nuclide information.

14. Disposing of radioactive waste

Due to the short half life of the nuclides used, any contaminated waste produced is stored until it has decayed to background and then disposed of via the appropriate route e.g. Sharps bin or black bag waste.

15. Contingency arrangements

Contingency A - RADIATION SPILLAGE

1. Immediately alert personnel working near the area of the radiation spill and if possible alert RPS. **Deal with contaminated personnel first, see Contingency B “CONTAMINATION OF STAFF”** If in doubt contact radiation protection service for help and advice, see contact numbers at bottom of sheet.

2. Any personnel not required to deal with the spillage should remove themselves from the area after checking themselves for contamination.

3. Do not allow anyone to walk through the spillage and spread the contamination. If possible isolate and cordon off the area using warning tapes and signs.

4. If the laboratory does not have to be used immediately, then vacate the area until the radioactivity has decayed.

5. When the spill is no longer active, treat as an ordinary chemical spill.

6. If clean up is to be attempted wear a protective apron, overshoes shoes and gloves.

7. Cover the spillage with absorbent material to prevent it from spreading.

8. Using tongs start to mop up from the outside in.
9. Ensure that any glass that has broken is placed in a sharps bin and label as radioactive.

10. Monitor the area to ensure that all the activity has been removed.

11. **DO NOT CONTAMINATE THE MONITOR!**

12. Carefully dispose of the active cloths in a black plastic bag labelled as radioactive waste.

13. If the area has been cleared of radioactivity, remove the tapes and signs.

14. Remove apron, shoes, gloves and place in the black plastic bag.

15. Seal the bag and place behind lead bricks.

16. Monitor hands, clothes and feet to ensure that they are not active.

17. Check that the black plastic bag is no longer radioactive before disposal (next day).

18. Remember to remove the radioactive waste label from the bag before it leaves the unit.

**Emergency Contact Numbers**

**Radiation Protection Bleep** 07623 857377 - key in telephone number when promoted.

Other numbers
Stephen McCallum 53109 or 01224 865951 (Home)
Mrs Claire Redford 53209
Mrs Lynsey McKay 52515

**Contingency B – CONTAMINATION OF STAFF**

If a member of staff believes they are contaminated they should always attempt to locate the contaminated area and decontaminate just that area.

**Contamination of the skin, hands, arms etc**

- If significant contamination is found on the hands staff should remove and discard gloves and re-monitor their bare hands.

- If still contaminated then the hands should be washed using a suitable detergent and then re-monitored and if necessary a soft brush should be used. Care should be taken not to break the skin.

- Other areas of exposed skin should be washed in a similar manner and re-monitored.

- If contamination persists then any ‘hot spots’ should be located and the area treated with a saturated solution of potassium permanganate (the brown discolouration can be removed with 10% solution of sodium metabisulphate). Note down the reading on the contamination monitor. Contact RPA for advice.

- The RPS should make an appropriate report any incident, including an estimation of the
Contamination due to needlestick injury

- If a needlestick injury occurs, make the wound bleed by squeezing the surrounding area. Ensure any blood from the wound is contained on absorbent material. As it is a bio-hazard and may also be active

- UNDER NO CIRCUMSTANCES SHOULD YOU SUCK THE WOUND

- Monitor the wound using the contamination monitor to check for residual contamination.

- If contamination persists then any ‘hot spots’ should be treated with a saturated solution of potassium permanganate (the brown discolouration can be removed with 10% solution of sodium metabisulphate). Note down the reading on the contamination monitor. Contact RPA for advice.

- The RPS should make an appropriate report any incident, including an estimation of the dose, and submit it to the RPA.

Contamination in the eyes

- If a member of staff suspects that radioactivity has splashed into their eyes, they should use the eye bath provided.

- Another member of staff should then take a reading using the contamination monitor. If contamination persists then contact the RPA and the contaminated member of staff should go to the emergency eye clinic.

- The RPS should make a suitable report of any incident, including an estimation of dose, and submit to the RPA.

Contamination on clothing

- If contamination is found on clothing, the clothing should be removed, bagged and either disposed of or be allowed to decay. Clean scrubs are stored in the cupboard in lab G020.