Introductory Notes

The University Radiation Safety Policy requires that all new projects involving the use of ionizing radiation have a risk assessment of the hazards conducted and control measures implemented prior to the commencement of any radiation work.

This form should be completed and forwarded to the Radiation Safety Committee for their approval. All new research projects using ionizing radiation must have approval by the Radiation Safety Committee prior to commencement of the radiation work.

For new projects awaiting research grant funding, the researcher should initially check that the project will satisfy the Work Environment, Hazard & Control Measures and the Waste Production sections of this document. When funding is secured and the project has approval to commence, this form should then be completed and forwarded to the Radiation Safety Committee.

Instructions

The following questions and checklists are designed to assist researchers in assessing the hazards associated with their projects and the measures required to control those hazards. The checklist also ensures that regulatory requirements of the NSW Radiation Control Act & Regulation are satisfied. [Refer to the Radiation Control Act 2 and Regulation 3 for details].

Tick appropriate boxes and add notes to each section in the space provided as appropriate.

The project involves:

- Radioactivity below the scheduled limit for licensing
- Radioactive material requiring a licence to use
- Premises requiring registration
- Irradiating equipment that requiring registration

<table>
<thead>
<tr>
<th>Project title:</th>
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<tbody>
<tr>
<td>Name of Granting Body:</td>
<td></td>
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<tr>
<td>Name of Granting Scheme:</td>
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<tr>
<td>Duration of Project:</td>
<td></td>
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<tr>
<td>Building and room number[s] where radiation work will be done:</td>
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<tr>
<td>DECCW premises registration number:</td>
<td></td>
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<tr>
<td>Chief Investigator:</td>
<td></td>
</tr>
<tr>
<td>Name:</td>
<td></td>
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<tr>
<td>e-mail:</td>
<td></td>
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<tr>
<td>contact number:</td>
<td></td>
</tr>
<tr>
<td>Chief Investigator’s radiation licence number:</td>
<td></td>
</tr>
<tr>
<td>Type of radiation source:</td>
<td></td>
</tr>
<tr>
<td>ie. P-32, I-125, X-ray:</td>
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</table>
RISK ASSESSMENT

Source of Radiation:

Complete details for the type of source[s] used in the project!

1. Unsealed Sources

<table>
<thead>
<tr>
<th>Radionuclide</th>
<th>Physical form</th>
<th>Chemical form</th>
<th>Total activity held Bq</th>
<th>Activity used per procedure Bq</th>
<th>Half Life</th>
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</table>

2. Sealed Sources

<table>
<thead>
<tr>
<th>Radionuclide</th>
<th>Total activity Bq</th>
<th>Source activity at calibration date</th>
<th>Half Life</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

3. Irradiating Apparatus

<table>
<thead>
<tr>
<th>Type of equipment [eg. diagnostic, analytical]</th>
<th>Make &amp; model</th>
<th>Maximum kV or keV</th>
<th>DECCW Registration? Y/N</th>
</tr>
</thead>
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</table>

Procedures:

Briefly describe what procedures will be conducted with:

1. Unsealed radioactive material.

   Procedures [eg. labelling, radio-tracer]

2. Sealed radioactive sources or X-ray apparatus

   Procedures [eg. Gamma irradiation, material analysis, imaging]
Work Environment:

For work with unsealed radioactive material, the laboratory should have the following features:

- Sealed floor and bench top joints
- Smooth washable waterproof bench tops
- Smooth walls finished with washable paint
- Secure isotopes storage facilities
- Stainless steel sinks
- Hands free operated washbasin
- A fume cupboard [may be optional]

If medium level activities are to be used [see definition below], the laboratory should have the additional features:

- Floor covering coved to walls
- Bench tops coved to walls
- Knee or foot operated wash basins
- Continuous drainage systems labelled at accessible points
- Smooth ceilings including flush light fittings
- A fume cupboard
- Coved ceilings to walls [for upper activity levels of the range]

If the laboratory does not have all of the above features, provide a brief explanation of why that feature is not required.

Definition:

Medium level laboratories are defined by the activity and radio toxicity group of the isotope used.

For commonly used isotopes, medium level laboratories are those using activities in the following ranges:

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Toxicity group</th>
<th>Activity range</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-3, Kr-85, Tc-99m</td>
<td>4</td>
<td>200 GBq – 20 TBq</td>
</tr>
<tr>
<td>C-14, P-32, S-35, Cr-51, Fe-59</td>
<td>3</td>
<td>2 GBq – 200 GBq</td>
</tr>
<tr>
<td>Ca-45, Sr-90, I-125, I-131, Cs-137</td>
<td>2</td>
<td>20 MBq – 2 GBq</td>
</tr>
</tbody>
</table>

For further information about other isotopes, see Table C3 of Appendix C of the Safety in Laboratories Standard AS 2243.4. This table lists the toxicity groups of isotopes, from which the medium level activity range can be determined. Low, medium & high activity ranges are listed in Table F1 of Appendix F of the same standard. Alternatively contact the University RSO, howard.ackland@sydney.edu.au for advice.
Hazards & Control Measures:
Tick what radiation hazards are associated with your procedures:
- External Gamma or X-ray radiation
- External Beta radiation
- Inhalation, Ingestion or Absorption of radioactive material
- Contamination of Work area
- Personal Contamination
- Other Hazards [specify]

Tick what features are applicable to your laboratory:
- Secure facility with only authorized access
- Designated radiation work area within facility
- Clear and cluttered work area
- Effective shielding of operator
- Effective shielding of sources in storage
- Dedicated fume cupboard or glove box
- Designated secure storage area for radioisotopes
- Spill clean-up kit

Tick which procedures are in place in your laboratory:
- Standard operating procedures
- Work conducted over spill trays or absorbent bench covers
- Work surface monitoring and decontamination procedures
- Radioactive waste storage and disposal procedures
- Emergency procedures
- Personal monitoring procedures – where appropriate

Tick which administrative controls are in place in your laboratory:
- Restricted access to radiation facility
- List of personnel authorized to use radiation
- Radiation safety training program for project personnel
- Local induction, training and orientation
- Records of project team training
- Hazard signs displayed at entry to facility
- Labelling of all containers with radioactive material
- Records kept of radiation usage

The above are the basic control measures that should be in place in any radiation laboratory. If some of the items are not in place in your laboratory, make certain that they are not required.
Waste Production:
Briefly describe what radioactive waste will be generated from the process?

<table>
<thead>
<tr>
<th>Form of waste</th>
<th>Type of waste</th>
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</thead>
<tbody>
<tr>
<td>Liquid</td>
<td>[eg. scintillation liquid, contaminated absorbent paper, gloves, vials, biological waste]</td>
</tr>
<tr>
<td>Solid</td>
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<tr>
<td>Gaseous</td>
<td></td>
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</tbody>
</table>

What is the estimated activity & amount of waste?

<table>
<thead>
<tr>
<th>Activity of waste generated per experiment</th>
<th>&lt;100Bq/gm</th>
<th>&gt;100Bq/gm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of waste generated: Litres or kilograms per experiment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated total volume of waste per month</td>
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</table>

Waste disposal:

- If waste is >100Bq/gm

Where will the waste be stored? [Waste store, in lab, freezer etc.]

__________________________________________________________________________

If waste will decay to <100 Bq/gm – what storage time is required?

__________________________________________________________________________

- If waste is <100Bq/gm

How will it be disposed of?

__________________________________________________________________________

Individuals Involved:

Consider each project team member (where they are known) and their capacity to do the work safely and effectively.

<table>
<thead>
<tr>
<th>Name</th>
<th>Role in team eg research assistant</th>
<th>Experience &amp; training [including date of training]</th>
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</tbody>
</table>
RISK SUMMARY & CONCLUSION

After considering the hazards and risk control methods, tick which one of the following is appropriate:

- The risk posed is insignificant and unlikely to increase during the course of the project.
- The risk is significant, but will be effectively controlled.
- There is uncertainty about the level of risk.
- The risk is significant and cannot be effectively controlled.

RISK EVALUATION

The project is to be reviewed annually to check that risk controls are still in place, relevant and working effectively. Risk control methods should also be reviewed whenever there is an incident or if there is a significant change to the equipment or types and amounts of isotopes used.

Name of reviewer:
Review dates:

DECLARATION

As the Chief Investigator of this project, I am satisfied that:

- The use of ionizing radiation is essential for the completion of this project
- The amount of radioactive waste produced by this project is the minimum possible
- The department has facilities for the storage and disposal of all waste radioactive material
- The facilities are or will be made suitable for work with ionising radiation prior to commencement of the project.
- The risk control measures listed above will be in place prior to commencement of work with ionising radiation.
- Research staff have an appropriate licence to use sources of radiation
- Radiation laboratories are appropriately registered
- Irradiating apparatus are registered

Additional Comments: __________________________________________________________

Chief Investigator
Head of Department

Name (please print): ____________________________________________________________
Signature: ________________________________ ________________________________
Date: ________________________________ ________________________________

Please attach copies of:
- The registration certificate for the laboratory or apparatus
- The Chief investigator’s licence to use radiation sources
- Standard operating procedures
- Emergency procedures dealing with spills

This completed form should be forwarded to:
University Radiation Safety Officer
OHS Office
Room 306
Margaret Telfer Building K 07
howard.ackland@sydney.edu.au

30 May 2011
Radiation Safety Committee’s Approval / Comments

For RSC use only.

The project will be conducted in:

Room: _______, Building: ________, DECCW Registration number: ________

Comments:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

The Committee considers that there are adequate risk control measures in place to permit this project to be conducted safely. In addition, there is a disposal path for the amounts of all waste produced.

The RSC granted approval for this project to proceed at meeting of ________
RSC approval number _________

Name: _______________________ Signature _______________________ Date __/__/__

Position: Secretary RSC
REFERENCES

1. OHSRM Program – the University’s occupational health and safety risk management system, documents are available on-line from: http://www.usyd.edu.au/risk/ohs_manual/ohsrn.shtml

2. NSW Radiation Control Act 1990, Amended August 2002

3. NSW Radiation Control Regulation 2003

4. Guidelines for Working with Hazardous Substances

5. Hazardous Waste Disposal Guidelines

   Items 4 & 5 are available on-line from:

6. Australian Standard AS 2243.4 -1998 Safety in Laboratories Part 4 - Ionizing Radiation


<table>
<thead>
<tr>
<th>REVISION</th>
<th>APPROVED BY</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version 1</td>
<td>RSO</td>
<td>12 May 2011</td>
</tr>
</tbody>
</table>

30 May 2011
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