CONTINGENCY PLANS – Department and University

1. Radioactive Substances

Minor contamination of the work area

- "Minor" spills involving up to about 1 MBq activity.
- If possible, quickly throw tissues over any liquid spill to prevent it spreading on the bench or dripping on the floor.
- Monitor to confirm you are not contaminated yourself, if so deal with that first.
- If feasible, preferably without leaving the area, ask for assistance from a colleague who can assist with monitoring and supplies of cleaning materials. Clearly mark/segregate the area if you have to leave in order to obtain help.
- Obtain supplies of absorbent tissues, etc. and plastic bags to take contaminated waste.
- Soak up the spill using absorbent towels, etc., taking care to work toward the centre of the spill to minimise the risk of spread the contamination.
- Remove any "Benchkote" or other covering.
- Where contamination remains, clean first with 5%-25% detergent solution [e.g. DECON 90] and re-monitor.
- Where the contamination is by short-lived isotopes [e.g. phosphorus-32] and the levels are not excessive it may be easiest to cover the affected area with "Benchkote" and a "Perspex" sheet or similar and leave the contamination to decay. (Mark the covered area with trefoil tape and write an information note on it).
- Monitor yourself and the work area afterwards, and record this in the monitoring record book for the laboratory.
- Report the incident to the RPS for the laboratory.

Personal contamination

- Wherever possible, without leaving the area, get assistance from a colleague (who can do the monitoring and pass you cleaning materials).
- To avoid further spread of contamination on the hands, leave your disposable gloves on but wash contamination from them as far as practicable then carefully remove them and put on another pair of disposable gloves.
- Remove any contaminated clothing, and put to one side.
- Monitor the skin and wash any contaminated area using tissues or cloths, attempting to avoid spreading contamination to uncontaminated areas of skin.
- A heavily contaminated person could use an emergency shower if provided although this can spread contamination onto previously clean areas of skin and is a last resort.
- Any reasonable method may be used for cleaning contaminated parts of the body as long as this does not break the skin. Do not allow possibly contaminated cleaning materials to enter the eyes, nose or mouth.
- If skin contamination persists, refer to the Safety Office for advice on methods of decontamination.
- Oral administration of stable iodine to possible block thyroid uptake of I-125, should only be done under medical advice (contact the Safety Office or Addenbrooke's Hospital) and it must be taken quickly (within hours) to maximise the blocking effect.
- Report the incident to your Radiation Protection Supervisor.
- Attempts may be made to clean contaminated clothing by hand (wear gloves) but if this is impracticable or unsuccessful place the item in storage for decay or discard as radioactive waste.

Major spills of radioactive substances

- “Major" spills where maybe tens of MBq (mCi) amounts are involved e.g. where an entire stock vial is spilt in a dispensing area.
- In such situations it is important to try and stay calm and think!
- Preferably without leaving the area, call for help and ask for the RPSs to attend. Inform departmental management, and ask for assistance from the University Safety Office.
- Next stabilise the situation, principally by making safe any immediate hazards and then ensuring all persons (including yourself) leave the room, after monitoring them appropriate, then closing the door. In larger laboratories put up a barrier around the accident area.
- It may be appropriate to take steps such as switching off hazardous electrical equipment, quickly throwing absorbent material onto a spill to prevent it spreading, etc. However, ensure that you are adequately protected (gloves, etc.).
- Once the situation is stabilised take time to further monitor those who have been in the vicinity and deal with any contamination on them, minor injuries, or contamination on surfaces outside the laboratory - this should not have occurred - but should be checked.
- Assemble the personnel and materials required to deal with the spill, including disposable overshoes, plenty of absorbent towels, and waste bags, etc.
- Decide on who will do what, e.g. supervise the work, monitor and bag wastes, the actual decontamination operations.
- Set up a barrier at the entrance to the room (or around a section of a laboratory) that can then be treated as a temporary controlled area. Ensure that there are adequate provisions for monitoring, putting on and taking off of protective clothing, washing, etc.
- Decontamination can now proceed, and should be carried out methodically, with frequent monitoring to ensure that the contamination is not spreading, and monitoring of any persons and materials leaving the area. On a case by case basis, a balance should be struck between attempts to decontaminate items and, to minimise ‘dose’ simply discarding items as radioactive waste (after monitoring).
- If the spill is of radioactive iodine, first stabilise by adding excess alkaline thiosulphate solution (e.g. sodium thiosulphate [25 g] and sodium iodide [2 g] in 0.1M sodium hydroxide [1 litre]) - this should be made up before starting work with significant amounts of iodine-125 (including iodination reactions)!

Injuries involving radioactive contamination

- The first priority is to deal with serious (e.g. life threatening) injuries by administering immediate first aid such as compression on cuts and resuscitation, and then arranging for the injured person to be taken to hospital. These actions take priority over controlling the spread of contamination, although where practicable this should be considered. Someone should go with the casualty to the first aid room or hospital and efforts made to pre-warn A & E at the hospital (or contact the EARRPS office at Addenbrooke's - telephone: 9-216908) of the possibility of radioactive contamination. First Aiders will also require re-assurance that does will be low and the risks small, from typical uses of radioactive substances within the University. However this should be considered as part of the prior risk assessment process, and departmental rehearsals of contingency plans.
- In the case of contaminated cuts that do not require immediate hospital attention attempts should be made to clean the cut, but only after first covering it and then cleaning any surrounding contaminated areas. The purpose of the first step is to reduce the risk that contamination from surrounding areas will be washed into the wound. Retain dressings and any objects removed from the wound (e.g. glass pieces) for monitoring and disposal as radioactive wastes. Note any contamination readings in the area of the wound after cleaning. Dress cuts and then deal with other contamination on the injured person. They may then be sent for follow-up medical attention (if required).

- Report the incident to the RPS and the Safety Office.
- Prior discussion with departmental first-aiders, in terms of ‘what to do’ if there is an accident involving radioactive materials, should take place when preparing or rehearsing the required contingency plans for the area.

Loss or theft of radioactive sources

- Any suspected loss or theft of radioactive materials must be reported to RPS, Head of Department and the Safety Office without delay.
- The RPS will supervise an immediate search of the premises, involving the users and report to the Head of Department and Safety Office.
- If theft is confirmed the Safety Office will notify the Police, Environment Agency and Health and Safety Executive.

Otherwise, if the material is not found within 24 hours the Safety Office will notify the Police, Environment Agency and Health and Safety Executive.

2. Sealed Sources

In the event of any incident, accident, fault, or suspected fault involved a sealed source, the contingency plans will depend on the information in the risk assessment. Contingency plans must be set out in Department local rules and procedures. The RPS must be informed. If the matter is an incident which has resulted from failure of safety devices, and/or resulted in exposure of persons to ionising radiation, then the University RPA must immediately be informed.

It may not be practicable to rehearse in detail the arrangements for contingency plans for sealed sources but the Ionising Radiations Regulations require that 'where appropriate' the arrangements in such plans are rehearsed. Therefore all users must be fully aware of the plans and must know their role, and who to contact in the event of untoward events. The availability of equipment (monitors), personnel and advice, to deal with situations should be regularly checked by the (senior/lead) RPS, and a written record made.

3. Radiation Generators (x-ray machines/accelerators)

In the event of any incident, accident, fault or suspected fault of a radiation generator, the contingency plans will depend on the information in the risk assessment, but the electricity supply must be switched off immediately and the RPS informed. If the matter is an incident which has resulted from failure of safety devices, and/or resulted in exposure of persons to ionising radiation, then the RPA must immediately be informed.

It may not be practicable to *rehearse* in detail the arrangements for contingency plans for generators but the Ionising Radiation Regulations require that 'where appropriate' the arrangements in such plans are rehearsed. All users must be fully aware of the plans and must know their role, and who to contact in the event of untoward events. The availability of (monitors), personnel and advice, to deal with situations should be regularly checked by the (senior/lead) RPS, and a written record made.

4. Reporting incidents and accidents

All significant accidents and incidents involving ionising radiation should be reported to the RPS and the RPA at the Safety Office as soon as possible after the event to ensure appropriate follow up and/or medical supervision or reassurance to the individual as appropriate. Some incidents also require reporting to the regulators. Departments should

submit an accident report to the Safety Office via the Departmental Safety Officer. Accidents that are significant and must be reported are:

1. Failure of a radiation generator to terminate the exposure by the usual means.
2. Failure of an interlock or other safety device which causes, or has the potential to cause, an exposure.
3. Any unexpected exposure to IR for any reason, to any person.
4. Damage, theft or loss of a unsealed radioactive substances - check with the RPA for any additional requirements to report under IRR17, the conditions of an EPR permit or EPR exemption provisions.
5. Any spill of a radioactive substance.
6. Any injury to a person whilst they are working with radioactive substances.

5. University-wide Contingency Plans

Supporting information and documentation regarding University-wide contingency plans is held in the Safety Office (paper) filing system in the current 'Environment Agency' file.

a) Environmental Issues

The University is obliged to employ best available techniques (BAT) to minimise the generation of, transfer of, and the effects of disposal of radioactive waste to the environment and to people. Included in this is the requirement to have in place effective contingency arrangements to cope with unplanned releases or potential releases of radioactive substances.
The major agents that are likely to impact on the controlled use and storage of radioactive substances are flood, fire, and collapse of buildings due to explosion, other natural occurrences or from terrorist activity.

The University's response to a significant emergency or incident (including environmental issues) that cannot be fully managed at departmental level is through co-ordination by the Emergency Response Team (EMT). This comprises of a small group of senior Officers who are required to be available to meet at short notice 24 hours/day.
Safety matters (including issues involving ionising radiations) are represented on the EMT by Dr Martin Vinnell, Head of the Safety Office. Martin Vinnell can call upon additional advice from the RPAs/RWAs as needed by the EMT. The EMT is empowered to access all facilities available within the University and any external resources needed, without budgetary constraint, in order to deal with incidents. Mr Hudson deputises on EMT when Dr Martin Vinnell is not available.
Detailed contingency plans are not written for all conceivable situations (but see references to DREAM and SIMPLE below) – the EMT is expected to manage incidents in association with the emergency services, in order to minimise the effects of any incident and to ensure business continuity. Table-top exercises are held by the EMT from time-to-time in order to rehearse, as far as is possible, some of the more likely scenarios that might occur.
Two levels of information and immediate actions are held- 1). Departmental Response Emergency Action Plans (DREAM) - a secure metal box located at the entrance to each department (accessible to University Security and the Fire and Rescue Service) setting out amongst other matters, the location of hazardous materials within the Department, and, 2) Strategic Incident Management Plan – Lengthy Emergencies (SIMPLE) /a strategic action plan owned and maintained by the EMT.

Safety Office Reception: 01223 333301

Environment Agency, 24 hour emergency contact number: 0800 8070 60

Flood
The sites of the University that use radioactive substances and/or produce and accumulate radioactive waste are all outside the identified areas at risk from flooding from rivers and the sea (Environment Agency web-site 2012) the relevant flood maps are held at the University Safety Office (the chance of flooding occurring less than 0.1% in any year).

Use of radioactive substances in basement or sub-ground floor areas of buildings potentially increases the risk of these substances being involved in floods generated within a building, or as the result of rainwater ingress into the building. Buildings with these issues are: Department of Engineering (Nuclear Laboratory), Department of Pathology (Molteno Building), The Polar Museum, Department of Biochemistry (Sanger and Hopkins Buildings), CIMR (Addenbrooke's Site), The Wolfson Brain Imaging Centre, Department of Genetics, Department of Zoology and the Stem Cell Institute.

Contingency arrangements in those departments/buildings include the use of the local DREAM procedure, departmental incident response teams and direct access to Safety Office resources and if necessary the EMT through the University Central Administrative Offices.

Fire
All buildings where radioactive materials are used or stored are equipped with fire detection equipment. Basic information as to the location of radioactive substances is available to emergency services by the DREAM system – held inside the main entrance areas of all University Departments. Key holders and where appropriate RPSs and representatives of the EMT and /or the Safety Office, will attend incidents and liaise with the Fire and Rescue Service, at any fire of significance where radioactive materials are or might be involved.

High Cross
The University's main radioactive waste store is located at the High Cross Site, Madingley Road. Environmental issues relating to the impact of a fire at the site have been assessed in an earlier project carried out by the Health Protection Agency (then National Radiological Protection Board). The report of that assessment is held in the contingency plans section of the Environment Agency file in the Safety Office filing system, referred to above.

Building collapse
Would be dealt with under the standing EMT arrangements.

Security and counter terrorism
The University has a mobile 24 hour 365 day/year internal security patrol service, covering all sites of the University. This is supported by University wide, constantly monitored CCTV systems. The University Security Control Centre (and a satellite centre in the event that the main centre is incapacitated) would work with the EMT and Police in the event of a significant security incident. The Head of Security is a member of the EMT.

Sealed Sources – Departmental source management plans exist for all large sources including HASS sources.

HASS Sources – HASS security plans have been prepared in association with the University Security Section and agreed with the Police (CTSA) and the Environment

Agency.

High Cross – the High Cross site is subject to regular patrols by the University Security Service.

Departmental radioactive waste stores – the location of these are known to University Security and observation of these is part of their routine activity.

b) Radiation Safety Issues (Members of the Public)

Sealed Sources – REPPIR (Radiation Emergency Preparedness and Public Information Regulations) assessments have been carried out for all large sealed source locations within the University. No situations have been identified whereby preparation of a source and site emergency plan is required - this is because of limited activity, non-dispensability of the sources, or sources that are currently defined as 'special form'. This also applies to HASS sources whilst stored within secure equipment.

HASS sources – Departmental contingency plans are in place up to achieve an appropriate response to incidents involving HASS that have, may have been, or are in the process of, being removed from, their secure and shielded locations. Emergency plans for each HASS have been agreed with CTSA and the Environment Agency. Evacuation of the area and liaison with University Security and RPAs would be the immediate action in the event of any suspicion of tampering with equipment containing a HASS.

Other Dispersible sources – the quantities of dispersible sources in use within the University is currently such that the risks presented to the public are very low. However, contingency arrangements are in place in all departments that use these sources to enable local emergency management of any situation that might arise. Additional support for departments can be obtained from the RPAs/RWAs at the Safety Office. The largest accumulations of dispersible sources will be found at the Wolfson Brain Imaging Centre, and the High Cross Radioactive Waste Store.

c) Transport Emergencies

Procedures designed to deal with incidents or accidents occurring during the road transport of radioactive materials by the University Safety Office vehicle or by Departmental vehicles, are set down in the Transport Quality Assurance manual held by the RPAs in the Safety Office. These procedures have been written in association with the University Radiation Protection Advisers and the appointed consultant Dangerous Goods Safety Officer (Keith Harrington of RoadSafe Europe Ltd). Advice published by the Association of University Radiation Protection Officers and The Office of Nuclear Regulation (HSE) has been consulted during the preparation of the QA manual Emergency procedures for action by drivers of vehicles carrying radioactive materials are carried in the cab of these vehicles, and these procedures are rehearsed from time to time.