

# Section 9. Areas where ionising or X-ray generators are used or stored

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### 9.1 Designation of areas

The Approved Code of Practice for IRR17 recognises three levels of laboratory where work with ionising radiation may be carried out.

- Controlled areas
- Supervised areas
- Non-designated areas

There are currently no Controlled or Supervised areas in the University. Where laboratory work with ionising radiation is likely to fall under the criteria for such designations (see appendix 1 for criteria), the UIRPO and DIRPS will designate suitable areas, on the advice of the RPA.

For the purposes of these local rules, non-designated areas where storage of or work with ionising radiation may be carried out have been denoted as “Authorised Areas”. Authorisation must be given by the DIRPS and UIRPO.

## **9.2 Authorised areas (non-designated) within the University**

### **9.2.1 Room 3.02**

Room 3.02, Life Sciences, Colchester Campus has been designated as an Authorised Area for laboratory work and storage of radioisotopes.

Laboratory work and storage of radioisotopes can take place in this room, provided the prior risk assessment indicates that dose rates are not likely to exceed 1mSv per year for any person and the foetus of a person.

The following rules apply to this area:

- A sign consisting of a Trefoil in a yellow triangle along with the wording “Radioactive” must be displayed on the door. (See section 9.4)
- Only University of Essex registered radiation workers may enter the area unsupervised.
- Other members of staff, students or visitors are only permitted to enter the area with the permission of the UIRPO or DIRPS. They must be under the direct supervision of a radiation worker, UIRPO or DIRPS.
- The laboratory must remain locked at all times. The issue of keys is to be restricted to registered radiation workers who need to enter the area.
- Stock radioisotopes must only be stored in locked containers (including refrigerators and freezers) within room 3.02 with access only by authorised radiation workers.

- The Sink used for the disposal of aqueous waste must be designated and clearly marked. Radioactive aqueous waste must not be disposed of down the unlabelled sink.
- Should the room become unusable for the purpose of carrying out maintenance or any other reasons, then work may NOT be transferred to other laboratory areas without the written permission of the UIRPO advised by the RPA.
- No radiation work will be carried out after 6pm except in exceptional circumstances with the permission of the DIRPS and Head of Department.
- A Permit to Work (PtW) system is in operation where access is needed for maintenance. Please refer to section 9.3 for further details.

### **9.2.2 Isotope Room (Room 3.30)**

**Room 3.30 is authorised for the accumulation of radioactive waste awaiting disposal.**

Room 3.30 must be securely locked and used only by authorised staff. It must be labelled with a Trefoil in a yellow triangle (see section 9.4) along with the wording “Radioactive.”

A Permit to Work (PtW) system is in operation where access is needed for maintenance. Please refer to section 9.3 for further details.

### **9.2.3 Life Sciences Store**

**The Life Sciences Store is authorised for the temporary storage of radioactive substances awaiting collection.**

A locked steel cupboard has been identified in the Life Sciences Store in which radioactive substances may be held temporarily whilst awaiting collection by the authorised radiation worker which has ordered them. (Storage should not normally exceed a day). Storage is only permitted if the transport packaging has not been opened. A procedure for managing the delivery of radioactive sources is kept in the store. Staff working in the store must be trained in the procedure

With the exception of the above temporary arrangement, stock radioisotopes may only be stored in room 3.02.

### **9.2.4 Instruments containing closed sources**

The following rooms are currently authorised for the use of equipment containing closed sources:

- 3.02 Perkin Elmer TriCarb 2910 counter
- 3.07 GLC Uni Cam 610 Series

- 3.07C GLC Shimadzu

The instruments must be labelled with a Trefoil in a yellow triangle (see section 9.4) along with the wording “*Radioactive*”

The instruments must not be relocated without the agreement of the DIRPS and UIRPO.

## **9.3 Non-authorised areas**

Work involving the use of ionising radiation or x-ray generators is not permitted in non-authorised areas.

## **9.4 Maintenance**

No maintenance may be carried out in any authorised radiation area without the approval of the DIRPS. In the absence of the DIRPS the UIRPO should be contacted. Laboratory work must not be undertaken whilst maintenance work is being carried out.

Before giving approval for maintenance work, the DIRPS must ensure that the area has been monitored for contamination, and, given the nature of the intended maintenance work, that no radiation hazard exists. Particular attention should be paid to the presence of radioisotopes. Any areas of significant risk should be clearly identified with appropriate signs.

If maintenance work is planned for duct 9 (or other pipework that has been used for disposal or radiation sources) it should first be monitored for contamination, so that it can be confirmed that no radiation hazard exists. A check on the integrity of the stack/pipework should also be made, as the presence of corrosion may increase the risk of contamination.

The permit must specify the precautions that must be in place to ensure maintenance workers are not at risk from exposure to radiation. Maintenance workers entering the area must be given clear instructions, in writing of any area they should not enter, equipment which may not be moved and any work which is not permitted. (NB: Provided the Permit to Work is complied with the direct supervision of maintenance workers by radiation worker UIRPO or DIRPS will not be required).

## 9.4 Signage

All rooms, containers or equipment in which radioactive materials are used or stored must be clearly and legibly marked. Signs must comply with the Safety Signs and Signals Regulations and so must consist of a Trefoil in a yellow triangle (see picture) along with the wording “*Radioactive*”.



All containers of radioactive substances should also display the radionuclide and the activity.

When possible, some form of unique identifies should be used to be able to track the radioactive substances by radioactive accountancy.

## 9.5 Decommissioning of laboratories/plant that has been used for radiation work

For permanent decommissioning or where significant modification of rooms and areas are planned (for example, for conversion of laboratory to an office) it is vitally important that the UIRPO, DIRPS are informed well in advance of the work. The RPA may have to be consulted and advice obtained from the Environmental Agency.

Before maintenance, decommissioning laboratories or removal of materials / plant from areas where radiation work has taken place, it is necessary to monitor for contamination. If contamination is found decontamination or disposal as radioactive waste will be necessary. Anything that may have been contaminated (e.g. ducts, pipework) should be labelled with the trefoil and “radioactive” until it is possible to confirm that it is free from contamination. Work on such areas will require a permit to work, in order to ensure radiation risks are removed prior to work. Records of monitoring and decontamination must be kept (see important note below)

The following laboratories and stacks have been used for low levels of radiation work in the past but are no longer used:

- 4.13/4.15: used for isotope work. Last work was done 08/08/2000 with S-35. Last monitoring record (05/02/2001) conformed no contamination
- 3.25: Contained scintillation counter until May 2013. Table was wipe tested to confirm free of contamination.
- 5.08: last monitored 21/07/2004. Confirmed no contamination, except higher background on new porcelain sink (all new sinks showed this higher natural background count).

NB: 3.07, 5.14, 5.20, 5.36 6.24 (Greenhouse) had designated supervised areas but were never used for isotope work. Ducts 8 and 12 have also never been used for radiation work.

Plumbing under sinks that have been used for radiation waste the past (i.e. sinks located in 4.13/4.15 and 5.08) and the isotope lab (room 3.02), and their connecting drains are labelled as an extra warning to maintenance staff.

Where any maintenance on duct work in Life Sciences is planned the duct is first monitored for radiation prior to work being undertaken as a precaution.

***Important note on decommissioning and records:***

In the long term, if the permit needs to be surrendered then the University will need to give written evidence that all contamination has been removed or risk being placed on the contaminated land register. Before any building modifications are allowed to go ahead, contamination surveys may have to be performed beyond the scope of routine monitoring. For some institutions, failure to provide evidence has resulted in costly decommissioning operations.

The following documentation must be kept and copies forwarded onto the UIRPO as evidence that the University has complied with the permit. In particular, historical records must be kept of long lived radionuclides i.e. C-14.

- Contamination monitoring records
- Any history of use of long lived radionuclides or their disposal.
- Contacts of persons who may have worked in the area a long time in the past
- Order details of radionuclides.

## **Appendix**

### **Controlled areas**

A Controlled area is designated where it is necessary:

- to prevent or supervise access by employees unconnected with the work
- When the external dose rate is greater than  $7.5\mu\text{Sv/h}$ , when averaged over the working day
- If hands of an employee can enter a working area and receive an external dose greater than  $75\mu\text{Sv/h}$ ,
- If the employee is liable to receive an effective dose of greater than  $6\text{mSv/year}$
- to prevent the spread of significant contamination outside of the working area.

**A sign with a radiation warning sign with the legend “Controlled Area” must be posted on the perimeter of the controlled area.**

## **Supervised areas**

A Supervised area is designated where it is necessary:

- to keep a working area under review
- the employee is liable to receive an effective dose of greater than 1mSv/year

**A sign with a radiation warning sign with the legend “Supervised Area” must be posted on the perimeter of the Supervised area.**

**The formal approval of the UIRPO (on advice of the RPA) must be given before changing the status of any radiation area or decommissioning any area.**