RP COP017 – TRANSPORT OF RADIOACTIVE MATERIAL

1. Scope
This Code of Practice (CoP) concerns University staff or postgraduate students who transport radioactive material or radioactive waste from University premises to other University premises or to premises out with the University. The regulations surrounding the transport of radioactive material are complex and persons must consult with the Radiation Protection Unit (RPU) where instructed to do so in this CoP. In broad terms, this CoP should allow persons, without referring to the RPU, to:

- Classify, prepare and consign an Exempt quantity of radioactive material or waste for transport by any mode of transport; See Section 3
- Classify, prepare and consign an Excepted Package for transport on UK roads; and See Section 7
- Classify and prepare (BUT NOT CONSIGN) an Excepted Package for transport by Air. See Section 8

Anything else must involve significant instruction and guidance from the RPU.

Appendix 7 acts as the Radiation Protection Programme (RPP) for the University of Edinburgh for the transport of its radioactive material/waste.

Persons should ensure that they are reading the most up-to-date version of this document by checking the version number against the issued document on the CoP area of the RPU website at:


2. Introduction
The transport of radioactive material needs to be regulated in order to prevent, as far as possible, accidents to persons or property and damage to the environment, the means of transport employed or to other goods. All UK regulations relating to the transport of radioactive materials, by whatever mode of transport, are ultimately derived from the International Atomic Energy Agency’s (IAEA) Regulations for the Safe Transport of Radioactive Material. This text is then adopted by each of the different modes of transport and modal rules are written:

- AIR: Technical Instructions for the Safe Transport of Dangerous Goods by Air (NOTE: The Technical Instructions are translated into another text by the International Air Transport Association (IATA) who prepare their own Dangerous Goods Regulations (IATA DGR). The IATA DGR text is used by most airlines.)
- ROAD: European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)
- SEA: The International Maritime Dangerous Goods Code (IMDG)
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- **RAIL**: International Carriage of Dangerous Goods by Rail (RID)
- **INLAND WATERWAYS**: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN)

The UK government takes these modal rules and issues UK specific regulations, however, much of the UK regulations simply refer to parts of the modal rules listed above. Enforcement of the regulations is by the Office for Nuclear Regulation (Road, Rail and Inland Waterway), the Maritime and Coastguards Agency (Sea), and the Civil Aviation Authority (Air).

The University doesn’t expect to move radioactive material/waste by sea, rail or Inland Waterway so these modes of transport are not discussed further in this CoP (however, see Section 3 on Exempt radioactive material). If you intend to move radioactive material/waste by sea, rail or inland-waterway then contact the RPU.

The Modal rules, and the number of differences and subtleties within them, make for very complex reading; hence the limited scope of this CoP and the advice to contact the RPU if unsure about any part of the journey.

Ultimately the University is responsible for implementing the rules and regulations but specific duty holders involved in the transport of radioactive material, and what they are responsible for, are listed below:

**Table 1: Duties and responsibilities within the transport chain**

<table>
<thead>
<tr>
<th>Duty holder</th>
<th>Responsible for</th>
</tr>
</thead>
</table>
| **The University** | • Managing the Radiation Protection Programme.  
 • Providing adequate Information, Instruction and Training to allow University personnel to carry out their duties as defined in this table. |
| **Consignor (i.e. the ‘sender’)** | • Packaging  
 • Marking & Labelling  
 • Emergency Plan  
 • Instructions in Writing  
 • Consignment  
 • Documentation  
 • Training |
| **Consignee (i.e. the ‘receiver’)** | • Receipt of consignment |
| **Carrier (i.e. the company/ enterprise that physically carries the package/ goods from A to B).** | • Stowage  
 • Carriage  
 • Preparation for, and dealing with, contingencies  
 • Driver training |
| **Driver** | • Actions to be taken in the event of an emergency |

University staff or postgraduate students may act as the consignor, consignee, carrier and driver of radioactive material during a transport movement.
3. Exempt Radioactive Material

Firstly, users should consider whether or not the material they intend to transport is actually classified as radioactive material for the purposes of the transport regulations. A consignment may be exempt from the transport regulations if the quantity of material being carried isn’t defined under the regulations as being radioactive material. All materials are, to some extent, radioactive but the various rules and regulations around the world set levels, below which, the material isn’t considered to be subject to regulation. In Dangerous Goods transport this is known as Exempt Radioactive Material.

Both the activity concentration AND the activity limit in table 2 below must be exceeded for the material or waste to be defined as being radioactive. If one isn’t exceeded, the consignment is exempt and the transport regulations surrounding the transport of radioactive material don’t reply; however, see further guidance in this section. Users should also consider if the consignment may contain a sub-risk associated with another Dangerous Goods class; if so, contact the H&S Dept., or other local dangerous goods adviser.

Table 2: Activity Limits for Exempt Consignments

<p>| Radio- | Activity concentration for exempt material (Bq/g) | Activity limit for exempt consignment (Bq) | Radio- | Activity concentration for exempt material (Bq/g) | Activity limit for exempt consignment (Bq) |</p>
<table>
<thead>
<tr>
<th>nuclide</th>
<th></th>
<th></th>
<th>nuclide</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H-3</td>
<td>$1 \times 10^6$</td>
<td>$1 \times 10^9$</td>
<td>Tc-99</td>
<td>$1 \times 10^4$</td>
<td>$1 \times 10^7$</td>
</tr>
<tr>
<td>C-11</td>
<td>$1 \times 10^1$</td>
<td>$1 \times 10^6$</td>
<td>Tc-99m</td>
<td>$1 \times 10^2$</td>
<td>$1 \times 10^7$</td>
</tr>
<tr>
<td>C-14</td>
<td>$1 \times 10^4$</td>
<td>$1 \times 10^7$</td>
<td>In-111</td>
<td>$1 \times 10^2$</td>
<td>$1 \times 10^6$</td>
</tr>
<tr>
<td>O-15</td>
<td>$1 \times 10^1$</td>
<td>$1 \times 10^4$</td>
<td>I-125</td>
<td>$1 \times 10^3$</td>
<td>$1 \times 10^6$</td>
</tr>
<tr>
<td>F-18</td>
<td>$1 \times 10^1$</td>
<td>$1 \times 10^6$</td>
<td>I-129</td>
<td>$1 \times 10^2$</td>
<td>$1 \times 10^5$</td>
</tr>
<tr>
<td>Na-22</td>
<td>$1 \times 10^1$</td>
<td>$1 \times 10^6$</td>
<td>I-131</td>
<td>$1 \times 10^2$</td>
<td>$1 \times 10^6$</td>
</tr>
<tr>
<td>Na-24</td>
<td>$1 \times 10^1$</td>
<td>$1 \times 10^5$</td>
<td>Xe-133</td>
<td>$1 \times 10^3$</td>
<td>$1 \times 10^4$</td>
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<tr>
<td>P-32</td>
<td>$1 \times 10^3$</td>
<td>$1 \times 10^5$</td>
<td>Ba-133</td>
<td>$1 \times 10^2$</td>
<td>$1 \times 10^6$</td>
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<td>P-33</td>
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<td>$1 \times 10^8$</td>
<td>Cs-137</td>
<td>$1 \times 10^1$</td>
<td>$1 \times 10^4$</td>
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<tr>
<td>S-35</td>
<td>$1 \times 10^5$</td>
<td>$1 \times 10^8$</td>
<td>Pm-147</td>
<td>$1 \times 10^4$</td>
<td>$1 \times 10^7$</td>
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<tr>
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<td>$1 \times 10^6$</td>
<td>Eu-152</td>
<td>$1 \times 10^1$</td>
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<td>$1 \times 10^7$</td>
<td>Ti-201</td>
<td>$1 \times 10^2$</td>
<td>$1 \times 10^6$</td>
</tr>
<tr>
<td>Cr-51</td>
<td>$1 \times 10^3$</td>
<td>$1 \times 10^7$</td>
<td>Ti-204</td>
<td>$1 \times 10^4$</td>
<td>$1 \times 10^4$</td>
</tr>
<tr>
<td>Fe-55</td>
<td>$1 \times 10^4$</td>
<td>$1 \times 10^6$</td>
<td>Bi-207</td>
<td>$1 \times 10^1$</td>
<td>$1 \times 10^6$</td>
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<tr>
<td>Co-57</td>
<td>$1 \times 10^2$</td>
<td>$1 \times 10^6$</td>
<td>Bi-210</td>
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<td>$1 \times 10^6$</td>
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<tr>
<td>Co-60</td>
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<td>$1 \times 10^5$</td>
<td>Pb-210</td>
<td>$1 \times 10^1$</td>
<td>$1 \times 10^4$</td>
</tr>
<tr>
<td>Ni-63</td>
<td>$1 \times 10^5$</td>
<td>$1 \times 10^8$</td>
<td>Ra-226</td>
<td>$1 \times 10^1$</td>
<td>$1 \times 10^4$</td>
</tr>
<tr>
<td>Ge-68</td>
<td>$1 \times 10^1$</td>
<td>$1 \times 10^5$</td>
<td>Am-241</td>
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<td>Se-75</td>
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<td>$1 \times 10^6$</td>
<td>Cf-252</td>
<td>$1 \times 10^1$</td>
<td>$1 \times 10^4$</td>
</tr>
<tr>
<td>Rb-86</td>
<td>$1 \times 10^2$</td>
<td>$1 \times 10^5$</td>
<td>Uranium</td>
<td>$1 \times 10^0$</td>
<td>$1 \times 10^3$</td>
</tr>
<tr>
<td>Sr-90</td>
<td>$1 \times 10^2$</td>
<td>$1 \times 10^4$</td>
<td>Thorium</td>
<td>$1 \times 10^0$</td>
<td>$1 \times 10^3$</td>
</tr>
</tbody>
</table>
Notes to Table 2: For mixed radionuclide consignments, contact the RPU for specific advice as they have to be summated using a rule specified in the relevant transport regulations.

3.1 Carriage of Exempt radioactive material by private transport

The transport of Exempt radioactive material is not regulated but the advice on carriage of exempt material on private transport is summarised below:

<table>
<thead>
<tr>
<th>Mode of Transport</th>
<th>Advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Car</td>
<td>Carriage of Exempt radioactive material permitted; see also Section 3.3</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>Carriage of Exempt radioactive material permitted; see also Section 3.3</td>
</tr>
<tr>
<td>Bicycle</td>
<td>Carriage of Exempt radioactive material permitted; see also Section 3.3</td>
</tr>
<tr>
<td>By foot</td>
<td>Carriage of Exempt radioactive material permitted; see also Section 3.3</td>
</tr>
<tr>
<td>Other</td>
<td>Contact the RPU for specific advice if mode of transport not listed.</td>
</tr>
</tbody>
</table>

3.2 Carriage of Exempt radioactive material on public transport

In general, transport operators will include in their Terms of Carriage or equivalent, a statement prohibiting the transport of Dangerous Goods on their services. In the case of radioactive material, the definition of Dangerous Goods is taken to be whether the consignment meets the conditions of an Exempt consignment or not. By definition then, radioactive material meeting the conditions for an Exempt consignment, is not classified as Dangerous Goods under UK or international transport legislation. The advice on carriage of Exempt radioactive material on public transport is summarised below:

<table>
<thead>
<tr>
<th>Mode of Transport</th>
<th>Advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxi</td>
<td>Carriage of Exempt radioactive material permitted; see also Section 3.3</td>
</tr>
<tr>
<td>Bus*</td>
<td>Carriage of Exempt radioactive material permitted; see also Section 3.3</td>
</tr>
<tr>
<td>Rail/Tram</td>
<td>Carriage of Exempt radioactive material permitted; see also Section 3.3</td>
</tr>
<tr>
<td>Air</td>
<td>It is advised that Exempt radioactive material is NOT carried on passenger aircraft as there is a risk of the package and/or the traveller being refused permission to board the aircraft. It is advised that the material is consigned as an Excepted Package (Sections 3.4 and 8 refer).</td>
</tr>
<tr>
<td>Other</td>
<td>Contact the RPU for specific advice if mode of transport not listed.</td>
</tr>
</tbody>
</table>

*includes University shuttle bus service.
3.3 Marking of Exempt radioactive material for transport
Although Exempt consignments do not require reference to the transport regulations the RPU advise that any package transported as exempt is:

- Marked on the **INSIDE** with the word ‘**RADIOACTIVE**’ (this could be done with a small bit of radioactive warning tape);
- Marked on the outside of the package with the consignor (i.e. sender) and consignee (i.e. recipient); and,
- Transported in a suitable receptacle. For example, if liquids are to be carried, whether exempt radioactive material or not, the RPU would expect, from a common sense point of view, that some absorbent material is placed inside the container and a screw top lid or similar was used to provide containment of the material if damaged/dropped.

**NO RADIATION TREFOILS OR OTHER MARKINGS IDENTIFYING THE PACKAGE AS RADIOACTIVE SHOULD BE ON THE OUTSIDE OF THE PACKAGE**

3.4 Shipping/sending of Exempt radioactive material
Technically, Exempt radioactive material could be sent by ordinary post with no reference to the transport regulations; however, consider the risk of packages being quarantined, delayed or redirected (NB: An increasing number of ports and airports around the world are fitted out with sensitive radiation detection and monitoring equipment). It is therefore not advised that Exempt material is sent by ordinary post.

It is advised that Exempt radioactive material is shipped/sent as an Excepted Package by couriers who specialise in this area. This should give users sending Exempt material a greater degree of confidence that their package will get from A to B safely.

3.5 ONR Waste Derogation
A derogation, issued by the Office for Nuclear Regulation (ONR), permits consignors to dispose of radioactive waste that contains very low levels of radioactivity using the normal refuse collection services and without reference to the regulations covering the transport of radioactive material. This means that some radioactive waste consigned for transport may be above the activity limit for an exempt consignment but still carried without reference to ADR, RID or CDG2009.

More information on this derogation can be found in RP CoP_009 on the Disposal of Radioactive Waste.
4. Radioactive Material Groups and Package Hierarchy

If the activity limit AND the activity concentration of the consignment is above the limits from table 2 then it will be defined as a Radioactive Material transport movement.

The transport rules and regulations split radioactive material into 6 groups: Special form, Low Specific Activity (LSA), Surface Contaminated Object (SCO), Fissile, Low Dispersible Material and Other form. The definitions for most of these can be found in the modal rules but only ‘Other form’ and ‘Special form’ are likely to be moved by the University. Special form radioactive material is where the material is contained in such a way that, almost certainly, the material shall remain intact in the event of a transport accident/incident. There are a range of performance tests that must be complied with for special form material and the material must gain unilateral approval. Special form material should be accompanied by a certificate to demonstrate that it has passed the required performance tests. Some higher activity Sealed Sources within their recommended working life are supplied as Special Form approved. Other form material is essentially everything else not specifically described or covered by one of the groups above. Other form radioactive material accounts for the vast majority of material moved by the University.

Package types follow a hierarchical system with the lowest form of package, an Excepted Package, being subject to very little testing but only able to take a limited quantity of radioactive material. Packages at the top of the scale can carry huge quantities of Radioactive Material but are subject to rigorous testing. The graphic below lists all the packages for carrying radioactive material. Excepted Packages and Type-A packages are likely to be the only package types consigned by the University.

Figure 1: Radioactive Material packaging hierarchy

The modal rules specify the requirements that must be met in order to use the various packaging types listed above. All packages used for transporting radioactive material must meet certain general requirements on the quality of the package. Additional requirements placed on the package are then added the higher up the package hierarchy you go. The package requirements for Excepted Packages and Type-A Packages are detailed in the relevant sections of this CoP.
5. Marking and Labelling of Packages and Vehicles
The correct marking and labelling of radioactive material packages, and vehicles, for transport is a fundamental requirement of the regulations.

5.1 Marking of Packages
The marking of radioactive material packages essentially means the text that is used to provide specific information about that package. Excepted Packages do not need to carry any external marks other than the letters “UN” followed by the appropriate UN number, and an identification of the consignee/consignor. They are also required to be marked with orientation arrows, if liquids are being carried, and the gross permitted mass, if the mass of the package is in excess of 50kg.

Type-A packages must also be marked as per Excepted Packages but additionally the Proper Shipping Name, the text “Type-A”, the originating International Vehicle Registration (VRI) code, and a package sponsor identifier (e.g. maker’s mark) must appear on the package in a durable and legible format. The RPU must be consulted on the marking of Type-A packages.

Type IP-1, IP-2, IP-3, Type B(U)/B(M), Type-C and UF₆ packages are also subject to certain marking and labelling requirements under the modal rules but are unlikely to be consigned by the University. Specific advice on the marking and consignment of these types of packages can be sought from the RPU.

More specific details on the marking of Excepted Packages for Road and Air transport are given in the detailed sections 7 & 8.

5.2 Labelling of Packages
The labelling of radioactive material packages refers to the diamond-shaped warning signs that use colours and symbols to identify the hazard within the package. These labels are only required to be placed on Type-A packages and above.

Radioactive material has 3 main labels, shown here on the right, which are either yellow or white and also contain the dangerous goods class number and the radiation trefoil symbol. (NOTE: There is actually a 4th label which covers fissile material: U-233, U-235, Pu-239, Pu-241 but excluding Natural or Depleted Uranium. It is unlikely that the University will be involved in the transport of fissile material.) The more red bars on the label, the higher the radiation levels being emitted from the package. Users should not put any labels on a package without first having consulted with the RPU.
Excepted Packages for road transport are not required to be labelled in any way (do not confuse labelling and marking); however, excepted packages being transported by air are required to be labelled with a specific label used only by the air industry. This label is shown in Appendix 2.

5.3 Placarding of Vehicles
As well as marking and labelling packages for transport, road vehicles carrying those packages may also need to be marked and/or labelled.

When radioactive material is carried in Type-A packages and above, a placard, like the one shown here on the right, is required to be displayed on both sides and at the back of the vehicle. These placards must be at least 250mm x 250mm in size.

No vehicle marks or placards (labels) are required to be displayed on vehicles carrying only excepted packages.

In addition to the placards, orange coloured plates are also required to be displayed, on a flat surface, at the front and rear of the vehicle. These are required to be 400mm x 300mm although their size can be reduced to 300mm x 120mm for small vehicles.

Alternatively, for consignments where the number of packages being transported does not exceed 10, and where the Transport Index of the consignment does not exceed 3, orange plates do not have to be displayed provided that a cab notice is displayed in a prominent position inside the vehicle. The text shown on the cab notice is very specifically stated in the Department for Transports Road Derogation No.9 and is reproduced below:

- The notice shall include the words (using capital letters as indicated) “This vehicle is carrying RADIOACTIVE MATERIAL” and “in the case of accident get in touch at once with THE POLICE”;
- The capital letters in the word “RADIOACTIVE” shall be a minimum of 12mm high and all other capital letters in the notice shall be a minimum of 5mm high;
- The notice shall state the name, address and telephone number of a person capable of providing advice that would be of assistance in an emergency;
- All lettering on the notice shall be embossed or stamped as well as being black, bold and legible; and
The notice shall be not less than 12cm square, fireproof to the extent that the words on the notice shall remain legible after exposure to a fire involving the vehicle, securely posted in the vehicle in a position where it is plainly visible to the driver but does not obscure his view of the road and displayed only when the vehicle is carrying radioactive material.

The RPU must be consulted on the placarding of vehicles, and the use of cab notices, carrying Type-A packages and above.

6. Documentation

The different modal rules specify that a consignor must produce a transport document for the transport of radioactive material.

Excepted Packages are exempt from many of the documentation requirements in the modal rules; however, there are still some things that have to be recorded about the transport movement. More specific details on the documentation requirements for Excepted Packages for Road and Air transport are given in the detailed sections 7 & 8.

6.1 Road Transport

For Type-A packages and above, the full documentation requirements of the modal rules must be followed. There is no standard transport document prescribed in the regulations, however, specified information must be provided in a specified order on any document used. The ADR transport document does not have to be signed but as the information must be recorded on the transport document in a set order, the RPU should be contacted.

The consignor must also provide a statement regarding the actions, if any, that are required to be taken by the carrier. This statement should include things like supplementary requirements for the loading, stowage, carriage, handling and unloading of the package. It should also include emergency arrangements and any further restrictions on the mode of carriage.

Instructions in writing are also required to be provided to the driver (for Type-A packages and above) as an aid during an accident emergency situation. There is a four-page example in the modal rules (see section 5.4.3 of ADR) as to what details must be included in the instructions in writing.

The RPU should be contacted regarding the preparation of Instructions in writing for Type-A package movements.

6.2 Air Transport

For Type-A packages and above, the full documentation requirements of the modal rules must be followed. A Shipper’s Declaration for Dangerous Goods (DGD) is required and the IATA regulations specify the format of this document. The DGD document splits the required information into roughly four main areas: matters concerning the document itself; details of the journey; information about
the dangerous goods; and a declaration of compliance with the legal duties imposed on the shipper (consignor).

Industry practice has shown that the DGD is likely to be heavily scrutinised by cargo personnel accepting radioactive material for transport onto aircraft. Any mistakes and/or omissions are likely to result in the package(s) being refused to board the aircraft.

The IATA regulations state that any person signing the declaration of compliance on the DGD document must have been trained on an IATA approved training course and that the training is valid. The RPU updates and maintains their training to allow DGD documentation to be signed (for both Excepted Packages and Type-A packages) and must be contacted to sign off any paperwork for the air transport of radioactive material.

7. Transport of Radioactive Material/Waste in Excepted Packages by ROAD

If the activity limit AND the activity concentration of the consignment is above the limits from table 2 then it will be defined as a Radioactive Material transport movement. The lowest type of package for carrying limited quantities of radioactive materials or wastes is an Excepted Package. Excepted Packages are still subject to some requirements of the transport regulations and the majority of radioactive material consignments at the University are in Expected Packages.

In the main, University staff and postgraduate students should be able to classify, prepare & consign their own excepted packages for transport by road without reference to the RPU; provided that the requirements in this CoP are adhered to.

University staff and postgraduate students wishing to classify, prepare and consign their own excepted packages for transport by road, without reference to the RPU, should fill out the General Awareness training form shown in Appendix 4 and return it to the RPU.

7.1 General Package Requirements

Excepted Packages are exempt from many of the packaging requirements in ADR however, there are some general requirements that they must meet:

- The dose rate on ANY surface of the package must not exceed 5 micro Sieverts per hour (see Appendix 1),
- The external surfaces of the package must be free from contamination (see Appendix 1),
- The mass, volume and shape of the chosen package should allow it to be carried easily and safely,
- The package must withstand routine (accident free) conditions of carriage (i.e. normal acceleration, vibration, braking etc.).
External surfaces must be free from protruding features and easily decontaminated (cardboard boxes are ok),

Outer layer of package should prevent the collection and retention of water (again, cardboard boxes are fine),

The radioactive contents of the package must be compatible with the packaging material chosen,

Any other dangerous properties of the packaged material must be considered; contact the RPU in this instance,

For the carriage of liquids it is considered good practice to pack absorbent material (twice the volume being consigned) into the inner container. This is not always practical, for example, when consigning radioactive waste liquid scintillant.

Excepted Packages are not subject to any specific testing requirements outlined in the regulations but they must retain their contents during routine carriage; for example, a container with a screw top for transporting liquid is considered to be suitable to be able to retain the liquid contents should the package fall over during routine transport operations.

### 7.2 Activity Limits

There are four different UN numbers covering Excepted Packages but only two of the UN numbers, UN 2910 – Limited Quantity of Material and UN 2911 – Instruments or Articles are likely to be transported by University staff and postgraduate students. The most commonly used UN number at the University is UN 2910 which relates to any radionuclide in a limited quantity.

Provided that a package can meet the general package requirements in 7.1 above, does not exceed the activity limits in Table 3 below and, can meet any other requirement in this section, it can be consigned as a UN 2910 Excepted Package.

### Table 3: Activity Limits for Excepted Packages

<table>
<thead>
<tr>
<th>Radio-nuclide</th>
<th>Solids ‘Other form’ (MBq)</th>
<th>Liquids (MBq)</th>
<th>Radio-nuclide</th>
<th>Solids ‘Other form’ (MBq)</th>
<th>Liquids (MBq)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-3</td>
<td>40,000</td>
<td>4,000</td>
<td>Tc-99</td>
<td>900</td>
<td>90</td>
</tr>
<tr>
<td>C-11</td>
<td>600</td>
<td>60</td>
<td>Tc-99m</td>
<td>4,000</td>
<td>400</td>
</tr>
<tr>
<td>C-14</td>
<td>3,000</td>
<td>300</td>
<td>In-111</td>
<td>3,000</td>
<td>300</td>
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<td>Unlimited</td>
</tr>
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<td>500</td>
<td>50</td>
<td>I-131</td>
<td>700</td>
<td>70</td>
</tr>
<tr>
<td>Na-24</td>
<td>200</td>
<td>20</td>
<td>Xe-133</td>
<td>Unlimited (Gas)</td>
<td>n/a</td>
</tr>
<tr>
<td>P-32</td>
<td>500</td>
<td>50</td>
<td>Ba-133</td>
<td>3,000</td>
<td>300</td>
</tr>
<tr>
<td>P-33</td>
<td>1,000</td>
<td>100</td>
<td>Cs-137</td>
<td>600</td>
<td>60</td>
</tr>
<tr>
<td>S-35</td>
<td>3,000</td>
<td>300</td>
<td>Pm-147</td>
<td>2,000</td>
<td>200</td>
</tr>
</tbody>
</table>
### Table 3: Radioactive Material Limits

<table>
<thead>
<tr>
<th>Radio-nuclide</th>
<th>Solids ‘Other form’ (MBq)</th>
<th>Liquids (MBq)</th>
<th>Radio-nuclide</th>
<th>Solids ‘Other form’ (MBq)</th>
<th>Liquids (MBq)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cl-36</td>
<td>600</td>
<td>60</td>
<td>Eu-152</td>
<td>1,000</td>
<td>100</td>
</tr>
<tr>
<td>Ca-45</td>
<td>1,000</td>
<td>100</td>
<td>Ti-201</td>
<td>4,000</td>
<td>400</td>
</tr>
<tr>
<td>Cr-51</td>
<td>30,000</td>
<td>3,000</td>
<td>Ti-204</td>
<td>700</td>
<td>70</td>
</tr>
<tr>
<td>Fe-55</td>
<td>40,000</td>
<td>4,000</td>
<td>Bi-207</td>
<td>700</td>
<td>70</td>
</tr>
<tr>
<td>Co-57</td>
<td>10,000</td>
<td>1,000</td>
<td>Bi-210</td>
<td>600</td>
<td>60</td>
</tr>
<tr>
<td>Co-60</td>
<td>400</td>
<td>40</td>
<td>Pb-210</td>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td>Ni-63</td>
<td>30,000</td>
<td>3,000</td>
<td>Ra-226</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>Ge-68</td>
<td>500</td>
<td>50</td>
<td>Am-241</td>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>Se-75</td>
<td>3,000</td>
<td>300</td>
<td>Cf-252</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>Rb-86</td>
<td>500</td>
<td>50</td>
<td>Uranium</td>
<td>Unlimited (See note 2)</td>
<td></td>
</tr>
<tr>
<td>Sr-90</td>
<td>300</td>
<td>30</td>
<td>Thorium</td>
<td>Unlimited (See note 2)</td>
<td></td>
</tr>
</tbody>
</table>

**Notes to Table 3:**

1. ‘Solids – Other form’ will cover the majority of consignments from the University.
2. Unlimited quantities valid for Natural Uranium, Depleted Uranium and Natural Thorium only (Solid or Liquid forms).

If the activity limits in Table 3 above are exceeded or, an external surface dose rate of 5 microSv/h is exceeded on any surface, then the consignment **CANNOT** be transported as an Excepted Package unless it is:

- Shielded so that the dose rate on any surface falls back below 5 microSv/h; or
- Consigned as an instrument or article under 7.2.1 below; or
- Consigned as special form material. Some higher activity sealed sources within their recommended working life may have special form approval. Users should contact the RPU if they think their material/waste may be Special Form approved.

**7.2.1 Activity Limits for Instruments or Articles**

Radioactive material which is enclosed in or is included as a component part of an instrument or article may be carried in quantities that are ten times those shown in Table 3. The material must be classified as UN2911 – RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – INSTRUMENTS or ARTICLES and is subject to the following additional conditions:

- The dose rate of 5 microsieverts per hour at the surface does not apply to UN 2911 provided that the dose rate at 10cm from the surface of the instrument or article does not exceed 100 microsieverts per hour,
- Each manufactured instrument or article bears the word “RADIOACTIVE” on the OUTSIDE (except radioluminescent time-pieces...
or devices and regulatory-approved consumer products that are marked with the word ‘radioactive’ on an internal surface)

- The radioactive material is completely enclosed by non-active components.

Examples of manufactured instruments or articles (i.e. UN2911) that may be at the University are the Electron Capture Detectors (ECDs) in some Gas Chromatographs and Liquid Scintillation Counters that contain an internal standard.

### 7.3 Documentation

Many of the documentation requirements for consigning radioactive material are waived for excepted packages. For road transport, a *Transport Document* is all that is required and it must have:

- The UN number of the consignment preceded by the letters “UN”; and
- The name and address of the consignee **AND** the consignor.

Although not a legal requirement under the transport regulations, the University recommends that certain additional information is provided on the transport documentation for excepted package consignments. Persons should use and complete all parts of the Transport Document template in Appendix 3 for the transport of Excepted Packages by Road and furnish the driver/carrier with a copy of the transport document. This document must be kept locally for a minimum of 3 months.

### 7.4 Marking and Labelling

No *labels* are required on excepted packages but they must be *marked* with:

- the letters “UN” followed by the corresponding UN number (i.e. UN 2910),
- the consignee and/or consignor,
- Orientation arrows if liquids are being carried, and
- If the weight of the package exceeds 50kg then the permissible gross mass of the package must be shown clearly on the outside.
- the word “**Radioactive**” on the INSIDE of the package to warn persons of the presence of radioactive material immediately on opening the package. This could simply be done with a small piece of radioactive warning tape.

An example, meeting the marking requirements for an excepted package consigned by road under UN2910, is shown on the top half of Appendix 2. **NO OTHER LABELS OR RADIATION TREFOILS SHOULD BE ON THE OUTSIDE OF THE PACKAGE.**
7.5 Additional information for Excepted Packages transported by ROAD

If persons are transporting radioactive material that could also have another dangerous property, e.g. a Radioactive Material excepted package where the material also has a corrosive sub-risk, then the RPU must be contacted for specific advice as the additional sub-risk must also be taken into account.

Multi-modal consignments are common, for example transport to anywhere outside the UK is likely to involve air transport with a road movement either before or after (or both). In these cases, the regulations consider that if material is packaged and consigned in compliance with one modal text then, provided that the different mode of transport occurs as part of the same journey, it will be deemed to be compliant with any of the other modal regulations. The University recommends that if there is a part of the journey involving air transport then the IATA regulations take precedence as industry feedback suggests that airlines are most likely to refuse packages for transport if not 100% IATA compliant. Multi-modal consignments will therefore always require RPU input to check and sign the IATA paperwork.

The transport of radioactive WASTE and sealed sources between EU member states requires the consignor to obtain a prior written declaration from the consignee to confirm that the consignee complies with the national requirements on the safe storage, use and/or disposal of radioactive material in their country (Council Regulation 1493/93). In addition, the consignor of any non-exempt SUBSTANCE sent to another EU Member State is required to provide the Competent Authority in that Member State with information regarding all shipments sent by the consignor to that Member State in the relevant calendar quarter. The RPU would arrange for this information to be sent and staff and postgraduate students sending radioactive material to other EU Member States should contact the RPU.

8. Transport of radioactive material/waste in Excepted Packages by Air

As mentioned in the Introduction section, the transport of radioactive material by air has its own set of rules.

It is intended that this section of the CoP shall allow staff and postgraduate students to classify and prepare packages of radioactive material or waste for shipment by air but NOT to consign them. Even for Excepted Packages, the IATA modal rules require any paperwork associated with the consignment to be signed off by a person who has been on an IATA approved training course. The RPU staff have been on IATA approved training courses and can sign off the required paperwork.

Once the excepted package has been classified and prepared for shipment, persons must contact the RPU to sign the Transport Document and check that the consignment is ready for collection by the agent/shipper/carrier. It is likely that a member of the RPU staff will visit you to check that the package has been adequately prepared for consignment.
8.1 General Package Requirements
The package requirements for Excepted Packages being transported by air are no different to the package requirements shown in section 7.1 above for road transport however, consideration should be given to the effects of air transport (i.e. temperature and pressure changes) when choosing the package material.

8.2 Activity Limits
The activity limits for excepted packages being transported by air are equivalent to the activity limits for excepted packages being moved by road (See table 3).

8.3 Documentation
Excepted packages being moved by air are also exempt from many of the documentation requirements within the IATA modal rules; for example, Excepted Packages of radioactive material do not require a Shipper’s Declaration for Dangerous Goods (also called a DGD) unless they have sub-risks that themselves would require the use of a DGD. There are however some differences between the air and road documentation requirements.

For air transport of excepted packages, an Air Waybill, usually supplied by the carrier, is sufficient to satisfy the documentation requirements; for a list of carriers see Appendix 5. The “Nature and Quantity of Goods” box of the Air Waybill must be filled in with:

- the letters “UN” followed by the corresponding UN number (e.g. UN 2910),
- the Proper Shipping Name (Note: The Proper Shipping Name (PSN) is the name and description of the material/waste covered by the UN number. PSNs are listed next to the UN number of the material that they describe in various Modal texts. The PSN is shown in the modal texts as upper case characters, any lower case characters are an optional part of the description),
- No. of packages in the consignment.

It is unlikely that University staff and postgraduate students will be in possession of, or have all the information to complete, the Air Waybill for an excepted package consignment of radioactive material by air. The completion of the Air Waybill is likely to be done by the agent/shipper/carrier contracted by the University to move the package from A to B and therefore the University needs to provide them with all the relevant information needed to do this. All the information that the shipper/agent/carrier needs to fill in the Air Waybill is contained in the Transport Document shown in Appendix 3.

To ensure consistency, it is important that University staff and postgraduate students contracting an agent/shipper/carrier to move their radioactive package by air communicate the following division of responsibilities at the time of agreeing the service:
Table 4: Duties and responsibilities for Excepted Packages by Air

<table>
<thead>
<tr>
<th>Duty holder</th>
<th>Responsible for</th>
<th>How Documented?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The University</td>
<td>• Classifying the package</td>
<td>By completing and signing the Transport Document.</td>
</tr>
<tr>
<td></td>
<td>• Packing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dose rate check</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Check for contamination</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Marking</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Labelling (i.e. Excepted Package by air label)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Provision of a Transport Document</td>
<td></td>
</tr>
<tr>
<td>Agent/Shipper/Carrier</td>
<td>• Transferring information from Transport Document to Air Waybill.</td>
<td>By Signing the Air Waybill.</td>
</tr>
<tr>
<td></td>
<td>• Signing of the Air Waybill.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Checking State and Operator variations for the movement to the consignee’s address/location.</td>
<td></td>
</tr>
</tbody>
</table>

8.4 Marking and Labelling

Excepted packages for air transport must be marked with:

- the letters “UN” followed by the corresponding UN number (e.g. UN 2910) [Note] The letters UN and the UN number must be shown on the package using a specific label used only for the transport of Excepted Packages by air. This label is shown for illustration purposes on the bottom half of appendix 2 and the design must not be modified or altered in any way. The RPU has an official supply of these labels for use by anyone in the University. These can be sent out by the RPU for free. Contact the RPU if a label is required.
- the FULL name and address of the shipper (consignor),
- the FULL name and address of the consignee,
- Orientation arrows if liquids are being carried, and
- If the weight of the package exceeds 50kg then the permissible gross mass of the package must be shown clearly on the outside.
- the word “Radioactive” on the INSIDE of the package to warn persons of the presence of radioactive material immediately on opening the package. This could simply be done with a small piece of radioactive warning tape.
8.5 Additional information for Excepted Packages transported by AIR

If persons are transporting radioactive material that could also have another dangerous property, e.g. a Radioactive Material excepted package where the material also has a corrosive sub-risk, then the RPU must be contacted for specific advice as the additional sub-risk must also be taken into account.

The transport of radioactive WASTE and sealed sources between EU member states requires the consignor to obtain a prior written declaration from the consignee to confirm that the consignee complies with the national requirements on the safe storage, use and/or disposal of radioactive material in their country (Council Regulation 1493/93). In addition, the consignor of any non-exempt SUBSTANCE sent to another EU Member State is required to provide the Competent Authority in that Member State with information regarding all shipments sent by the consignor to that Member State in the relevant calendar quarter. The RPU would arrange for this information to be sent and staff and postgraduate students sending radioactive material to other EU Member States should contact the RPU.

9. Carriage of non-exempt Radioactive Material on non-Public Transport

University staff and postgraduate students may wish to personally transport radioactive material from one place to another instead of using specialist couriers. Advice on the transport of non-exempt radioactive material using non-public transport is shown below:

<table>
<thead>
<tr>
<th>Mode of Transport</th>
<th>Discussion and Advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Car / Motorcycle</td>
<td>University Staff and postgraduate students wishing to carry out transport of radioactive material using privately owned vehicles should check the terms and conditions of their insurance. As a minimum, business insurance is likely to be needed but many insurance companies have clauses that exclude the carriage of Dangerous Goods; Excepted Packages and above would be considered Dangerous Goods. It is therefore advised that staff and postgraduate students may transport Excepted or Type-A packages and above by private car/motorcycle provided they are adequately insured. Any radioactive material transported in private vehicles must also meet any other applicable requirements in this CoP relating to marking, labelling, documentation, etc. for transport of radioactive material by road.</td>
</tr>
</tbody>
</table>
Mode of Transport | Discussion and Advice
--- | ---
Hire Car / University-owned vehicle | The University has a motor insurance policy* which includes liability against the carriage of Dangerous Goods, including radioactive material, for any motor vehicle belonging to, hired by or loaned to the University used in connection with University business.

It is therefore advised that staff and postgraduate students may transport Excepted or Type-A packages and above in University-owned vehicles or vehicles hired by or loaned to the University.

Any radioactive material moved in University-owned or hired vehicles must also meet any other applicable requirements in this CoP relating to marking, labelling, documentation, etc. for transport of radioactive material by road.

By foot / Bicycle** | The transport of radioactive material by foot or by bicycle is not regulated as walking and cycling are not referred to in Dangerous Goods legislation.

It is advised that staff and postgraduate students may transport Excepted or Type-A packages and above by foot or by bicycle provided that the package meets any other applicable requirements in this CoP relating to marking, labelling, documentation, etc. for transport by road.

Other | Contact the RPU for specific advice if mode of transport not listed.

* Note, the insurance policy is not open to students.
** Note, for the purposes of the regulations; a bicycle is taken to be self-propelled. E-bikes would be classed as vehicles and subject to the same regulations as for cars/buses/motorcycles etc.

10. Carriage of non-exempt Radioactive Material on Public Transport

The various modal regulations on the carriage of Dangerous Goods affect the transport of radioactive material (including waste) in the UK by public transport. In addition, many public transport operators will have ‘conditions of carriage’ or similar which usually excludes the carriage of Dangerous Goods, e.g. radioactive material, on their services. Carriage of radioactive material on public transport assumes that someone, e.g. the user of the radioactive material, would be personally travelling with the package during its journey.

The advice on the carriage of non-exempt radioactive material on public transport is summarised below:
<table>
<thead>
<tr>
<th>Mode of Transport</th>
<th>Discussion and Advice</th>
</tr>
</thead>
</table>
| Taxi / Bus*               | In ADR, i.e. road transport, two specific provisions relevant to public transport of excepted packages are:  
Furnishing the driver/carrier with a copy of the Transport Document (1.4.2.1.1 of ADR); and  
All personnel involved in the transport movement shall be familiar with the general requirements of the provisions for the carriage of Dangerous Goods (e.g. General awareness training as per 1.3.2.1 of ADR).  
These two specific provisions essentially make the transport of radioactive material in Excepted Packages on UK roads by public transport impractical.  
Radioactive material consigned in Type-A packages and above is subject to an extensive array of provisions in the transport legislation. Significant requirements are placed on driver training, segregation, placarding of vehicles etc. that make movement by public transport impractical.  
It is therefore advised that staff and postgraduate students do not personally transport Excepted or Type-A packages and above by Taxi/Bus. It is advised that material is consigned using couriers who specialise in this area taking into account the guidance in other parts of this document. |
| **including University shuttle buses** |                                                                                                                                                      |
| Rail / Tram               | The RID, concerning the international carriage of Dangerous Goods by Rail, follows closely the requirements of ADR and essentially prohibits the carriage of Class 7 radioactive material as hand luggage, registered luggage, or in/on-board passenger trains (Chapter 7.7 of RID).  
It is therefore advised that staff and postgraduate students do not personally transport Excepted or Type-A packages and above by Rail. It is advised that material is consigned using couriers who specialise in this area taking into account the guidance in other parts of this document. |
| Air                       | The IATA DG regulations, concerning the transport of dangerous goods by air, explicitly state that Excepted Packages of radioactive material must not be carried by passengers or crew in checked (i.e. hold) baggage, carry-on (i.e. cabin) baggage or in/on their person. This similarly applies to Type-A packages and above.  
It is therefore advised that staff and postgraduate students do not personally transport Excepted or Type-A packages and above by Air. It is advised that material is consigned using couriers who specialise in this area taking into account the guidance in other parts of this document. |
| Other                     | Contact the RPU for specific advice if mode of transport not listed.                                                                                   |
11. Emergency Arrangements

Accidents involving the transport of radioactive material can give rise to situations where urgent action is required to protect workers, members of the public/emergency services and the environment from exposure to or effects from ionising radiation. The regulatory framework in the UK requires both the Consignor AND the carrier to have a plan, in writing, detailing the emergency arrangements in place to deal with reasonably foreseeable emergencies.

A model Emergency Plan is shown in Appendix 6 and is adequate for the vast majority of radioactive transport operations by the University. If required, users may adapt the model plan in specific situations for incorporation into Local Rules or arrangements. This model plan, or user specific plan if adapted, provides clear instructions to the driver on what to do in an emergency and must accompany every transport operation so that it is readily accessible by the driver or another person in the event of the driver being unable to take action.

Where the University acts as the consignor and carrier of radioactive material, the RPU arranges an approximately annual test of the emergency plan to ensure that each person involved in the transport movement understands their duties and what to do in the event of an emergency. A record is kept with the RPU of this training.

Where the University acts as the consignor but NOT the carrier; i.e. the carrier services are contracted out to a third party, the RPU liaises with the third-party carrier to ensure their emergency plan is subject to testing at suitable intervals.

12. Security

The University Security Manager has overall responsibility and accountability for security matters at the University.

Any person transporting radioactive material or waste from the University shall have gone through standard pre-employment checks as part of their recruitment and/or induction process and are issued with staff ID as a means of photographic identification.

Staff transporting radioactive material are required to read this CoP and fill in Appendix 4 as part of their General Awareness training which includes basic instructions on security.

12.1 High Consequence Dangerous Goods

The transport of radioactive material which has the potential for misuse in a terrorist event to cause mass casualties/ destruction/socio-economic disruption, otherwise known as High Consequence Dangerous Goods, is subject to additional security requirements. The activity level which takes a radionuclide
into this category is very high and will always require Type-A or above transport; hence the RPU will always be involved.

Security Plans (See section 1.10.3.2.1 of ADR) are required for consignors, carriers and other participants engaged in the carriage of High Consequence Dangerous Goods. In these situations, significant advance notice of the movement is given and notified to the Radiation Protection Unit. The University Radiation Protection Adviser leads on arranging adequate Security Plans for the movement of High Consequence Dangerous Goods.

13. Further Information

Further advice on the transport of radioactive material can be obtained from the Radiation Protection Unit of the Health and Safety Department.
Appendix 1

Monitoring Procedures for consigning an Excepted Package

In order to correctly consign an Excepted Package for transport, it must meet, amongst others, the following conditions:

- The dose rate on the outside surface of the package must not exceed 5 µSv/h;
- non-fixed contamination levels must be below a certain value.

This Appendix describes how to measure these conditions. The measurements should be made even for low-energy beta emitters, since it acts as a useful check that no unrecorded radionuclides have been incorrectly added to the consignment.

If the radiation dose rate from the package exceeds the limit above then shielding may be able to be added to the inner package to reduce the dose rate. Contact the RPU for advice.

Dose Rate Measurement

Where possible, dose rate measurements should be made using a radiation instrument measuring in microsieverts per hour. Contact the RPS for your area to see if you can borrow one to make a dose rate measurement of your package.

If you cannot get a hold of a suitable dose rate meter then there is a relatively simple way to measure the radiation using a Geiger-Müller detector scaled in counts per second and then applying a count-rate to dose-rate conversion factor. This will, in certain cases, over-read the true value but it will ensure packages are not consigned with dose rates in excess of the permitted level.

The procedure is as follows:

1. Ensure that there are no other sources of radiation in the area such that they could affect the reading on the instrument.
2. Take readings of the count rate around the package (including the base) with either a Mini Instruments type E, EL, or EP15. The detector should be held about 1 cm from the surface, making sure that nothing touches the tube end window.
3. Note down the highest reading.
4. If that reading is above the count rates in the following table, then the package may be in excess of the allowable limits. Contact the RPU for advice in this instance:
### Mini Instrument type | Count Rate (c.p.s.) above background
--- | ---
E | 10
EL | 25
EP15 | 25

### Surface Contamination measurement

1. Using a tissue paper (or piece of filter paper) dampened with water; wipe a significant fraction of the outside of the package, including the area around the lid and the base.

2. Measure the wipe with a contamination instrument appropriate to the isotope(s) in the package. Code of Practice RP COP003 gives further information on this. Note that in the case of tritium this means using a liquid scintillation counter as opposed to a contamination instrument. For tritium, a control wipe should also be taken.

3. If the reading is more than twice background (Note: Twice the value of the control wipe in the case of Tritium), the package should be decontaminated and the procedure repeated until the count rate is not greater than twice background.

4. Once there is no indication of external surface contamination the package can be consigned.
Appendix 2

Example marking of a UN2910 Excepted Package for Transport by Road

UN 2910
RADIOACTIVE MATERIAL, EXCEPTED PACKAGE
– Limited Quantity of Material

From:
THE UNIVERSITY OF EDINBURGH
OLD COLLEGE,
SOUTH BRIDGE,
EDINBURGH

To:
CERN
CH-1211 Geneva 23
Switzerland

Emergency Contact Details:
THE UNIVERSITY OF EDINBURGH,
HEALTH & SAFETY DEPARTMENT,
CHARLES STEWART HOUSE,
9-16 CHAMBERS ST.,
EDINBURGH
TEL: 0131 6502819 or 07736302588

Exempt Package label for Air Transport

Radioactive Material, Excepted Package
This package contains radioactive material, excepted package and is in all respects in compliance with the applicable international and national governmental regulations.

UN ________
The information for this package need not appear on the Notification to Captain (NOTOC)

Note: The excepted package label for Air transport is not, on its own, sufficient to meet the marking requirements for excepted packages. The road label above could be used, in addition to the air label, with the UN2910 number removed.
Appendix 3

Transport Document for the transport of Excepted Packages by Road or Air

<table>
<thead>
<tr>
<th>TRANSPORT DOCUMENT FOR EXCEPTED PACKAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Carriage of Dangerous Goods &amp; Use of Transportable Pressure Equipment Regs 2009</td>
</tr>
<tr>
<td>International Air Transport Association (IATA) Dangerous Goods Regulations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DETAILS OF CONSIGNOR (FROM):</th>
<th>IN CASE OF EMERGENCY CONTACT: RADIATION PROTECTION UNIT 0131 650 2818 or 0131 650 2819 Mobile (24hr):</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>DETAILS OF CONSIGNEE (TO):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DESCRIPTION OF LOAD: (UN No. and Proper Shipping Name)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DETAILS OF LOAD: (Physical &amp; chemical form, radionuclide, activity)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DATE OF CONSIGNMENT:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAXIMUM DOSE RATE AT THE SURFACE OF ANY PACKAGE (µSv/h):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

CONSIGNOR'S DECLARATION

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packed, marked and labelled, and are in all respects in proper condition for transport by road or air according to the applicable international and national governmental regulations.

Name of Signatory:  
Position within Consignor’s Organisation:  
Signature:  
Date:  

For a Word/pdf Template of this document contact the Radiation Protection Unit.
Appendix 4

General Awareness Training for transport of Excepted Packages

All persons involved in the carriage of Excepted Packages of radioactive material/waste (but excluding Exempt radioactive material) are required to have had General Awareness training in accordance with Chapter 1.3 of ADR (Note: No reference is made to the air transport regulations here as the University RPU staff, responsible for consigning and checking ALL air transport movements, are trained on an IATA approved course.)

The General Awareness training required to prepare and consign radioactive material/waste for transport as Excepted Packages on UK roads is not explicitly defined in ADR. The University has decided that reading this CoP, completing the boxes in this Appendix and signing the declaration at the bottom is sufficient to provide General Awareness training for the preparation and consignment of Excepted Packages by Road.

- I have read and understood the relevant parts of this Code of Practice.
- I understand that passengers must not be carried when travelling with Excepted Packages (e.g. Public Transport is not advised).
- I understand that smoking is not permitted in any vehicle where excepted packages are carried.
- I understand that the regulations require me to carry a small fire extinguisher (2kg) when carrying excepted packages and I consider myself competent to use this, if required, in an emergency.
- I understand that I shall not open any packages that have been consigned until they reach the intended consignee.
- I understand that the regulations require me to lock the vehicle carrying the radioactive material if it is left unattended at any point during the journey.
- I understand that if I discover the packages to be damaged or leaking at any part of the journey that I am instructed to remove them to an acceptable interim location under supervision and to contact the RPU for subsequent advice.

NOTE: Tick the ☐ to indicate that the action has been read and understood

(P.T.O/…)

Reference No. HS/RP/CoP017.3  Author: M. A. Green  Date: November 2016
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Appendix 4

General Awareness Training for transport of Excepted Packages

DECLARATION

I hereby declare that the information provided above is correct and to the best of my knowledge.

Name: 

Position: 

Signature: Date: 

This form should be completed by all persons wishing to transport radioactive material in Excepted packages by Road.

The completed form should be sent to the RPU at:
The Radiation Protection Unit,
Health and Safety Dept.,
Charles Stewart House,
Chambers St.,
EH1 1HT

or emailed to radiation@ed.ac.uk.
Appendix 5

List of Carriers of Radioactive Material

The list of carriers of radioactive material shown below is for information only; persons are permitted to use other carriers not on this list if they so wish. The University has not recommended nor vetted any of the carriers below but several of the carriers have been used for transporting radioactive material to the University. The RPU can help persons choose an appropriate carrier for their material or waste if required.

<table>
<thead>
<tr>
<th>Company Name &amp; Web address</th>
<th>Contact Details</th>
</tr>
</thead>
</table>
| Topspeed Couriers           | Topspeed Couriers Limited  
                           | Unit D, Marlborough Close  
                           | Parkgate Industrial Estate,  
                           | Knutsford, Cheshire WA16 8XN  
                           | TEL: 01565 631840  
                           | [http://www.topspeedcouriers.co.uk/radioactive-courier/](http://www.topspeedcouriers.co.uk/radioactive-courier/) |
| Hazmat Logistics Ltd        | Hazmat Logistics (UK) Ltd  
                            | Unit 2, The Mill Farm Business Park  
                           | Millfield Road  
                           | Hounslow  
                           | Middlesex TW4 5PY  
                           | United Kingdom  
                           | TEL: 0208 898 1654  
                           | Hazmat Logistics (UK) Ltd (Scottish Office)  
                           | Unit 6&7 Imex Centre, Broadleys Park, Stirling, FK7 7LQ  
                           | TEL: 01786 448243  
                           | [http://hazmatlogistics.co.uk/](http://hazmatlogistics.co.uk/) |
| The Courier Company         | The Courier Company (UK) Ltd  
                            | 11 James Way, Marshall Court, Milton Keynes,  
                           | MK1 1SU United Kingdom  
                           | TEL: 08700 116611  
| Dangerous Goods International (DGI) | DGI HEATHROW  
                               | Unit C8, Heathrow Corporate Park, Green Lane, Hounslow TW4 6ER  
                           | United Kingdom  
                           | TEL: 0208 814 0404  
                           | [http://www.dgiglobal.com/](http://www.dgiglobal.com/) |
Appendix 6

Model Emergency Plan

Important contact details

<table>
<thead>
<tr>
<th>University Radiation Protection Adviser:</th>
<th>+44 (0) 131 650 2818</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>07922 384526</td>
</tr>
<tr>
<td>University Radiation Protection Unit:</td>
<td>+44 (0) 131 650 2818/9</td>
</tr>
<tr>
<td></td>
<td>07736302598</td>
</tr>
<tr>
<td>University Security:</td>
<td>internal_2222 (emergency)</td>
</tr>
<tr>
<td>Or (non-emergency)</td>
<td>+44 (0)131 650 2257</td>
</tr>
</tbody>
</table>

Road Accident

The following instructions assume that you have not been seriously injured:

- If possible get the vehicle off the road or over to a safe stopping place, but do not place yourself at risk from other traffic in doing so.
- Switch off your engine and if possible use your hazard warning lights to warn other traffic.

If there are casualties

- Call the emergency services immediately by telephoning 999. Give them the full details of the accident location and of any casualties. Tell them that there is Class 7 Dangerous Goods present and what type of radioactive material package is in the vehicle (i.e Exempt, Excepted or Type-A).
- Do not move an injured person from the vehicle unless he/she is in immediate danger.
- Keep the public away from the vehicle as far as possible except for anyone who is assisting with the immediate treatment of casualties. Where equipped, and if safe to do so, set up temporary barriers (e.g. using tape) to keep the public away from the incident.
- Where possible, visually inspect the package(s) without touching it. If there appears to be any damage that could have breached the outer package(s), do not move it. If there does not appear to be any damage, move it as necessary to ensure that it is secure, but do not leave it unattended or anywhere where it might be damaged by other traffic.
- Telephone the Radiation Protection Adviser/Unit on any of the numbers at the top of this Emergency Plan who will be able to give Radiation Protection Advice. Tell them of the apparent state of the package(s).
- When the emergency services arrive, advise them of the apparent state of the package(s), or tell them if you could not see it/them. Also inform them of the form (special form, solid, liquid, gas) and the amount of radioactive material present (in units of Becquerels, Bq). This information is contained in the Transport Document / Consignment Note.
If there are NO casualties

- Call the emergency services immediately by telephoning 999. Give them the full details of the accident location and that there are NO casualties. Tell them that there is Class 7 Dangerous Goods present and what type of radioactive material package is in the vehicle (i.e Exempt, Excepted or Type-A).
- Where possible visually inspect the package(s) without touching it. If there appears to be any damage that could have breached the outer package, do not move it. If there does not appear to be any damage, move it as necessary to ensure that it is secure, but do not leave the package(s) unattended or anywhere where it might be damaged by other traffic.
- Keep the public away from the package(s) as far as possible; if possible set up temporary barriers to prevent access to the incident scene.
- Telephone the Radiation Protection Adviser/Unit on any of the numbers at the top of this Emergency Plan who will be able to give Radiation Protection Advice. Tell them of the apparent state of the package(s).
- If the emergency services do arrive, advise them of the apparent state of the package(s), or tell them if you could not see it/them. Also inform them of the form (special form, solid, liquid, gas) and the amount of radioactive material present (in units of Becquerels, Bq). This information is contained in the Transport Document / Consignment Note.

Vehicle Fire (NOT arising from a Road Accident)

- If possible get the vehicle off the road or over to a safe stopping place; don’t place yourself at risk from other traffic in doing so. Stop the engine.
- If it is safe to do so, and you are trained in its use, use the fire extinguisher to try to put out the fire.
- If it is not possible to extinguish the fire, contact the fire brigade by telephoning 999. Inform them that there is/are Class 7 Dangerous Goods on the vehicle and the type of package (i.e. Exempt, Excepted or Type-A)
- If it is not safe or possible to extinguish the fire remove the package(s) from the vehicle if it is safe to do so. Do not leave the package(s) unattended or anywhere where it might be damaged by other traffic.
- If it was not safe to remove the package(s), stay a safe distance from the vehicle and upwind of it, and keep the public away from the vehicle as far as possible. Where equipped, and if it is safe to do so, set up temporary barriers (e.g. using tape) to keep the public away from the incident.
- Telephone the Radiation Protection Adviser/Unit on any of the numbers at the top of this Emergency Plan who will be able to give Radiation Protection Advice.
- Tell the fire brigade if they arrive what type of radioactive material package is in the vehicle (i.e Exempt, Excepted or Type-A), the form (special form, solid, liquid, gas) and the amount of radioactive material present (in units of Becquerels, Bq). This information is contained in the Transport Document / Consignment Note.
Package Leaking / Spillage of Contents

- If in transit, get the vehicle off the road or over to a safe stopping place, but do not place yourself at risk from other traffic in doing so. Stop the engine.
- If it is safe to do so, visually inspect the package(s) without touching it. If possible, try to take images of the package(s) that might help to identify the apparent state of the package(s).
- If there appears to be any damage to the package(s) then do not move it.
- Telephone the Radiation Protection Adviser/Unit on any of the numbers at the top of this Emergency Plan who will be able to give Radiation Protection Advice.

Vehicle Breakdown

- If possible get the vehicle off the road or over to a safe stopping place, but do not place yourself at risk from other traffic in doing so.
- Warn other traffic by using the hazard warning lights if your vehicle is causing an obstruction.
- If you are not in a safe stopping place, leave the vehicle and move to a safe place, but where you can still see the vehicle. Leave any packages in the vehicle and secure the vehicle.
- Telephone the Radiation Protection Adviser/Unit on any of the numbers at the top of this Emergency Plan who will arrange for the collection of the package(s).

Vehicle Break-in / Stolen

If the vehicle appears to be broken into, check that the package(s) is still there and appears intact.

- If there is no damage or any damage appears insufficient to have breached the outer package, and the vehicle is still roadworthy, continue the journey and deliver the radioactive material to the consignee. Report the damage through the normal arrangements.
- If the package(s) appears to have suffered sufficient damage to breach the outer package, OR the vehicle is not roadworthy, do not continue the journey. Telephone the University Radiation Protection Adviser. Stay with the vehicle until other transport arrives, and do not leave the package(s) unattended.
- If the package(s) has gone missing, contact the police without delay using 999 and make it clear that it contains radioactive material. Tell them what type of radioactive material package is in the vehicle (i.e. Exempt, Excepted or Type-A) and give them the University Radiation Protection Adviser/Unit telephone numbers at the top of this Emergency Plan as a contact point for further information. Then immediately telephone the Radiation Protection Unit/Adviser and tell them that the radioactive material package(s) you were carrying has gone missing, what instructions were given to you by the police, where you are, and whether the vehicle is roadworthy. If the vehicle is roadworthy return to University premises.
unless you have been given other instructions by the police. If the vehicle is not roadworthy stay where you are and await other transport to arrive.

If the vehicle has disappeared, first of all think about where you left it – you might have parked it somewhere other than where you think.

- If it has definitely gone, complete with the package(s), contact the police without delay using 999 and follow the same procedure as for a missing package as outlined above.
- If the vehicle has definitely gone but the package(s) has been thrown out, visually inspect the package(s) for damage. Do not leave it unattended, and try to keep the public away from it. Telephone University Radiation Protection Unit/Adviser and advise them that you have a package that you are unable to move and where you are. Stay where you are and await other transport to arrive. The loss of the vehicle will be reported to the police by others.
Appendix 7

Radiation Protection Programme

1. Scope

A Radiation Protection Programme (RPP) is required to be established for the transport of Radioactive Material. The nature and extent of the control measures employed in the RPP follow a ‘graded approach’ such that they are commensurate to the level of hazards arising from transport of radioactive materials and wastes by the University.

Radioactive material transported by the University may be packaged in Exempt, Excepted or Type-A packages. Type-B packages may be moved on occasion but the transport of any Type-B packages is contracted out to a specialist contractor.

This appendix acts as the RPP for the University of Edinburgh for the transport of its radioactive material/waste. It addresses all stages of any transport operation, including packing, preparation, loading, handling, storage-in-transit and movement and considers reasonably foreseeable accidents and incidents.

2. Roles and Responsibilities

The regulatory framework governing the safe transport of radioactive material assigns specific duties and responsibilities to consignors, consignees, carriers and drivers; these are shown in Table 1 of RP CoP017 on Transport of Radioactive Material. Ultimately the University is responsible for implementing the transport regulations and, in many cases, will act as the consignor, consignee, carrier and driver.

The University is also responsible for managing the RPP and providing adequate Information, Instruction and Training to allow University personnel to carry out their duties safely. Without referring to the University Radiation Protection Unit (RPU), University staff and postgraduate students are restricted to:

- **Classifying, preparing and consigning** an Exempt quantity of radioactive material or waste for transport by any mode of transport,
- **Classifying, preparing and consigning** an Excepted Package for transport on UK roads; and,
- **Classifying and preparing** (BUT NOT CONSIGNING) an Excepted Package for transport by Air.

The consignment of Type-A packages on a recurrent basis is managed by the local RPS and Local Rules are issued. Any other ad-hoc transport of radioactive material is consigned and managed by University Radiation Protection Unit (RPU) staff.
3. Dose Assessment and Optimisation

The Radioactive Material transported by the University could emit Alpha, Beta, Gamma or Neutron radiation however, in almost all cases, the Alpha and Beta radiation will be stopped, or significantly reduced, by the packaging material.

The University only occasionally transports radioactive material and the majority of consignments are in excepted packages. The effective dose to persons transporting the excepted packages under normal conditions of transport, and to members of the public, is most unlikely to exceed 1mSv per year. No special work patterns, detailed monitoring, dose assessment programmes or individual record keeping is therefore required.

University staff and postgraduate students transporting Type-A packages and above must complete a Proposed Scheme of Work (PSoW) form which acts as a task-specific risk assessment. Personal monitoring is considered on a case-by-case basis and is specified by the RPU.

4. Surface Contamination

Surface contamination monitoring is carried out on packages prior to consignment although no records are required to be kept of this monitoring. The procedure is specified in Appendix 1 of RP CoP017 on Transport of Radioactive Material and packages are not consigned by the University unless they are free from contamination on the outside of the package. Free from contamination means less than 4 Bq/cm² for Beta, Gamma and low-toxicity alpha emitters and less than 0.4 Bq/cm² for all other alpha emitters.

NOTE: Low-toxicity alpha emitters means Natural Uranium; Depleted Uranium; Natural Thorium; Uranium-235 or Uranium-238; Thorium-232; Thorium-228 and Thorium 230 when in ores; and alpha radionuclides with a half-life < 10 days.

5. Segregation and other protective measures

No segregation, handling or storage controls need to be considered to reduce occupational exposures for any radioactive material/waste consigned by the University. Local Rules covering the transport of Type-A packages insist on safe stowage of packages prior to transport.

6. Emergency Response

Emergency response arrangements covering the types of packages consigned by the University are shown in Appendix 6 of RP CoP017 on Transport of Radioactive Material.

Emergency response arrangements for recurrent Type-A package consignments are detailed in the relevant Local Rules associated with the transport movement of that material. The emergency response arrangements...
for any ad-hoc Type-A package consignments are prepared by the RPU on a case-by-case basis and included with the documentation for that consignment.

Emergency response arrangements for Type-B consignments are prepared by the specialist contractor.

7. Security

Security arrangements covered by the types of packages transported by the University are addressed in Section 12 of RP CoP017. Ultimately the University Security Manager has overall responsibility and accountability for security matters at the University. Carriers and shippers have their own security arrangements and members of staff and postgraduate students personally transporting or moving radioactive material are given basic instructions on security as part of General Awareness training.

8. Training

General Awareness Training is provided to all personnel consigning excepted packages by road under RP CoP017. The General Awareness training consists of persons reading through RP CoP017 and signing Appendix 4 to indicate that they have read and understood the requirements. A signed copy is then returned to the RPU.

Additional, specific, training is given by the University RPA for persons transporting Type-A packages on a recurrent basis; for example, the transport of Tc-99m and F-18 from the Little France Campus to the Royal (Dick) School of Veterinary Studies at Easter Bush. This training is documented and a certificate of attendance is issued.

RPU staff are trained in the transport of radioactive material and ensure that their training remains valid.

The requirement to consult a Dangerous Goods Safety Adviser (1.8.3 of ADR) shall not apply to undertakings:

a) Whose transport activities concern quantities, in each transport unit, that are smaller than those referred to in 1.1.3.6, 1.7.1.4 and in Chapters 3.3, 3.4 and 3.5 of ADR; or
b) Whose main or secondary transport activities are not the carriage or related loading or unloading of dangerous goods but occasionally engage in the national carriage or related loading or unloading of dangerous goods posing little danger or risk to the population.

The University is not required to consult a Dangerous Goods Safety Adviser for its transport of Exempt or Excepted Packages as these types of packages meet a) above.
The University does not utilise the services of a Dangerous Goods Safety Adviser for its Type-A and above package movements as it considers that its main or secondary business activity isn’t the transport of radioactive material and that it only transports radioactive material on an occasional basis.

**NOTE:** What constitutes as ‘occasional’ is not explicitly defined in the regulations however, it only relates to the transport of Type-A packages and above. The University deems that its Type-A movements are occasional.

**9. Quality Assurance**

The University’s main Health and Safety Policy provides the organisation and arrangements for the health, safety and welfare at work of all employees and students, and the safety of authorised visitors and members of the public entering the precincts of the University.

The main H&S policy is supported by many Codes of Practices, such as CoP_017 on the Transport of Radioactive Material. CoP_017 is not subject to a formal review period but is updated as and when required by changes in the transport rules/regulations.