1 Acquisition of Radioactive Material and Radiation Generators

Scope

1. This chapter covers the acquisition of radioactive materials or radiation generators.

Introduction

2. Radioactive material is a source of ionising radiation and is in widespread use across the MOD. Other sources of ionising radiation also in use across the MOD are radiation generators such as high voltage electrical equipment (which can generate parasitic X-rays) as well as X-ray equipment.

3. The use of radioactive material is regulated by the Health and Safety Executive (HSE) and the environmental regulators (EA, SEPA, NRW, NIEA), who require all users to account for the amount of radioactive material held, use it with minimal risk, store it correctly, transport it safely (as a Class 7 Dangerous Good) and dispose of it legally when no longer required.

4. The following information describes the statutory requirements and reflects the MOD policy for the acquisition of radioactive materials and other sources of ionising radiation; and the procedures to ensure compliance.

Statutory requirements and parallel arrangements

5. In addition to the general requirements of the Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1999, the following specific legislation applies directly or is applied indirectly through parallel arrangements designed to achieve equivalent standards:

a. Justification of Practices Involving Ionising Radiation Regulations 2004 (as amended) (parallel arrangements): These regulations prompt the question. “Do you need to use ionising radiation or is there an alternative?”; If you do need it, “What is the least amount required and what safeguards will be in place?”;

b. Ionising Radiations Regulations 2017 (IRR17) and Ionising Radiations Regulations (Northern Ireland) 2017 (IRRNI17) (apply directly): These regulations define the correct safety culture to ensure that any radiation exposure to employees is kept as low as reasonably practicable (ALARP) and that the employer ensures that the risk of using radioactive material or X-ray generators is mitigated for all personnel;

c. The Environmental Permitting (England and Wales) Regulations 2016 (EPR16) (as amended) (parallel arrangements): These regulate the amount and type of radioactive material that can be held, stored and disposed of in England and Wales by individual sites;

d. Environmental Authorisations (Scotland) Regulations 2018 (EASR18): These regulate the amount and type of radioactive material that can be held, stored and disposed of in Scotland by individual sites;

e. Radioactive Substances Act (Northern Ireland) 1993 (RSA93) (as amended) and associated Exemption Order: These regulate the amount and type of radioactive material that can be held, stored and disposed of in Scotland and Northern Ireland by individual sites;

f. Radiation (Emergency Preparedness and Public Information) Regulations (REPPIR) 2019 (apply directly): This defines the emergency planning requirements should there be an accident that would expose the public to ionising radiation exposure;

g. Ionising Radiation (Medical Exposures) Regulations 2017 (IRMER2017) and The Ionising Radiation (Medical Exposure) Regulations (Northern Ireland) 2018 (IRMERNI2018) (apply directly): These regulations define medical exposures to radiation and the appropriate culture, responsibilities, and management arrangements to ensure that such exposures are kept ALARP in line with the intended diagnostic or therapeutic purpose; and

h. Carriage of Dangerous Goods Regulations (CDG and ADR) (apply directly): These include specific regulations on the transportation of radioactive (Class 7) material.

6. Any personnel involved in acquisition of equipment containing radioactive material or radiation generating equipment must obtain sufficient information from the original suppliers or manufacturers. This information should be readily available to end users and stores in order to be fully compliant with statutory regulations and MOD Policy. Advice should be sought at the earliest opportunity from the appointed Radiation Protection Adviser (RPA).

7. It should be noted that the HAZMAT, ChiP and COSHH Regulations apply to a substance's chemical and physical properties only, and do not cover ionising radiation issues.

8. Radiation risk is also to be considered at all stages of the CADMID procurement cycle for equipment containing radioactive material or emitting ionising radiation and must also address the through life cycle and eventual disposal of the ionising radiation source. All aspects of maintenance and operation (including military service) are to be taken into account.

Duties

9. All personnel who are authorised to procure equipment have a statutory duty to ensure that information on radioactive materials and radiation generators is brought to the attention of the RPA. The general legal duties of suppliers, manufacturers and others, will apply to all procurement personnel supplying equipment (including replacement parts) to the Armed Forces. This specifically includes the duty to identify all sources of ionising radiation such as individual items; radioactive material that is contained within other equipment (and not easily accessible); or X-ray equipment with the potential to emit ionising radiation. For all sources of ionising radiation, it must be ensured that:

a. the Manufacturer has supplied information that includes whether the equipment contains any radioactive material (whether or not they state it is a hazard) or that it is a radiation generator;

b. the radioactive content is identified by name and the amount in Becquerels (Bq) or Curies (Ci) is detailed in a data sheet;

c. a detailed stores description of the item that would allow identification without a NATO Stock Number is used in the stores database. This applies to radioactive items that form part of a kit, as a standalone item or as a radioactive spare. Holders of such items need to identify and account for radioactive material as a statutory requirement;

d. the equipment is designed and constructed to restrict exposure to employees and the public from the source of ionising radiation so far as is reasonably practicable;

e. a Radiation Risk Assessment has been carried out with advice from the RPA as appropriate, or one will be commissioned through the RPA;

f. the end user is provided with adequate information about the proper use, testing, storage and maintenance of the equipment;

g. through life costs including disposal are correctly identified and dealt with prior to the purchase of the material;

h. with advice from the RPA, a critical examination (where applicable) has been or will be undertaken to ensure that safety features operate correctly; and

i. the RPA has been notified.

10. Procurement personnel are responsible for ensuring that clear and unambiguous information is passed along the whole supply chain from the design, manufacture and supply to the use or installation, and disposal.

Acquisition

11. The majority of DE&S projects follow the Concept, Assessment, Demonstration, Manufacture, In-Service and Disposal (CADMID) lifecycle model. The MOD's Acquisition Safety and Environmental Management System (ASEMS) is applicable to this model and includes two core safety manuals for authorised procurers. These manuals are the Project Orientated Safety Management System (POSMS) and the Project Orientated Environmental Management System (POEMS). These assist procurement teams in complying with regulatory and policy requirements.

12. Note: POEMS and POSMS do not apply to nuclear based technologies, for example, the naval nuclear propulsion programme.

13. Before any source of ionising radiation is introduced, permanently or temporarily, (including for trials) into the unit or establishment, a number of requirements for notification or approval may be required and must be considered by the authorised procurer.

14. There is a statutory requirement for procurement personnel to consult an RPA at the earliest opportunity when a source of ionising radiation is being considered in the concept stage of the project. The RPA must be consulted, in advance, on:

a. the nature and extent of the hazard for equipment containing radioactive material or X-ray generating equipment;

b. acceptance into service of all new or modified sources of ionising radiation;

c. the prior examination of plans for new installations of X-ray generating equipment including the proposed engineering controls and design features;

d. safety features and warning devices to restrict exposure to ionising radiation; and

e. the nature, extent and results of critical examinations.

15. Early RPA consultation is required in relation to the above requirements but also to determine whether the radiation hazard can be avoided altogether. If there is an operational advantage in using a source of ionising radiation, the RPA is required to form part of the procurement team's group of safety experts advising on the Safety Case Report at each stage of the CADMID cycle.

16. It is recommended that the RPA be consulted on matters relating to the safe storage and other control requirements for any proposed new radioactive material at the establishments where it is to be used. If special storage arrangements or other requirements are identified, the authorised procurer will also need to provide funds to meet these requirements and inform the establishments affected of the requirements.

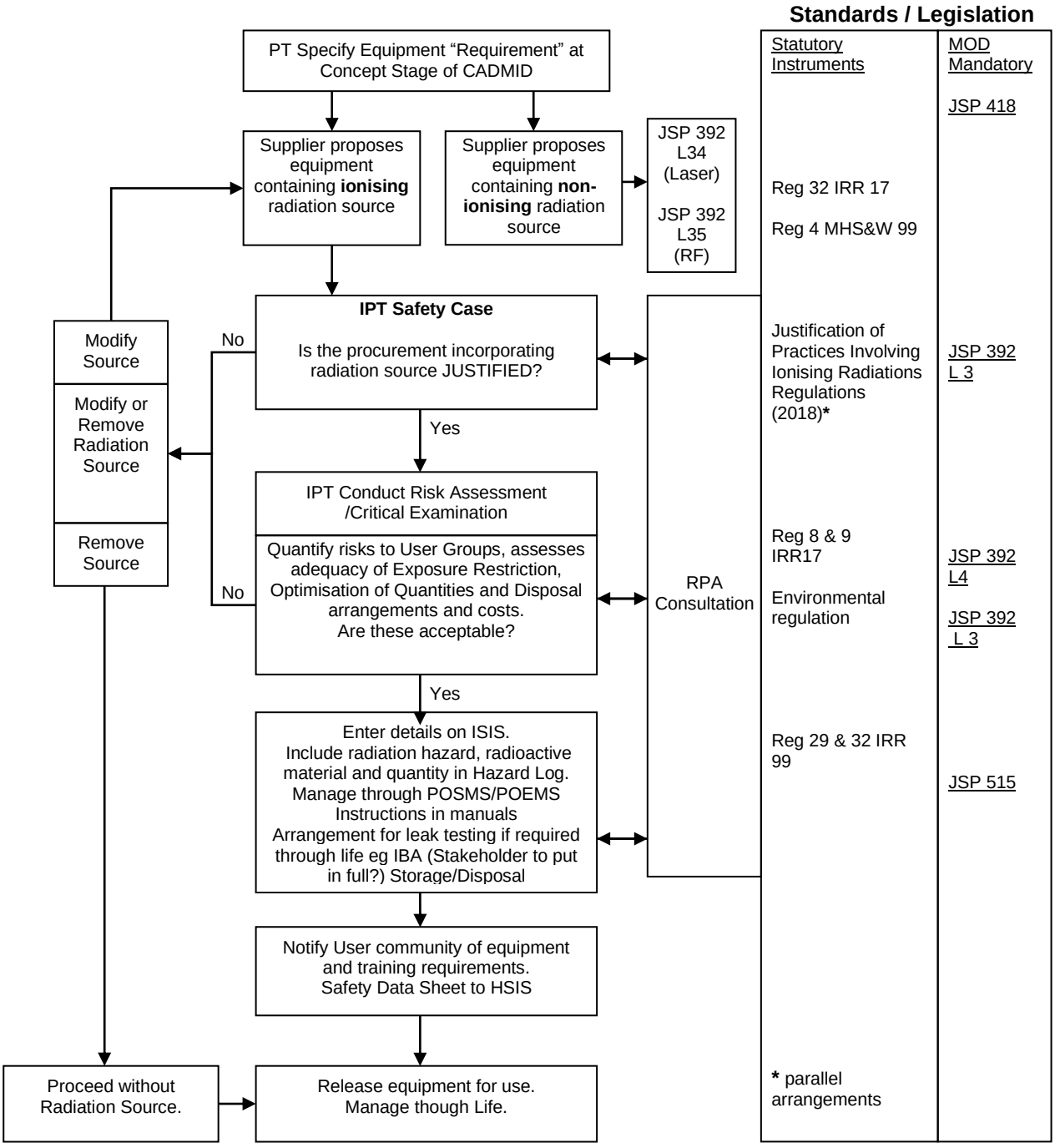
17. There are significant costs in disposing of radioactive items (or making suitable arrangements for those radioactive items that cannot be disposed of) at the end of the life of this equipment. Consultation with the RPA in respect to the available disposal options PRIOR to their acquisition will help the authorised procurer during the CADMID lifecycle model. The recommended (and simplest) disposal route is to return the radioactive materials to the manufacturer / supplier and this arrangement can be achieved by including it in the contract for the acquisition of the radioactive materials.

Records

18. Details of the source of ionising radiation must be included in the hazard log together with details of the other hazardous materials present. Similarly, an assessment of the radiation risks must be included in the Safety Case Report which is produced at each stage of the CADMID cycle. Where an item is given a NATO Stock Number (NSN), the amount and type of radioactive material as well as a detailed description of its location within the item, should be included on the record. The radioactive item must be identified on JSP 515: Hazardous Stores Information System (HSIS) (even if the manufacturer states there is no radiation hazard from this source) and a summary of the radiation risks, identified in the Safety Case Report, must be provided to all personnel handling or storing the equipment. This information is to be provided in the relevant equipment manuals. Where more than one radioactive item is contained within equipment, full details of the total radioactive content are to be documented.

19. Records must be made and retained in accordance with the requirements of Chapter 3 of JSP 392. Further information can be provided by the RPA and MOD Record Retention Policy (JSP 441 Information, Knowledge, Digital and Data in Defence).

Overview flow diagram indicating key process stages of acquisition



Note: This flowchart is only applicable to the acquisition of equipment where there is a potential hazard from ionising radiation such as equipment containing radioactive sources or those which are radiation generators.