REGULATORY GUIDE

Transport of Radioactive Material v3
1. Introduction

This document provides guidance for licence holders to meet the requirements of the *Code for the Safe Transport of Radioactive Material (2019) (Radiation Protection Series C-2, Rev. 1) (Transport Code)*.

2. Legislative Basis for Safe Transport of Radioactive Material

The CEO of ARPANSA is the Competent Authority for the transport of radioactive material by a Controlled Person (as defined in section 13 of the *Australian Radiation Protection and Nuclear Safety Act 1998* (the Act)) by road, rail and inland water ways within Australia. One of the functions of the CEO according to section 7(c) of Australian Radiation Protection and Nuclear Safety Regulations 2018 (the Regulations) is:

*to grant approvals under the Transport Code in the CEO’s capacity as competent authority for the Commonwealth for the purposes of the Transport Code.*

Section 59 (1)(c) of the Regulations states that the holder of a facility or source licence must comply with the Transport Code (Code for the Safe Transport of Radioactive Material).

To address the requirements of the Transport Code, ARPANSA undertakes the following regulatory activities with respect to Controlled Persons:

a) Issuing approvals  
b) Assessment of designs  
c) Assessment of the management systems of licence holders  
d) Inspection or observation of test arrangements  
e) Inspection or observation of manufacturing  
f) Inspection or observation of maintenance and service arrangements  
g) Inspection or observation of transport operations  
h) Inspection or observation of emergency arrangements  
i) Communication with relevant stakeholders  
j) Investigation of incidents and accidents  
k) Enforcement actions  
l) Distribution of information and liaison with relevant stakeholders  
m) Interdepartmental liaison and cooperation  
n) Review and updating the transport code reflecting national and international legislative requirements

3. Issuing approvals

The following approvals are subject to ARPANSA assessment and approval:

a) Design for:  
i. Special form radioactive material
ii. Low dispersible radioactive material

iii. Packages containing 0.1 kg or more of uranium hexafluoride

iv. Packages containing fissile material

v. Type B(U) packages and Type B(M) packages

vi. Type C packages

b) Special arrangements

c) Certain shipments

d) Radiation protection programs for special use vessels

e) The calculation of radionuclide values that are not listed in Table 2 of the Transport Code.

f) Validation of certificates

Note: Some of the items listed above may be subject to the approval of other competent authorities as listed in Schedule B of the Transport Code.

Applications for approval are assessed against all relevant regulatory requirements. Depending on the nature of approval sought, ARPANSA may request additional information. The results of assessment determine whether an approval certificate will be issued.

The approval process also takes into account whether the applicant and subsequent consignors and carriers have adequate provisions in place for preparedness and response to an emergency in the transport of radioactive material.

When considering applications for approval of shipments under special arrangement, ARPANSA takes into account the demonstration by the applicant that the overall level of safety provided by the design of the package and the supplementary operational controls during transport is at least equivalent to that which would be achieved if all applicable regulatory requirements were met.

During the assessment process for competent authority approvals, ARPANSA will take into account whether the applicant has appropriate arrangements in place for monitoring of radiation doses to persons due to the transport of radioactive material, to ensure that the system of protection and safety complies with Code for Radiation Protection in Planned Exposure Situations (2016)\(^1\).

Applicants seeking an approval for any of the above should include the information as described in the Approval Checklists.

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\(^1\) The Radiation Protection Code C-1 - Code for Radiation Protection in Planned Exposure Situations (2016) sets out the requirements in Australia for the protection of occupationally exposed persons, the public and the environment in planned exposure situations. The primary means of controlling exposure in planned exposure situations is by good design of facilities, equipment, operating procedures and through training – all of which contribute to optimisation of protection. C-1 is based on the ‘requirements’ relating to planned exposure situations described in the Safety Requirements of the International Atomic Energy Agency (IAEA); Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards General Safety Requirements Part 3, GSR Part 3 (IAEA 2014).
4. Design assessment

Paragraph 220 of the Transport Code defines ‘design’ as:

the description of fissile material excepted under para. 417(f), special form radioactive material, low dispersible radioactive material, package or packaging that enables such an item to be fully identified. The description may include specifications, engineering drawings, reports demonstrating compliance with regulatory requirements, and other relevant documentation.

Therefore, ‘design’ should be considered to include much more than the drawings and specifications that enable the packaging to be manufactured. The design assessment should include the supporting reports and documents that substantiate or verify statements or assumptions made by the designer. It should also include all relevant arrangements for package preparation, instructions or provisions for maintenance and servicing, and any approved procedures for repair or modification. Details of the requirements are described in section VI of the Transport Code, and Section VI of the IAEA Specific Safety Guide No. 26 Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material describe how to address these requirements.

5. Management system

During the assessment process for competent authority approvals, ARPANSA will take into account whether the applicant has an appropriate management system based on international, national or other acceptable standards for the management of transport as required by the Transport Code (paragraph 3062).

Note: Depending on the type of the business the management system for transport can be integrated into the organizational management system.

The management system is subject to inspection to determine its compliance with a certified quality system. In general, inspection of a management system usually covers the items described in Appendix A1. However, this list is not exhaustive and additional items may be inspected to determine compliance with the Transport Code.

6. Test arrangements

It is imperative that packages and scale models or representative examples of package features and materials (including special form radioactive material) are tested to demonstrate compliance of the design with regulatory requirements. Testing may be carried out by the designer, the applicant, a third party testing organisation, or the competent authority or its nominated independent agent. ARPANSA may witness the tests to verify that they are performed in accordance with established procedures.

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2 Para 306: A management system based on international, national or other standards acceptable to the competent authority shall be established and implemented for all activities within the scope of the Regulations, as identified in para. 106, to ensure compliance with the relevant provisions of these Regulations. Certification that the design specification has been fully implemented shall be available to the competent authority. The manufacturer, consignor or user shall be prepared:

(a) To provide facilities for inspection during manufacture and use;
(b) To demonstrate compliance with these Regulations to the competent authority.

Where competent authority approval is required, such approval shall take into account and be contingent upon the adequacy of the management system.
7. **Manufacture of packages**

Packages should be manufactured in a controlled manner and in accordance with the design specifications and management system. In order to verify this, ARPANSA may inspect manufacturing of packages. Such inspections may use the checklist in Appendix A2.

8. **Maintenance and servicing**

The licence holder must demonstrate before each use of packaging that the requirements of paragraphs 502 and 503 of the Transport Code have been met. The inspection of maintenance and servicing operations may include the items in the checklist in Appendix A3. During the lifetime of the packaging, the user should maintain sufficient records to demonstrate that the requirements of paragraphs 502 and 503 of the Transport Code have been met. These records are subject to inspection by ARPANSA.

For approved packages, the user should record all safety related deviations from and modifications to the specifications as well as any significant damage noted during use of the packages. ARPANSA should be informed of these deviations before the packages are returned to service within an agreed time period. Corrective measures or modification proposals including any plans for repairs will be subject to agreement by ARPANSA. Any packages undergoing such repairs, modifications or changes should not be returned to use until ARPANSA has approved the change.

9. **Transport operations**

ARPANSA may undertake inspection of transport operations. Such inspections may be conducted during any phase of transport or during storage in transit and may be announced or unannounced. Typical transport inspection items appear in the checklist in Appendix A4.

The specific requirements for notification of the competent authority are established in paragraphs 557–563 of the Transport Code. The competent authority may request additional notification before a package is shipped or after it has been received to allow for certain inspections to be undertaken. The need for further notification should be determined in accordance with the package types and the number of shipments made and received.

10. **Accidents and emergency response**

ARPANSA’s assessment of transport emergency response arrangements will take into account the results of periodic risk assessment of accidents involving the transport of radioactive material. Emergency planning and procedures should reflect the recommendations of the *IAEA Safety Guide on Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material, TS-G-1.2*.

*Note: Certain transport accidents are covered by the Convention on Early Notifications of a Nuclear Accident and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.*
11. **Enforcement actions and investigations of incidents**

ARPANSA’s [Compliance & Enforcement Policy](#) describes the graded approach to non-compliance. Investigation of incidents and accidents will be carried out in accordance with established procedures. If an incident involves more than one competent authority then the inspection may be jointly conducted.

12. **Distribution of information**

ARPANSA will prepare, distribute and update information and guidance such as this to facilitate compliance. Such information is intended to assist users in the application and interpretation of the Transport Code. ARPANSA may liaise with other relevant agencies to organise training, seminars and workshops.

13. **Inter-jurisdictional liaison**

ARPANSA liaises with other competent authorities to share information in relation to safe transport of radioactive material and to maintain national uniformity in regulating transport of radioactive material through the Radiation Regulators Network (RRN). ARPANSA leads a national competent authority working group, the ‘Transport Competent Authority Forum’ that discusses national and international issues related to transport of radioactive material to assure national uniformity and international harmonisation.

14. **Review and update of requirements of the Transport Code**

There is a process in place to review and update the Transport Code to maintain international harmonisation, reflecting the requirements of international standards and legislation such as IAEA Specific Safety Requirements for safe transport of radioactive material. Associated guidance documents are revised accordingly.
Appendix A – Inspection checklist

As part of compliance monitoring ARPANSA undertakes inspection and/or site visits of transport activities. The following appendices provide guidance on the elements considered in the inspection activities in the areas of Management System (Appendix A1), Manufacturing of Packages (Appendix A2), Maintenance and Servicing (Appendix A3) and Transport Operations (Appendix A4).

A1 Management System

a) Line of responsibility (organisational structure) and adequacy of resources to meet the requirements of the Transport Code

b) Training of personnel

c) Procedures for the design and fabrication or for the selection and procurement of packaging

d) Appropriateness of packaging for the specific contents of packages by the consignor

e) Records (e.g. certificates and any associated instructions for handling, loading, storage, use and maintenance of the packaging etc.)

f) Procedures are followed for the preparation and use of the package, in accordance with the approval certificate, the instruction manual and related documents

g) Procedures for marking and labelling of packages

h) Procedures for calibration instruments and monitoring of packages for both radiation and contamination.

i) Procedures are for preparation and control of all relevant shipping documents, for providing correct placarding of the carrier’s vehicles, for providing all the required documentation to carriers, and for providing any required notification to the competent authorities of each State into which or through which the consignment is transported.

j) During transport, carriers perform any required actions relating to placarding, stowage and segregation of packages, etc. particularly any administrative controls relating to exclusive use shipments, or supplementary operational controls as specified in the competent authority certificate.

k) Radiation protection program for its activities related to the transport of radioactive material

l) Procedures for non-conformance control, investigation, reporting and communication

m) Arrangements for emergency response
A2 Manufacturing of Packages

1. Management system
   a) Availability of management system for manufacturing process
   b) Quality assurance system verification

2. Equipment
   a) Adequacy and suitability of equipment for production
   b) Adequacy and suitability of inspection and test equipment

3. Personnel
   a) Training and qualifications
   b) Accreditation records

4. Documentation
   a) Documented procedures/plans
   b) Availability and currency of all drawings, specifications and records
   c) Control procedures for documentation
   d) Conformance with identification numbers and serial numbers

5. Materials
   a) Control of material for manufacturing
   b) Procurement of materials and conformance with standards
   c) Storing and testing of materials for conformance with specifications

6. Manufacture
   a) Conformance with design specifications
   b) Any modifications to the approved design
   c) Process controls, tests and inspections during manufacture

7. Records
   a) Adequacy of records of operations
A3 Maintenance and servicing

1. Documentation
   a) Availability of maintenance and service instructions and schedules
   b) Specific reference to disassembly and assembly procedures and maintenance frequency in instructions and schedules
   c) Package logbook
   d) Verification of logbooks and records by authorised personnel

2. Specification of components or features
   a) Identification and categorisation of package components or features
   b) Verification of categories

3. Testing and inspection
   a) Evidences of specific tests and inspections. For example, functions or operational tests of components; results of visual inspections; pressure test; dynamic testing; leak test; non-destructive testing.

4. Packaging components
   a) Procedures for repair, reconditioning, refurbishments and disposal of packaging components

5. Equipment and tools
   a) Availability of specific test equipment
   b) Calibration of equipment
   c) Availability of special equipment

6. Training
   a) Appropriate training of personnel (e.g. task specific)
   b) Adequacy of training program

7. Records
   a) Records management
A4 Transport operations

1. Phase of inspection
   a) Prior to dispatch
   b) During shipment
   c) During trans-shipment
   d) During storage in transit upon arrival at destination

2. Driver instructions/handbook
   a) Availability of written instructions
   b) Emergency procedures/instructions
   c) Procedures/instructions for trans-shipment or en route storage requirements, in applicable
   d) Training/competency certificate

3. Consignment of documentation (load manifest)
   a) Availability of load manifest with shipment details
   b) Details of load manifest such as source type and activity, package types, category labelling
   c) CSI (criticality safety index)
   d) Confirmation of TI (transport index) and/or SI

4. Particulars of consignment
   a) Availability of competent authority certificates
   b) Compliance with provisions and conditions of approvals
   c) Completeness of documentation (e.g. authorisation, sign off, holding points)

5. Vehicles
   a) Vehicle maintenance program and records
   b) Suitability of the vehicle (e.g. weight limitations)
   c) Tie-down and anchorage points (including test results)
   d) Placarding of vehicles
   e) Compliance with stowage conditions

6. Operators
   a) Adequacy of training
   b) Training records
   c) Radiation protection program

7. Procedures
   a) Approved written procedures

8. Emergency arrangements
   a) Approved plans and procedures
   b) Compatibility of consignor and carrier’s plans

9. Security arrangements
   a) Security arrangements as applicable