International Regulatory Framework for Safe Transport of Radioactive Material

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What is Transport





...In the context of the Transport Regulations, transport is defined differently...

"The deliberate physical movement of radioactive material (other than that forming part of the means of propulsion) from one place to another."

IAEA Nuclear Safety and Security Glossary, 2022 (Interim) Edition



Transport of Radioactive Material



Industry & Agriculture

Medicine & Research

Front End Fuel Cycle (Uranium ores, fresh fuel, UF6,..) Back End Fuel Cycle (irradiated Fuel, Radioactive Waste, ..)

Radioactive Sources

1.4





IAEA Transport Regulations



Dec 1959

UN Economic and Social Council

- expressed the desire that IAEA be entrusted with drafting of recommendations on the transport of radioactive material,
- provided that they are consistent with the recommendations on the transport of dangerous goods
- and established in consultation with UN and specialized agencies concerned.

PLEASE DUDTE NO. EC 525

9 December 1959

NATIONS UNIES

Dear Mr. Cole,

UNITED NATIONS

The purpose of this letter is to draw to your attention the desire of the Economic and Social Council, expressed in paragraph (g) of its resolution 72% C (XXVIII) of 17 July 1959, that IABA be entrosted with the drafting of recommendations on the transport of radio-active substances, provided that they are consistent with the framework and general principles of recommendations of the Counittee of Experts on the Transport of Dangerous Gools of the United Nations, and that they are established in computations with the United Nations and the specialized spencies concerned. Excerpts from this resolution are enclosed (Enclosure 1).

NEW YORK

It is recognized that the Agency's recommendations on the transport of radio-active substances may affect the 1956 recommendations of the former Committee of Experts (Enclosure 2), and the amendments thereto, as indicated in the progress report of the Committee of Experts for Further Work on the Transport of Dangerous Goods (Enclosure 3). In accordance with paragraphs 3 (a) and 3 (g) of the Council's resolution, and paragraphs 17, 21, and recommendations A and C in paragraph 49 of the progress report, the drafting of any amendments to the following parts of the English edition of the 1956 recommendations which relate to the transport of radio-active substances, appear to come within the purview of LAEA:

21 DEC 1959

Forces / Latrique / Fait / Servant

ACTON

- (a) The classification and definition of Class 7 -Radio-active substances (paragraph 41);
- (b) The list of such substances (page 38), as smended by page 36 of the revised list (Annex 3 of the progress report) of document E/CN.2/191/Add.1 (see Enclosure 3);

Mr. Storling Cole Director General International Atomic Energy Agency Vienna 1 Austria

Publication History of IAEA Transport Regs.







IAEA Guidance related with SSR6

SSG-26	 Advisory Material for the IAEA Regulations for the Safe Transport of RAM How to achieve and demonstrate compliance with Transport Regs
SSG-78	 Compliance Assurance for the Safe Transport of RAM Recommendations on actions for competent authority to take to ensure compliance
SSG-86	 Radiation Protection Programmes for Safe Transport of RAM How to optimize RP to comply with Transport Regs (includes examples, checklist
SSG-33	 Schedules of Provisions of the IAEA Regulations for Safe Transport of RAM (2018 Edition) Aid for users by providing a listing of relevant requirements for type or material/ package/ shipment)
SSG-65	 Preparedness and Response for Nuclear or Radiolog. Emergency Involving Transp. of RAM Arrangements to be made at the preparedness stage. Support the implementation of GSR Part 7
SSG-66	 Format and Content of the Package Design Safety Report for Transport of RAM Preparation of PDSR to demonstrate compliance with Transport Regs
TS-G-1.4	 Management System for the Safe Transport of RAM How to implement, assess and continually improve a management system (and quality assurance)



Concept of SSR-6



Regulations for the Safe Transport of Radioactive Material

In the life-cycle of any regulated nuclear or radiological material <u>transport is the ONLY time</u> the material is deliberately placed <u>IN the public domain</u> <u>WITHOUT any</u> <u>ACTIVE radiological protection measures</u> in place.

In this public domain it is the job of the IAEA Transport Regulations to <u>apply 'PASSIVE'</u> radiological protection measures

i.e. enable the transported package to 'take care of itself'.

Transport Regs are <u>not 'thematic</u>' in format (how to transport NM/RAW/DSRS,..), but '**principle-based**'.

SSR-6

Package integrity as a function of the associated hazard



Package integrity as a function of the associated hazard – graded approach



Restrict the type and activity of the radioactive content





Provide severe accident proof package **design**



Objectives of Transport Safety



How to achieve safety..



Applying a **graded approach**

Imposing requirements





Requiring administrative controls

Scope of SSR-6

- Transport of radioactive material by all modes on land, water, or in the air, including transport that is incidental to the use of the radioactive material.
- Transport comprises all operations and conditions associated with, and involved in, the movement of radioactive material; these include:



Key Stakeholders for Transport Safety?





Radiation Protection in Transport of Radioactive Material



Radiation Protection in Transport

- Doses to persons shall be **below the relevant dose limits**.
- **Protection and safety shall be optimized** in order that the magnitude of individual doses, the number of persons exposed and the likelihood of incurring exposure shall be kept as low as reasonably achievable, economic and social factors being taken into account, within the restriction that the doses to individuals are subject to dose constraints.
- For occupational exposures arising from transport activities, where it is assessed that the effective dose either:
 - Is likely to be between 1 and 6 mSv in a year, a dose assessment programme via workplace monitoring or individual monitoring shall be conducted; or
 - Is likely to exceed 6 mSv in a year, individual monitoring shall be conducted





Radiation Protection in Transport

- A structured and systematic approach shall be adopted and shall include consideration of the interfaces between transport and other activities.
- RPP shall be established for the transport of radioactive material. Nature and extend of RPP shall be related to the magnitude and likelihood of radiation exposure.

all aspects of transport and the associated conditions both workers and the public

- Objectives of RPP:
 - to provide adequate consideration of radiation protection measures in transport
 - To ensure that the system of RP is adequately applied
 - To enhance a safety culture in the transport of radioactive material
 - To provide practical measures to meet these objectives.



SSG-26

para 302.

SSR-6

para 302

Radiation Protection in Transport

Packages, overpacks and freight containers containing radioactive material and unpackaged radioactive material shall be **segregated during transport** and during storage in transit:

- **From workers** in regularly occupied working areas by distances calculated using a dose criterion of 5 mSv in a year and conservative model parameters;
- From members of the public in areas where the public has regular access by distances calculated using a dose criterion of 1 mSv in a year and conservative model parameters;
- From undeveloped photographic film by distances calculated using a radiation exposure riterion for undeveloped photographic film due to the transport of radioactive material 1 mSv per consignment of such film;

ther dangerous goods in accordance with para. 506





SSG-26 para 302.1

Elements of a RPP for the transport

- 1. Scope of the programme
- 2. Roles and responsibilities for the implementation of the programme
- 3. Dose assessment and optimization (paras. 301 and 303)
- 4. Assessment of surface contamination (para. 301)
- 5. Segregation and other protective measures (para. 562)
- 6. Emergency response arrangements (paras. 304-305)
- 7. Training (para. 311)
- 8. Management system

IAEA Safety Standards for protecting people and the environment

Radiation Protection Programmes for the Transport of Radioactive Material



Specific Safety Guide

No. SSG-86

Transport Safety Standards Committee

Introduction



TRANSSC

- Safety Standards Committee for the area of safe transport of radioactive material (TRANSSC) comprises of senior regulators/transport ministry officials of all MS.
- Providing feedback and recommendations to the Agency in the development/revision of IAEA safety standards.







What is beyond IAEA safety standars?



Things do get interesting..

.. if you look at them from 3D perspective..



Hint: IAEA is not alone in the world of transport safety



International Regulatory Framework – Transport Safety



New and Some Old Challenges in Transport

- Delays and Denials of Shipments Facilitation of Safe and Secure Transport of Radioactive Material
- New concepts of TNPPs and FNPPs











Thank you

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