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**Emergency Preparedness and Response to Incidents  
During Radioactive Material Transport**

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**Abstract**

**Background**

Nuclear material and radioactive material are routinely and regularly transported around the world, in all regions, using multiple modes of transport, totalling twenty million shipments per year. To protect people, property and the environment, national and international transport regulations have been developed that apply to all modes of transport, including air, maritime, road, rail, and inland waterways. Stringent measures are required in these regulations to ensure adequate safety, containment, shielding and the prevention of criticality in the event of a transport accident. Despite the extensive application of safety controls, emergencies have occurred during the transport of nuclear or radioactive material. Emergencies during transport are included in Emergency Preparedness Category IV, the baseline level of preparedness applicable to all Member States.

The response to an emergency during the transport of nuclear or radioactive material involves unique hazards, considerations and response actions. The only existing safety standard that provides guidance for such emergencies is Safety Guide TS-G-1.2, *Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material* from 2002.

**Discussion**

TS-G-1.2 has been in use by Member States for 14 years and is due for revision based on experience in applying it. TS-G-1.2 is not consistent with the latest safety standards for emergency preparedness and response, including General Safety Requirements (GSR) No. GSR Part 7, Preparedness and Response for a Nuclear or Radiological Emergency, published in 2015, and thus does not provide guidance on all the required functions and infrastructure for emergency preparedness and response. Since the publication of TS-G-1.2 in 2002, there have been many publications in the Nuclear Security Series, requiring analysis and updating to ensure consistency.

The IAEA has been requested to develop and publish revised guidance on emergencies during transport, including by GC(59) Res. 10, paragraph 80, which “Requests the Secretariat... to emphasize the specific challenges and requirements for efficient international cooperation in response to nuclear and radiological incidents and emergencies relating to the transport of radioactive material” and “requests the Secretariat to continue its efforts to develop... guidance for States on how to respond to a maritime emergency involving radioactive material.”

This paper will provide an overview of the latest international requirements for emergency preparedness and response, their applicability to emergencies during transport, and the on-going program to update the Safety Guide TS-G-1.2.

## **Introduction**

Radioactive material is routinely and regularly transported around the world, in all regions, using multiple modes of transport, totalling approximately twenty million shipments per year. To protect people, property and the environment, national and international transport regulations have been developed that apply to all modes of transport, including air, maritime, road, rail, and inland waterways. Stringent measures are required in these regulations to ensure adequate safety, containment, shielding and the prevention of criticality in the event of a transport accident. Despite the extensive application of safety controls, emergencies have occurred during the transport of radioactive material. Emergencies during transport are included in Emergency Preparedness Category IV, the baseline level of preparedness applicable to all Member States.

The response to an emergency during the transport of radioactive material involves unique hazards, considerations and response actions. The only existing safety standard that provides guidance for such emergencies is Safety Guide TS-G-1.2, *Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material*, 2002<sup>1</sup>.

## **Justification for Revision**

TS-G-1.2 has been in use by Member States for 14 years and is due for revision based on experience in applying it. TS-G-1.2 is not consistent with the latest safety standards for emergency preparedness and response, including General Safety Requirements (GSR) No. GSR Part 7, Preparedness and Response for a Nuclear or Radiological Emergency<sup>2</sup>, published in 2015, and thus does not provide guidance on all the required functions and infrastructure for emergency preparedness and response. Since the publication of TS-G-1.2 in 2002, there have been many publications in the Nuclear Security Series, requiring analysis and updating to ensure consistency. The IAEA has been requested to develop and publish revised guidance on emergencies during transport, including by GC(59) Res. 10, paragraph 80<sup>3</sup>, which “Requests the Secretariat... to emphasize the specific challenges and requirements for efficient international cooperation in response to nuclear and radiological incidents and emergencies relating to the transport of radioactive material” and “requests the Secretariat to continue its efforts to develop... guidance for States on how to respond to a maritime emergency involving radioactive material.”

The Commission on Safety Standards (CSS) Report of the Fifth Term 2012-2015<sup>4</sup> included a recommendation for “consolidating safety standards and security recommendations for transportation of radiation sources and nuclear materials consistent with U.N. standards.”

These requests reflect the need for a comprehensive revision of TS-G-1.2 in light of updated EPR Safety Requirements.

## **Objective**

The objective of the publication is to provide guidance and recommendations on the implementation of the requirements established primarily in GSR Part 7 and Specific Safety Requirements (SSR) No. SSR 6, Regulations for the Safe Transport of Radioactive Material, 2012 Edition<sup>5</sup>, in order to prepare for and respond to emergencies during the transport of radioactive material.

The target audience is emergency planners and response organizations in the Member States, including regulatory bodies, national competent authorities, civil defence/civil protection/emergency management agencies, emergency responders, consignors, carriers, consignees, and others who are responsible for developing and implementing emergency preparedness and response arrangements.

## **Scope**

The scope of the publication will cover preparedness and response for a nuclear or radiological emergency during transport. The Safety Guide will provide guidance from the forwarding of the package to delivery at the consignee (including storage in transit). The publication will address the interfaces with nuclear security in emergency preparedness and response. The publication will exclude events without any safety significance (e.g. a disabled conveyance in a stable condition, such as a broken down motor vehicle or a vehicle involved in a minor traffic accident), while acknowledging that such events could trigger follow-on actions. The publication will also exclude movement of radioactive material within the site boundaries of authorized facilities.

## **Interface with other documents**

The publication will be an updated Safety Guide consistent with the requirements established in GSR Part 7 and SSR 6. The publication will interface with the Safety Standards Series, the Nuclear Security Series, and relevant international conventions, including:

- Arrangements for Preparedness for a Nuclear or Radiological Emergency, Safety Standards Series No. GS-G-2.1
- Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency, Safety Standards Series No. GSG-2
- Draft Safety Guide DS474 Arrangements for the Termination of a Nuclear or Radiological Emergency
- Draft Safety Guide DS475 Arrangements for Public Communications in Preparedness and Response for a Nuclear or Radiological Emergency
- Nuclear Security Series Implementing Guide No. 9, Security in the Transport of Radioactive Material
- Nuclear Security Series Implementing Guide No. 26-G, Security of Nuclear Material in Transport

- Nuclear Security Series Recommendations No. 14, Nuclear Security Recommendations on Radioactive Material and Associated Facilities
- Convention on Early Notification of a Nuclear Accident and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency

The publication will be developed in collaboration with international organizations in the framework of the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) to ensure consistent guidance from all relevant international organizations. IACRNE members, including the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO), as well as the United Nations Economic Commission for Europe (UNECE), will be invited to co-sponsor the document.

### **Overview of structure**

The publication will include guidance for both preparedness and response to a nuclear or radiological emergency during transport. It will address all five modes of transport as described in the Transport Regulations. The structure will build upon that of TS-G-1.2, reflecting the requirements for emergency preparedness and response established in GSR Part 7.

The publication will contain the general topics listed below, although with a different layout in the final version of the document:

- INTRODUCTION
  - Background
  - Objective
  - Scope
  - Structure
- FRAMEWORK FOR PREPAREDNESS AND RESPONSE TO AN EMERGENCY DURING THE TRANSPORT OF RADIOACTIVE MATERIAL
  - Modes of Transport
  - Road Transport
  - Rail Transport
  - Air Transport
  - Maritime Transport
  - Inland Waterway Transport
  - International Framework for Emergency Preparedness and Response during the Transport of Radioactive Material
- INTERFACES BETWEEN SAFETY AND SECURITY
  - Safety Considerations for an Emergency during Transport
  - Security Considerations for an Emergency during Transport
- GENERAL AND FUNCTIONAL ELEMENTS FOR EMERGENCY PREPAREDNESS AND RESPONSE DURING TRANSPORT

- Emergency Management System
- Roles and Responsibilities in Emergency Preparedness and Response
- Responsibilities of International Organizations in Emergency Preparedness and Response
- Hazard Assessment
- Protection Strategy for a Nuclear or Radiological Emergency
- Managing Operations in an Emergency Response
- Identifying and Notifying a Nuclear or Radiological Emergency and Activating an Emergency Response
- Taking Mitigatory Actions
- Taking Urgent Protective Actions and Other Response Actions
- Providing Instructions, Warnings and Relevant Information to the Public for Emergency Preparedness and Response
- Protecting Emergency Workers and Helpers in an Emergency
- Managing the Medical Response in a Nuclear or Radiological Emergency
- Communicating with the Public throughout a Nuclear or Radiological Emergency
- Taking Early Protective Actions and Other Response Actions
- Managing Radioactive Waste in a Nuclear or Radiological Emergency
- Mitigating Non-Radiological Consequences of a Nuclear or Radiological Emergency and of an Emergency Response
- Requesting, Providing and Receiving International Assistance for Emergency Preparedness and Response
- Terminating a Nuclear or Radiological Emergency
- Analysing the Nuclear or Radiological Emergency and the Emergency Response
- **INFRASTRUCTURAL ELEMENTS FOR EMERGENCY PREPAREDNESS AND RESPONSE DURING TRANSPORT**
  - Authorities for Emergency Preparedness and Response
  - Organization and Staffing for Emergency Preparedness and Response
  - Coordination of Emergency Preparedness and Response
  - Plans and Procedures for Emergency Response
  - Logistical Support and Facilities for Emergency Response
  - Training, Drills and Exercises for Emergency Preparedness and Response
  - Quality Management Programme for Emergency Preparedness and Response
- **REFERENCES**
- **APPENDICES**
- **ANNEXES**
- **CONTRIBUTORS TO DRAFTING AND REVIEW**

## Conclusions

With approval of the Document Preparation Profile (DPP) by all of the relevant Safety Committees, the next step for this publication will be to receive approval of the DPP from the Committee on Safety Standards (CSS), and then revisions to the actual document may begin in earnest. The current production schedule for the revision of the current Safety Guide (TS-G-1.2), which will receive a Specific Safety Guide (SSG) designation, indicates that the new SSG will be issued in 2020.

## Acknowledgments

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## References

- [1] International Atomic Energy Agency, *Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material*, Safety Guide No. TS-G-1.2 (ST-3), IAEA, Vienna (2002)
- [2] International Atomic Energy Agency, *Preparedness and Response for a Nuclear or Radiological Emergency*, General Safety Requirements No. GSR Part 7, IAEA, Vienna (2015).
- [3] [https://www.iaea.org/About/Policy/GC/GC59/GC59Resolutions/English/gc59res-9\\_en.pdf](https://www.iaea.org/About/Policy/GC/GC59/GC59Resolutions/English/gc59res-9_en.pdf)
- [4] <https://www-ns.iaea.org/committees/files/css/204/CSSfifthendoftermreportfinal.pdf>
- [5] International Atomic Energy Agency, *Regulations for the Safe Transport of Radioactive Material*, 2012 edition, Specific Safety Series No. 6, IAEA, Vienna (2012).