
Radiation Protection Programmes for the Transport of Radioactive Materials

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The need for radioactive material transport

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- To support nuclear power which supplies over 16% of the world's electricity
 - In medicine for diagnostics and therapy
 - For gamma sterilisation which provides 40% of the world's medical disposables and devices and also for food sterilisation
 - Radio-pharmaceuticals
 - Industrial radiography
 - All these activities are becoming increasingly global in terms of both products and services and international transport is essential to support them

Radiation Protection Programmes



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- The IAEA Transport Regulations now require organisations involved in the transport of radioactive materials to implement a RPP to control dose exposure to both workers and the public
- The extent of the control measures has to be decided by the operator but many factors need to be addressed

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Elements of a RPP



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- Scope and nature of the transport operation
- Roles and responsibilities of staff for radiological protection in each operation
- Dose assessment and optimisation
- Surface contamination checks
- Segregation and other protective measures
- Emergency response
- Training
- QA programme for documentation and operations

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The issue



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- Whereas some materials, e.g. spent nuclear fuel, are transported by dedicated carriers who are familiar with radiation protection measures there are many organisations for which radioactive transport is only a small part of their total business
- Such organisations may not have RPPs to meet the new requirements. They could perceive the development and implementation difficult to justify in business terms
- This could result in the loss of essential transport services and WNTI work alleviates this problem

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Dose assessment



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- Dose assessment at the pre-operational stage is a key issue since the requirements of the RPP relate to the likely exposure
- Where the dose is unlikely to exceed 1mSv/year no dose monitoring is required
- Where it is between 1 and 6mSv/year dose monitoring may be required and where it is >6mSv/year it is mandatory
- Reliable dose data are therefore important to assess the implications of the new requirements

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Nuclear fuel cycle transport



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- WNTI collated the doses to workers and the public for the transport of various nuclear fuel cycle materials for all modes of transport
- The objective was to provide data to assist operators in the preparation of their RPPs
- This work showed that it is unlikely that any group of workers or the public will receive doses $>1\text{mSv/year}$ and RPPs then fall into the lowest category for which no dose monitoring is needed
- Exposures for other materials will generally be $<1\text{mSv/year}$ but doses for some workers handling radioisotopes could be $>6\text{mSv/year}$

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WNTI actions to facilitate effective implementation of RPPs



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- Close cooperation with IAEA to provide industrial experience in the preparation of the guidance document TS-G-1.5
- Preparation of advice for organisations in the transport supply chain
- Seminars organised by fuel cycle companies for service providers on RPP requirements
- Preparation of RPP pro-formas for the various types of organisation in the supply chain
- Lectures to students involved in various aspects of sea transport on transport regulations and RPPs

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Conclusions

- Many vital industries are becoming increasingly dependent on the national and international transport of radioactive materials
- The organisations involved fully support the need for measures to limit radiation exposure to both workers and the public but need help and advice
- WNTI and its members are providing this help, e.g. in the preparation of RPPs and the sharing of best practice (ALARA) etc, based on experience
- This contributes to maintaining essential transport services for many important global industries