Chapter 15 Transport of radioactive materials

Radioactive materials are routinely transported all around the world by air, sea, road and rail. These materials include those associated with the nuclear fuel cycle — from uranium ores to spent fuel and radioactive waste — but also radionuclides for nuclear medicine and research, and radioactive sources for industry and radiotherapy. Although the safety record of these transports is excellent, they sometimes cause concern in the areas through which they pass. For example, a number of countries have expressed particular concern about ships carrying radioactive waste passing through or close to their territorial waters.

Transport of irradiated nuclear fuel elements

Regulations are, therefore, needed not just to ensure that the chances of an accident, which could result in radioactive material being dispersed in the environment, are kept to a minimum, but also to ensure that the workers involved in transport — including those loading and unloading shipments as well as drivers/pilots — are protected. Because much of this transport is international, transport safety was one of the first areas in which the IAEA developed safety standards. The IAEA Regulations for the Safe Transport of Radioactive Material were first published in 1961 and have been revised periodically since.

The Regulations govern the necessary packaging, shielding, labelling and other precautions that must be taken when transporting various types of radioactive material, including tests that packages must undergo to prove that they can withstand possible accidents. The requirements are graded according to the level of activity of the materials to be transported. In general, more hazardous radioactive materials need more extensive and more robust packaging and stricter quality and administrative controls.

The IAEA's Transport Regulations are widely accepted as the global standard for the transport of radioactive materials. In some cases, the Agency's Regulations are

incorporated into national laws or regulations. Other countries write their own regulations governing transport of radioactive materials, but make them consistent with the IAEA Regulations. Another way in which the Agency's Regulations are applied is through international regulations on the transport of hazardous goods. The regulations for the different modes of transport are issued by different organizations, particularly the International Civil Aviation Organization (ICAO) for air transport, the International Maritime Organization (IMO) for transport by sea, and regional organizations such as the Inland Transport Committee of the UN Economic Commission for Europe for transport by land and inland waterways. These organizations' regulations cover all types of hazardous material, and the parts that deal with radioactive materials are based on the IAEA Transport Regulations.

It is generally accepted that compliance with the IAEA Transport Regulations (either directly or via other regulations) assures the safety of workers and the public. However, there are often questions about whether the Regulations are complied with for particular shipments. IAEA surveys have suggested that they are widely implemented. As a way of demonstrating that they do comply, Member States can ask the IAEA to conduct an appraisal of their implementation of the Regulations. An international peer review team visits the country, studies their arrangements and then reports their findings and recommendations.

Testing ability of spent fuel transport container to withstand impact of train crash