

The Legislative and Regulatory Framework for The Transport of Radioactive Material and the Experience Gained During the Transport of Fresh Nuclear Fuel

This study provides an in-depth analysis of the legislative and regulatory framework governing the safe and secure transport of radioactive materials in the Republic of Türkiye (Türkiye), where thousands of such consignments are undertaken annually for medical, industrial, and energy-related purposes. Particular emphasis is placed on the operational experience gained from the recent transport of fresh nuclear fuel to the Akkuyu Nuclear Power Plant, scheduled to be commissioned in the near future.

The Nuclear Regulatory Authority (NDK) is the competent authority having a regulatory control on activities related to nuclear energy and ionizing radiation carried in Türkiye and responsible for authorization, inspection, and enforcement of all activities related with the transport of radioactive materials. Its legislative framework reflects alignment with International Atomic Energy Agency (IAEA) standards, particularly the Regulations for the Safe Transport of Radioactive Material, and is firmly embedded in Turkish national legislation. For transport security, Regulation on Physical Protection in the Transportation of Nuclear Material, which is in line with the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment; and the recommendation in IAEA's Nuclear Security Series No. 13 (INFCIRC/225/Revision 5) is implemented. Authorization procedures are structured to integrate safety and security considerations into every stage, starting from packaging to emergency preparedness. For radioactive sources, a dual authorization system (licensing and permitting) applies, while for nuclear materials, specific transport permits are required.

Institutional responsibilities in Türkiye are distributed among several actors, ensuring regulatory clarity and operational effectiveness. The NDK has the authority to regulate activities related to nuclear energy and ionizing radiation. The Ministry of Energy and Natural Resources provides strategic direction and policy coordination for the nuclear sector. The Ministry of Transport and Infrastructure regulates transport of dangerous goods (except for issues related to safety and security in the transport of radioactive materials which remains under the jurisdiction of the NDK) according to conventions to which Türkiye is a party (ADR, COTIF, SOLAS, ICAO) and national regulations. The Ministry of Interior (the police, gendarmerie, coast guard) provides escort services and physical protection during shipments. The Ministry of Customs is involved when transports cross borders, ensuring compliance with international obligations. In parallel, the Disaster and Emergency Management Authority (AFAD) ensures preparedness and response capacity in case of radiological emergencies. This multi-agency approach demonstrates the interconnectedness of safety, security, and emergency response capabilities.

International cooperation has been instrumental in strengthening Türkiye's capacity in this field. The IAEA has provided expert support through its International Physical Protection Advisory Service (IPPAS) and the Integrated Regulatory Review Service (IRRS), both of which benchmark national practices against international norms. Additionally, capacity development has been advanced through IAEA Technical Cooperation (TUR) projects and the European Commission's Instrument for Nuclear Safety Cooperation (INSC). These initiatives have enhanced regulatory expertise, improved institutional performance, and ensured the sustainability of a competent technical workforce.

In conclusion, Türkiye's system for the transport of radioactive materials is comprehensive, integrating national legislation, international obligations, and operational experience. The Akkuyu fresh fuel transport exemplifies how regulatory authorities, security forces, transport institutions, and emergency responders can coordinate effectively under a milestone-based strategy. This achievement demonstrates that Türkiye's nuclear infrastructure is being built on solid foundations and adheres to international best practices. As the country enters the nuclear power era, the continued integration of safety, security, and international cooperation will remain essential for sustaining public trust and ensuring the highest standards in radioactive material transport.

Country or International Organization

Instructions

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