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TSO Support to Strengthen Newcomer Countries: GRS Model and Experience

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Worldwide, the number of countries embarking or re-embarking on the use of nuclear energy and making more extended use of nuclear technologies is increasing. Handling nuclear materials, ensuring the safe operation of nuclear facilities, and managing radioactive waste requires a strong national regulatory framework, an independent, powerful authority capable of enforcing the national regulations, disposing of sufficient internal technical competence or being supported by external expertise available through a Technical Safety Organisation (TSO).
These newcomers and the returning countries, too, need to build up capacities in rule-setting and enforcement, licensing, oversight and inspection in a variety of interrelated and complex fields ranging from radiation protection and nuclear safety to waste management and nuclear security.
The execution of the above-mentioned tasks, especially of rule-setting and safety assessment as part of licensing and oversight, requires a science- and knowledge-based approach, which is best implemented by the immediate involvement of the Technical Safety Organisation (TSO), supporting the regulatory body, in nuclear safety research and development.

Due to the wide range of independent expertise available within developed TSOs and their science-based approach and international engagement in research and training, TSOs have become a key factor in the building-up and strengthening of regulatory and TSO capacities in newcomer countries.

GRS is the central Technical Safety Organisation in Germany serving the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, which acts as the uppermost regulatory body. At the same time, GRS is also a major research institution in all fields of nuclear safety.
As a non-profit organisation, GRS is independent of any political and commercial influences and is strictly committed to the highest international standards and practices in nuclear safety. GRS is an active force in the exchange of experience and the discussion among experts through intensive international networking, e.g. in the European Technical Safety Organisations Network (ETSON) and the IAEA TSO Forum. These are essential preconditions for successfully communicating within the different safety cultures.

GRS contributes to the further development of the state of the art in science and technology by its own internationally integrated research and development activities. Through bilateral agreements and international assistance programmes, we are collaborating extensively with international regulators and TSOs. We are rigorously committed to our value charter to exclude any conflicts of interest towards third parties. Today, we can refer to successful experiences in supporting foreign regulators and their TSOs in capacity-building and in know-how transfer.
The expertise of GRS comprises all essential fields of nuclear safety and security (including e.g. safety assessment, development of advanced simulation codes, I&C, systems and component behaviour, ageing management, external and internal hazards), safety of radioactive waste (e.g. waste disposal concepts, geo-chemical and geo-mechanical behaviour), and radiation protection (e.g. fuel inventories, activation and consequence analysis and calculations, emergency preparedness, decommissioning).
An effective way of know-how transfer is the transfer of simulation codes for the safety assessment of nuclear facilities, accompanied by training in how to handle these simulation tools correctly. In this way, GRS makes available its thermal hydraulics system code ATHLET and the severe accident simulation tools ATHLET-CD and COCOSYS. Together with our French partner IRSN, we are constantly developing the integrated severe accident code ASTEC, which we provide to other institutions and which has become the European reference tool in this field. In the last years, the number of requests for a code transfer has increased to about 50 per year.
Recipients are among others universities, research institutions and regulatory authorities or TSOs that use these instruments for research, education and safety assessment in charge of their national regulators.

Furthermore, GRS is involved in a variety of European INSC projects co-ordinated by the IRSN-GRS subsidiary RISKAUDIT. These projects mainly aim at building and strengthening regulatory infrastructures, supporting regulators in setting safety requirements or establishing QM, licensing of nuclear facilities and their decommissioning. Classically, the INSC programme was targeted at the countries of the former Soviet Union, like the Ukraine, Belarus, and Armenia. Meanwhile the focus has widened e.g. to Mexico, Brazil, Vietnam and

North African countries. Over many years, emphasis was put on the assistance to the Ukrainian regulator and his TSO in coping with the Chernobyl legacy.
Moreover, GRS has entered into bilateral agreements with foreign regulators. Our experts review safety analysis reports, perform PSAs and stress tests, assess internal and external hazards, and prepare advanced safety requirements. For example, GRS drafted the new Dutch safety requirements, which are guided by the latest German safety requirements and consider international safety standards of the IAEA or WENRA.

Through all these activities, we have gathered useful experience in connection with the safety issues related to a large spectrum of existing and advanced reactors as well as regarding different national safety approaches and requirements.

Country or International Organisation

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