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Topical Issue 1: Definition, roles, functions and value that guide TSO

**Needs, requirements and challenges for technical
support to nuclear safety authority**

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Abstract. To face the very broad range of technical matters on which the regulatory and licensing activity are based, and related research and development activity, the Nuclear Safety Authorities (NSA) may need to rely upon external technical and scientific support.

In providing technical support to NSA, the experience shows, from one side, the importance to have technical support organizations (TSO) with recognized competence, independence and appropriate regulatory view, and from the other side, the importance to have within the NSAs well developed management and technical capability to address, coordinate and use the results of the external technical support. Retaining the NSA the full responsibility for the final decision.

Under which conditions and *modus operandi* the external support shall be provided in order to comply with requirements of being independent, competent and timely provided, fulfilling the administrative procedures, is the subject of attention and consideration of TSO function today.

The Italian regulatory body is currently going to be institutionally re-established according to new law approved in 2009 /1/ and it needs to be resourced and fully organized with necessary capacities in the nearest future. The perspective of a new nuclear program, recently launched by the government, with significant incoming tasks for regulation and licensing, against the existing limited resources, let foresee a substantial potential need for technical support and advice.

ITER-Consult (Ltd), created in 2003 in Italy, has well developed capabilities to provide independent technical evaluation and support to NSAs, to maintain safety culture and updated knowledge, to transfer know how and to establish international cooperation and networking.

This mission is guided assuming as values the independence, the professional competence, the transparency, the credibility and the establishment of respectful relationship with the partners. Challenges exist for funding and operational stability for a private expert organization committed to retain independence and no-commercial attitude.

Introduction - Undertaking a nuclear power program is a major commitment requiring, among others, to address the nuclear **Safety, Security and Safeguards (3Ss)** which are prerequisite for a high level of nuclear safety.

High levels of nuclear and radiation safety need to be applied, maintained, evaluated and further improved in the time in order to ensure a global nuclear safety regime. For this objective competences, resources and capacity are necessary. Part of this capacity is the availability of technical support organizations (TSO) in regulatory and research activities related to nuclear and radiation safety.

This support provided either by dedicated expert organizations or by selected expert organizations has shown to become more and more essential and significant in the last years due to limitation of human resources in nuclear safety authorities. Moreover the growing need to support the capacity building

A. Madonna and G. Orsini

process in new countries embarking on nuclear energy has requested an additional “supporting” effort from expert organizations.

The needs of the regulators – The institutional status, role and functions of the nuclear safety authority are defined in the national basic nuclear law of each country. Institutional independence, authority, functions, capability and adequate resources are necessary requirements for an effective NSA having the responsibility to:

- define safety objectives, principles and criteria issuing regulations and regulatory guidelines;
- perform licensing and management activities related to safety evaluation of siting, design, construction and operation of nuclear installation,
- conduct inspection and enforcement during construction and operation of nuclear installation
- ensure transparency and public information.

Human and technical resource limitation, organizational aspects, increased scope of national and international activities, optimization of use of internal resources are aspects that contribute to generate the need for support from external organization. The technical support is particularly important as it contributes to the regulatory decision process while the final decision remains in the responsibility of the regulatory authority.

The effectiveness of the NSA in its regulatory and licensing function manifests itself in the capability to have clear established safety objectives and to correctly address and coordinate the technical evaluation review to be performed in the licensing process.

This indicates that the NSA shall have well developed and experienced management capability plus technical expertise capable to establish an effective licensing review process, identify the needed technical support, formulate what is required, coordinate the working interface within internal staff and external expert organization, establish priorities, understand the results and use them in the decision process.

The Nuclear Regulatory Authority of Italy (now Ispra “Istituto Superiore per la Protezione e la Ricerca Ambientale”) has been established since the years fifties and has covered its role very effectively since the very beginning. It has promoted and developed an high level of competences to face the different technical aspects concerning the safety of nuclear installation and significantly contributed to the international cooperation. The regulatory decision process has been based mainly on well established safety requirements and on the evaluation performed by its own internal technical staff. Therefore no institutional dedicated TSO support has been created in the past in Italy. Nevertheless external support for research, studies and technical evaluation has been provided depending on specific needs by external organizations including national and foreigner research institutes, universities and expert organizations.

The current activity of the Italian NSA is entering a process of increased demand. In addition to the ongoing duties for NPP under decommissioning, research reactors, transport of radioactive materials, waste management, the obligations deriving from international conventions/treaties and the international cooperation, there is the perspective of construction of new NPPs in Italy.

This calls for new tasks and important efforts in establishing safety criteria and in organizing the regulatory body in view of incoming regulatory and licensing activities. For that the Italian NSA needs additional resources, re-development of lost competences, increased management capabilities and updating in the field of safety conception and requirements of current NPP technology and design..

It is part of the incoming workload the no-negligible effort to make operational the licensing procedure for localization, construction and operation of NPP which has been re-defined by the new specific law approved in February 2010 /2/.

The need for external support and advice to the Italian NSA in the incoming demanding scenarios, meeting the necessary requirements, is a key point to be effectively and timely addressed.

At the moment the support from external organization, when needed, is identified and activated through an administrative process which implies relevant formal and procedural fulfillments. The experience

A. Madonna and G. Orsini

gained shows the importance for the NSA to have available suitable instruments and procedures, which allow prompt activation of the needed technical support avoiding uncertainties and delays that can challenge the schedule of activities or the commitments being taken. The availability of general agreements and/or framework contracts with external support organization could effectively address this issue.

The technical support to regulators – An increased demand is observed today in developed countries, and in the new countries embarking on nuclear programs, for technical support to NSA and other public institutions and administrations. The technical support to NSA can be more or less systematic depending on the national culture and approach chosen to perform the regulatory function and related technical evaluations.

Different approaches to technical support exist: in some countries dedicated expert organization are supporting regulatory authority by statutory established functions, elsewhere the support is identified on a case by case basis and it is provided by external organization (in some cases foreign organizations) on the basis of specific contractual agreement or framework contracts.

In countries where the TSO function is quite institutional, the technical support is provided by ad hoc organizations, in most cases public company, non-commercial and fully dedicated. In such cases the TSOs do precise their role as “Technical Safety Organization” which underlines the institutional aspect of their support function. These organizations are mainly funded through state budget or through stable yearly contractual budget from the administration of the NSA. Their independence in terms of no connection with industrial activity (operators, industry) and with promotion sector, is ensured by statutory requirements and property status.

In general the requirement of independence of expert organizations, national or foreign, with regard to direct or indirect potential conflict of interest with the industrial-promotional sectors is a pre-requisite that shall be proved by the company and verified by the NSA.

The capability of a TSO to provide support for regulatory and licensing activities relies on experience, well trained experts, knowledge of regulatory requirements, knowledge of national and international approaches, knowledge of roles and responsibility of the regulator from one side and of the operator from the other side.

The Italian expert organization ITER-Consult, created in 2003, is non governmental, not state funded, only financed by contracts from national and international activities and is not involved (in order to retain independence) in activities on industrial side that can conflict with support to regulatory authority. The Organization is ISO certified providing evidence of its quality policy and implemented quality management system. It is a responsible resource capable to provide independent technical support, maintain safety culture and knowledge. ITER-Consult since the very beginning of its activity has recognized, and promoted, the relevant value of the international cooperation and networking among TSOs for maintaining competence, to optimize the resources, to improve knowledge, to get acquainted with different approaches, to benefit from the experience coming from other organizations. Relations and cooperation are established with national organizations and institutions (e.g: Ministries, Ispra, Universities, ENEA, CIRTEN), international organizations and institutions (e.g.: IAEA, EC, ANNuR, NEA, JNES), European regulators (e.g: ASN, STUK, CSN, Rostechnadzor, SUJB, SNRCU, BNRA) and EU TSOs (e.g.: IRSN, GRS, BELV, VTT, SEC-NRS, SSTC-NRS).

Challenges and requirements in providing technical support – The *modus operandi* and requisites characterizing the technical support should be such to ensure that it complies with requirements of being independent, competent, correctly and timely available. This objective needs to receive due attention and consideration.

It is well recognized the importance to provide technical support to NSA independently from potential conflicts of interest and performed by qualified and competent experts. Moreover the approach for effective delivery of the technical support activity needs to make reference to clear objectives, clear understanding of roles and responsibilities of the involved parties, well implemented technical management and effective quality system.

A. Madonna and G. Orsini

The experience also shows that the effectiveness and suitability of the external technical support is better ensured when the technical support is elaborated following a “regulatory approach”, that implies due knowledge of regulatory function and role. In this end the non-commercial attitude of expert organizations represents a value not only for the prevention of potential conflict of interest but also for the development of the most appropriate view and approach in providing their services to the NSA.

The TSO organizations shall develop and maintain updated technical knowledge and competence. For that cooperation and networking need to be developed and promoted among TSOs and strengthened at national and international level. The international cooperation constitutes a basic pillar in the field of nuclear safety and the expert organizations shall be effectively involved in the initiatives promoted by international organizations.

TSOs organizations need financial resources to carry out their activity and to ensure the above mentioned necessary development, updating, international cooperation and participation in research-study activities. The funding stability for a private organization, not state funded, only financed by contracts can be a key issue especially for an expert organization being committed to retain full independence from industrial side which implies the non-commercial attitude.

REFERENCES

[1]

/1/ Legge 23 luglio 2009, n. 99 "Disposizioni per lo sviluppo e l'internazionalizzazione delle imprese, nonché in materia di energia" (art.29) - *Gazzetta Ufficiale* n. 176 del 31 luglio 2009

/2/ Decreto legislativo del 15 febbraio 2010 , n. 31 .''Disciplina della localizzazione, della realizzazione e dell'esercizio nel territorio nazionale di impianti di produzione di energia elettrica nucleare, di impianti di fabbricazione del combustibile nucleare, dei sistemi di stoccaggio del combustibile irraggiato e dei rifiuti radioattivi, nonché misure compensative e campagne informative al pubblico, a norma dell'articolo 25 della legge 23 luglio 2009, n. 99-*Supplemento ordinario n. 45/L alla Gazzetta Ufficiale* n. 55 del 8 marzo 2010.