The specific tasks of RF TSO - FSUE VO "Safety", related with Implementation of Obligations under the Convention on Nuclear Safety

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Abstract. It was more than 20 years ago that IAEA discussed the issue pertaining to the need in scientific and engineering support to the regulatory body. The Convention on Nuclear Safety being the keystone in assurance of the global nuclear safety and security regime was adopted in 1994. It is pointed out that two independent organizations supervised by Rostechnadzor have been established within the Russian TSO system, FSUE VO "Safety" being one of them. The tasks of the organization comprise obligatory certification of equipment as well as acceptance of equipment before its delivery to the NPP both in Russia and in the countries constructing the power units based on the Russian designs. The acceptance procedure has been set forth in the new Russian document at the level of the federal rules and regulations for nuclear safety assurance. As far as its implementation decision is concerned, a task for selection and training of personnel has been set and allocated on the Training and Methodological Center of Nuclear and Radiation Safety established with the support of FSUE VO "Safety", which provides training programmes and specific lecture courses in the wide range of the relevant topics.

1. Preamble

The issue pertaining to the need in scientific and engineering support both to the nuclear programmes of the member states and their regulatory bodies in particular was raised and discussed in the IAEA as far back as in [1], i.e. more than 20 years ago. Among the functions that were being discussed were not the functions of the TSOs but those of the organizations involved, literally, in "research and development" (R&D).

However, all basic provisions pertaining to the R&C organizations' competence mainly remain relevant today both for nuclear energy application control and nuclear energy safety regulation.

The diplomatic conference convened by IAEA in 1994 adopted the Convention on Nuclear Safety. Joining the Convention by the member states and fulfillment of the obligations established therein is one of the essential elements forming the foundation of the Global Nuclear Safety and Security Regime (GNSSR).

The Convention doesn't contain any definition for the TSO. It contains the definition of a "regulatory body" (RB) (Art. 2) as a body given the legal authority to grant licenses. If a regulatory body doesn't have enough expertise, then as it is stated in [2] to fulfill its obligations under the Convention it may have to involve the TSOs, which become subjects of the regulatory practice of a number of member states.

The commitments of the RF TSOs to fulfillment of main obligations of the Convention as well as its flexibility in adaptation to the so-called "challenges of the time" are demonstrated.

2. Russian Practice

2.1. Existing System of Interfaces between TSOs and Rostechnadzor

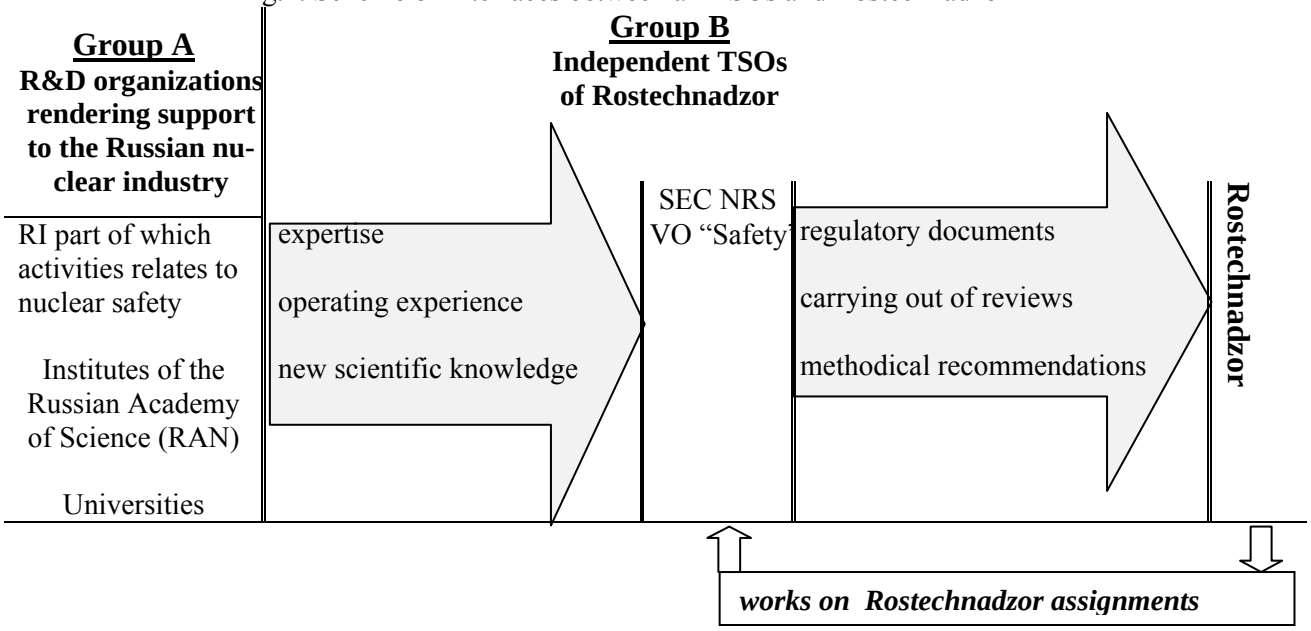
There are many institutes and other organizations in Russia, which can provide scientific and technical support to the Russian regulatory body (Rostechnadzor). They comprise such institutes as Research Institutes (Group R) and Developers (Group D).

The employees as specialists of these organizations may be involved in the specific Rostechnadzor functions. In this case there is a need in resolving the problems related to the experts' independence and avoiding the conflict of interest.

The main solution to this problem is to involve the employees of R&D organizations for the activities of FSI "Scientific and Engineering Center of Nuclear and Radiation Safety" (SEC NRS) and FSUE

VO "Safety", which are, as stated in [3], rendering direct engineering support to Rostechnadzor in the field of nuclear and radiation safety (see the scheme in Fig. 1). These two organizations are fully *independent of the licensees*.

Fig.1. Scheme of Interfaces between all TSOs and Rostechnadzor



2.2. The role of Independent TSOs Supervised by Rostechnadzor

Rostechnadzor and its TSOs are striving to perform commitments for statements formulated in the Convention articles. Table 1 demonstrates some fields of support rendering to Rostechnadzor by SEC NRS and VO "Safety" via Convention's articles.

Table 1.

Articles of Convention	*TSO tasks*
Article 7. ***LEGISLATIVE AND REGULATORY FRAMEWORK***	participation in development and revision of regulatory legal documents (including technical rules) in the field of atomic energy use;
Article 8. ***REGULATORY BODY***	jointly with Rostechnadzor, these two organizations fully independent of the licensees provide for those *financial and human resources*, which are necessary for implementation of functions and authorities delegated by the Government to Rostechnadzor.
Article 12. ***HUMAN FACTORS***	✓ analysis "man-machine" interfaces with consideration of the ergonomic approach to arrangement of the Main Control Room workplace ✓ analysis of personnel errors and the state of the feedback system on the basis of operating experience
Article 14. ***ASSESSMENT AND VERIFICATION OF SAFETY***	✓ participation in scientific researches on justification of nuclear and radiation safety principles and criteria ✓ conducting of safety reviews in the field of atomic energy use ✓ arrangement and conducting of certification of the software tools used for calculated safety analysis

On the whole, the set of the above mentioned activities carried out by the Russian TSOs while rendering support to Rostechnadzor contributes to their fulfillment of those functions, which have been determined in [4] and have already been mentioned in [5].

3. Equipment Supplied at the RF NPPs and tasks of FSUE VO "Safety"

Article 13. QUALITY ASSURANCE

Each Contracting Party shall take the appropriate steps to ensure that quality assurance programmes are established and implemented with a view to providing confidence that specified requirements for all activities important to nuclear safety are satisfied throughout the life of a nuclear installation. …

Rostechnadzor pays utmost attention to quality assurance in all stages of NPP design, construction and operation. The Federal norms and rules level document [6] in force, establishing requirements to the Quality Assurance Program for NPP equipment manufacturing stage NQAP (M), when manufacturing of equipment, products for safety important systems, which should developed by the manufacture.

It was mentioned in [1] that "…the materials available for manufacturing of components may differ from those, which are used in other countries; …these differences shall be reflected in the national rules and regulations of the country".

As far as Russia is concerned, the supplier-country may apply not only other materials as compared, for instance, with those defined in [7], but also the regulations pertaining to the process of equipment manufacturing and testing differing from the Russian regulations.

The basis for solution of this problem is Art. 37 [8] defining that "…the equipment, items and technologies for nuclear installations, radiation sources or storage facilities are subject to obligatory certification in accordance with the legislation of the Russian Federation"..

The equipment certification body was accredited at the TSO - FSUE VO "Safety", since the certification process is connected not only with assessment of compliance with the Russian regulations but also with testing of equipment including assessment of test benches, arrangement and conducting of reviews related to certification of laboratories and their measurement equipment, including metrological assurance.

Additionally, within the period that has passed after the previous Conference [5], a new document at the level of federal rules and regulations [9] has been put into force in Russia. The document was developed with consideration of IAEA docs 50-C/SG-Q and Q1-Q14, which includes code of statements and guidance for quality. The document [9] is using for the process of manufacturing and procurement of equipment attribute to safety classes 1, 2 and 3 and sets forth the rules of compliance assessment of the equipment supplied at the Russian NPPs. The Decision of Rostechnadzor and Rosatom entrusted FSUE VO "Safety" with compliance assessment conducted in the following forms:

- acceptance of the equipment at the suppliers, which should result in confirmation of the following: implementation of procedures and processes envisaged by technical documentation, full implementation of inspections and tests during manufacturing, availability of documents with the inspection and test results, elimination of the detected non-conformities;
- testing during incoming checks, manufacturing and after completion of manufacturing;
- confirmation of compliance to be made in the equipment certification system for the items and technologies for nuclear installations, radiation sources and storage facilities in the form of obligatory certification.

In accordance with the Decision, measures should have been taken with reference to selection and training of personnel for carrying out acceptance of equipment, which is included into the TSO tasks.

Thus, acceptance of equipment –is an illustrative example of one of the possible options for extending the tasks of the TSOs. At the same time, it may be considered as a challenge for the RF TSOs, as far as the programme on NPPs energy power expansion is implementing in Russia as well the power units based on the Russian designs are being constructed in other countries.

4. Training and Professional Development

Article 11. FINANCIAL AND HUMAN RESOURCES

2. *Each Contracting Party shall take the appropriate steps to ensure that sufficient numbers of qualified staff with appropriate education, training, and retraining are available for all safety-related activities in or for each nuclear installation…*

It is stated in i. 5.10 [5] that in the course of the regulatory body personnel training there is a need in training at the courses in order to maintain the appropriate level of knowledge especially "…for acquaintance with the important changes in legislation, procedures or other issues".
The Training and Methodological Center of Nuclear and Radiation Safety (TMC) was established with the assistance of FSUE VO "Safety" for resolution of this task.
The specific topics of the training course curriculum comprise, in particular, the following:

- IAEA standards;
- regulatory requirements for the procedure of supervision and testing; requirements of Rostechnadzor applied during design, manufacture and operation of items; items' documentation control rules; items' control rules; metrological requirements; and process monitoring;
- the Russian federal requirements for quality assurance programmes, branch requirements for the stages of items' design, manufacture and operation applied in quality assurance (procedure of development and launching of production, procedure of items' acceptance, design supervision, etc.);
- issues related to refinement of planning methods and arrangement of supervision over physical protection of nuclear-, radiation- and man-caused dangerous facilities as well as ways and methods of inspections of the physical protection system and its specific components taking into account all new and state-of-the-art requirements;
- reliability and risk management; relation between the quality assurance problems and the nuclear and radiation safety assurance management problems;
- management of quality, safety, integrated management systems, observance of the Russian and international standards and recommendations, approaches to long-term plans for development of codes and standards.

An IAEA workshop was arranged at the TMC NRS within February 25-29, 2008 in the framework of Project 9084 on "Regulatory Supervision over the Programmes Implemented by Licensees in the Field of Safety and Human Factor Control at the NPPs".

5. Conclusion

The two-level system of the TSO provides a firm basis for responding to new tasks and challenges of our time. Besides, when accomplishing these tasks the Russian TSOs use the vast international experience, which has been generalized in the approaches, standards and activity of the IAEA. Such basis is a good prerequisite for sufficiently easy adaptation of the TSOs to the challenges of our time, e.g. quality assurance and reliability of equipment purchasing on NPPs. .
At the same time one can make a conclusion that the main challenges of our time are related to the staff for implementation of atomic energy development programmes rather than technical problems.
This challenge can be resolved by TMC NRS development of the relevant training programmes and specific courses, which ensure training of specialists as well as maintaining of their qualification at the state-of-the-art level and involving of young graduates for working at the TSOs.

References

[1] INTERNATIONAL ATOMIC ENERGY AGENCY. Guidebook on Research and Development Support for Nuclear Power. Technical Reports Series No. 298, VIENNA,1989.
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[5] Kuznetsov M.V., Kozlov Vl.V., Kapralov E.Yu. FSUE VO "Safety". Cooperation of Russian and EU Technical Support Organizations. Report at the IAEA International Conference on the Challenges faced by Technical and Scientific Support Organizations in Enhancing Nuclear Safety, 23 - 27 April 2007, Aix-en-Provence, France.
[6] NP-011-99. Requirements to Quality Assurance Programms for nuclear power plants.

[7] PNAE G-7-008-89. Rules on design and safe operation of components and pipelines of nuclear power installations.
[8] Federal Law No. 170-FZ “On the Use of Atomic Energy”, 1995.
[9] NP-071-06. Rules for compliance assessment of equipment, component parts, materials and semi-finished products supplied to nuclear facilities.