

Russian Support Experience to Strengthen Newcomer Countries Regulatory Infrastructure

T. Goryaeva¹, E. Kapralov¹, M. Kuznetsov¹, V. Potapov¹

¹Federal State Unitary Enterprise VO «Safety» (FSUE VO «Safety»), Moscow, Russia

Abstract. The Russian Federation now implements an ambitious exporting program of Russian nuclear energy technologies including Russian design NPP constructing in a number of newcomer countries. According to the international agreements and best practice this leads to a necessity of providing a consistent nuclear regulatory infrastructure support. The Russian TSOs gain valuable experience in assistance of the newcomer countries regulatory capacity building.

1. Introduction

The Russian Federation now implements an ambitious exporting program of Russian nuclear energy technologies including Russian design NPP constructing all over the world including the newcomer countries. According to the international agreements, IAEA approaches [1] and best practice this leads to a necessity of providing a consistent nuclear regulatory infrastructure support to the newcomer countries. Such support activities include legal and regulatory base development support, transfer of regulatory practice and experience, technical and scientific consulting, personnel training and wide set of services rendered by Russian TSOs.

2. Russian TSO Approach to Assistance of Newcomer Countries Capacity Building

Regulatory infrastructure support is based on the developed by Rostehnadzor methodology of the Complex Module Support Program (CMSP tool) that takes into consideration the corresponding IAEA approaches [2]. The CMSP elements are already provided in the bilateral cooperation with Turkey, Vietnam, Jordan and Belarus. Rostehnadzor TSOs are the most active participants of the CMPS cooperation.

2.1.CMSP General Methodology

CMSP consists of four modules covering the basic activities of regulatory infrastructure development in correspondence with the national nuclear program. The modules are:

- Development of a legal and normative base in the field of nuclear energy use.
- Transfer of state’ licensing, safety assessment and supervision practices.
- Strengthening a state regulatory body’ competency in technology-importing country.
- Range of outsourcing services for the state regulatory body.

2.2.CMSP Module: «Development of a legal and normative base in the field of nuclear energy use»

The module goal is development of a legal and normative base, including national laws and other legislative acts, which establish regulations for safety in the field of nuclear energy use, powers of government authorities, including safety regulatory body, roles and responsibilities of operating organizations, other aspects of state safety infrastructure. The module includes the following activities:

- identify regulation gaps at the stages of NPP’ site selection, design, construction, operation and decommissioning. Adaptation of Russian and best international practices.
- Analysis of newcomer country current legal and normative base to identify regulation gaps in the fields of security of nuclear facilities and materials, accounting and control of nuclear materials, management of spent nuclear fuel and radioactive waste.
- Assistance in development of legal base in the field of nuclear energy use, non-proliferation regime, national regulations of nuclear and radiation safety.
- Assistance in development of normative regulations in the field of nuclear energy use – compulsory rules and regulations, introduced by the state regulatory authority (in analogy with Russian Federal Norms and Regulations).
- Assistance in development of requirements and recommendations, manuals and guides pertaining the activities of state regulatory body in the field of nuclear energy use (in analogy with Russian Guides, Administrative orders, etc.).

2.3.CMSP Module: «Transfer of state’ licensing, safety assessment and supervision practices»

The module goal is development in importing country of sustainable methodology and infrastructure of safety regulation in the field of nuclear energy use. The module includes the following activities:

- Participation in establishment of state licensing system at the stages of NPP’ site selection, design, construction, operation and decommissioning.
- Participation in establishment of safety assessment system, including assessment and analysis of design documentation and nuclear facilities safety assessment documentation.
- Participation in development of regulations on acceptance of safety assessment’ results by the state regulatory body in cases of outsourcing of assessment activities.
- Assistance in development of system of state supervision over compliance with nuclear and radiation regulations during NPP construction, design and manufacture of NPP’ equipment, NPP commissioning and operation.
- Assistance in development of system of state supervision over compliance with regulations for nuclear security, accounting and control of nuclear materials, management of spent nuclear fuel and radioactive waste, NPP decommissioning.

2.4.CMSP Module: «Strengthening a state regulatory body’ competency in technology-importing country»

The module goal is establishment of qualification requirements for specialists of the state regulatory body in the field of nuclear energy use, including inspectors and safety assessment experts, formation of personnel training’ mechanisms, aimed at accomplishment of established qualification requirements, and development of management system of state regulatory body as backbone of its functioning. The module includes the following activities:

- Assistance in development of a management system (quality management system) of the state regulatory body.
- Development of qualification requirements for specialists of the state regulatory body.
- Training of specialists of the state regulatory body, including workshops, traineeships, inspections, scientific visits, e-learning, virtual workshops, etc.

2.5.CMSP Module: «Range of outsourcing services for the state regulatory body»

The module goal is direct rendering of technical support services for the state regulatory body, including quality supervision of manufacture, procurement and assembly of equipment for nuclear facilities under construction, nuclear facilities safety assessment, other outsourcing services. The module includes the following activities:

- Assessment of technical decisions by designers of nuclear facilities with regard to safety requirements.
- Assessment of manufacturers/suppliers of equipment, products, works and services for nuclear facilities under construction.
- Supervision of quality of manufacture, packaging, transportation and assembly of equipment, products, works and services for nuclear facilities under construction.
- Safety assessment of nuclear facilities.

2.6.CMSP Advantages

One of the most powerful feature of the CMSP tool is an opportunity of fine tuning of the support activities and services to the requirements of the newcomer country based on the current level of knowledge, and regulatory infrastructure. On the example of Belarus having own significant experience in the nuclear sphere – professional nuclear scientific staff (Joint Institute for Power and Nuclear Research – Sosny of the National Academy of Sciences of Belarus) and related scientific staff, modern heavy industry, developed nuclear legal acts structure (partially based on the Russian legal and regulatory documents) CMSP tool shows its efficiency allowing to target only existing infrastructure deficits.

3. Lessons Learnt and Experience

Assistance experience to Belarus shows the similar language makes it easy to introduce the same regulatory framework as in Russia. However, some specific areas of safety evaluation should be mastered and put into operation. Among them: safety analyses, accidents management (BDBAs, SA etc.), safety limits and conditions, human factor, methods of review conducting and organization. In turn, to be able to perform analyses it is necessary to have and to learn the use of specifically developed codes, and to have a group of qualified codes users.

Task important to be resolved is acceptance of the equipment at the manufacturing plants, 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. In Russia it is one of RF TSO FSUE VO “Safety” functions.

The most important CMSP directions for now are: development and support of the full scale national Belarus TSO on the base of the Sosny Institute, regulatory body specialists training providing interaction between the regulatory authority and other state authorities involved into the supervision process during the NPP construction for their effective joint functions, fulfilling the corresponding milestones of the national nuclear power program [3].

Appendix 1: References

- [1] INTERNATIONAL ATOMIC ENERGY AGENCY, Governmental, Legal and Regulatory Framework for Safety General Safety Requirements Part 1, IAEA-GSR part 1, Vienna (2010).
- [2] INTERNATIONAL ATOMIC ENERGY AGENCY, Establishing the Safety Infrastructure for a Nuclear Power Programme, IAEA-SSG-16, Vienna (2011).
- [3] INTERNATIONAL ATOMIC ENERGY AGENCY, Milestones in the Development of a National Infrastructure for Nuclear Power, IAEA- NG-G-3.1, Vienna (2010).