

**TECHNICAL AND SCIENTIFIC SUPPORT ORGANIZATIONS  
AND STRENGTHENING OF NUCLEAR REGULATION  
(CASE STUDY OF MOLDOVA)**

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**Abstract.** Authors present arguments for establishing of technical and scientific support organizations (TSO) infrastructure as obligatory components of the national radiation protection and nuclear safety infrastructure. In the small countries, like the Republic of Moldova, characterized by insufficient development of nuclear technologies, different social, economic, scientific and, why not, national peculiarities impose opportunity of efficient interaction of regulatory body with TSO. Are presents certain examples of interaction of those organizations. Is mentioned, that synergy of such interaction will contribute essentially in implementation of adequate nuclear culture in the country.

**Past and current status of nuclear regulation in the Republic of Moldova.** The Republic of Moldova was characterized by six regulatory bodies in nuclear field in the near past. Such functions were anachronisms from the former Soviet Union public central authorities. In spite of those, that regulation was multi-polar, based on the well-defined five domains (preventive medicine, emergency situations, standardization, sciences, agriculture), and new introduced domain as licensee, efficiency and interaction were poor and, finally, conduct to collapse of such type of authorizations. This was done because the obligation of obtaining of much type of authorizations didn't results with quality of radiation protection and nuclear security. Additionally, these were results with excessive administrative, economic and financial pressure on the operators.

Legal reform, initiated by the Law 111-XIV from 11 may 2006 year, results with withdraws of regulation functions in nuclear field of all ministries and departments and by established of a single regulatory body, named National Agency of Regulation of Nuclear and Radiological Activity (further National Agency). Its basic functions are in good compliance with IAEA requirements, presents in Safety Guide GS-G-1.1 and in Safety Requirements GS-R-1.

**Basic regulation functions of the National Agency** consists as rule of five distincte domains:

- a) Establish of adequate nuclear legal framework;
- b) State control and supervision (inspection);
- c) Authorization of nuclear and radiological activities;
- d) Enforcement procedure as results of infringement of the national legislation and regulations;
- e) State evidence of ionizing radiation sources;
- f) Control of non proliferations.

In spite of existing experience in other countries is important to understand, that integrated taking over of the structure, functions, working methods of the National Agency did not assure ad hoc optimal result. Many causes of this may be, from economic, social, and scientific up to domestic peculiarities. Establishing of a single regulatory body in the country characterized to transition to market economy, with traditions past from rigid, autocratic management method causes more pragmatic approach of the purposes and methods. In this way the roles of TSO in nuclear and radiological regulation rise essentially.

**The factors which may influence TSO contribution** differ from country to country, and may have following economic, social or scientific origins:

- a) Transition period to market economy;
- b) Inadequate nuclear culture;
- c) Transition from multi-polar regulation to single regulatory body;
- d) Ascendant development of nuclear technologies awards new, advanced knowledge of operators, which really are difficult to achieve from economic reasons;

- e) Inopportunity of development of proper infrastructure for supervision of radiation protection and nuclear security;
- f) Rise of the role of international commitments follows of signed Conventions and Treaty;
- g) Rise of IAEA requirements to regulation aspects of the countries beneficiaries of new nuclear technologies;
- h) Recognizing as TSO of scientific, didactic entities;
- i) Conversion to TSO of former military subdivision, laboratories from different enterprises.

Of course, mandate of TSO is to offer many-side support to the National Agency with purpose of efficient plenitude implementations of its duties. The participation of TSO may be practice in all domain of above mentioned activities of the National Agency, presents very shortly below.

**Legal statute of TSO for nuclear and radiological area.** From the legal point of view TSO may has any legal statute. TSO may be registered in the country or abroad. Inside the country TSO may be a technical division of the National Agency, or may exist separate from it. This depends of the approved staff and budget of the National Agency. Important is that such TSO must be recognized by the National Agency. Also is important that TSO must be legally recognized as the intrinsic part of the national radiation protection and nuclear security infrastructure. General requirements to the TSO must be clear and approved by the National Agency norms, specifics for different kinds of activities (training, specialized measures of ionizing radiation, attestation of RPO, calculation of physical protection, metrological services, quality control, individual dose monitoring, elaboration of emergency preparedness plan, elaboration of procedures for commissioning, decommissioning, operation, any recognized expert opinion, etc.,).

Indifferent of type of interaction between the National Agency, operator and TSO is necessary to maintain, that all time regulatory judgments can be made, and enforcement actions taken, without pressure from interests that may conflict with safety. For this, the National Agency shall be provided with adequate authority and power, and it shall be ensured that it has adequate minimal necessary staffing and financial resources to discharge independent its general assigned responsibilities.

In a countries like Moldova without major nuclear activities and characterized with dispersed human resources in different area of economy or specialized state institutions, it is very important its capitalize through any legal instruments. In this case the domestic infrastructure of radiation protection and nuclear security will have only benefits. But, **in all cases is necessary to recognized that the prime responsibility for radiation protection, for safety shall be assigned to the operator.**

Below, very shortly we presents TSO's potential contributions in solving different statutory duties of regulatory body (case study for Moldova).

**Establish of the legislative and normative framework.** Regarding this subject we waiting an essential contribution of TSO. Such TSO, e.g. with NGO statute, may analyze existing legal framework in the country, review the legal status of the similar country from abroad, general requirements of international organization and standards from the field, all country's obligations follows international agreements. As the result of this review, TSO may elaborate and award to the National Agency a first draft of necessary law or norm. At the same time, TSO may active participate at the stage of debate, consulting or round table organized by the National Agency for discussing of the draft of legal act.

**State control and supervision (Inspection).** During inspection organized by the National Agency, TSO may also contribute by technical sustaining (car, equipment) and, in extreme case by financial support of the mission as result of it budget financial constrains. From the other side, TSO may contribute to the operator to correct any mistake shows by the inspectors (certain technical measures, calculation regarding necessary radiation protection or physical protection measures, completion of the individual dose register, quality assurance control, etc.). The same support may be presents to the regulatory body or to the operator during authorization missions.

**Authorization.** The national register of ionizing sources is completed as results of information from inspection, authorization mission or information received from the operator follow annual inventory

process. As the rule, upgrade of the register is done weekly. This subject also may be assisted by the TSO by specialized services regarding soft assistance, Intranet and Internet assistance. In any case, TSO may assist operator during procedure of annual inventory of radiation sources. Of course, in any special case, TSO assistance must be regulated by approved norms regarding protection of sensible information.

**Enforcement actions in the events of violation of safety requirements.** TSO may assist National Agency through qualified juridical consultations during analyzes of protocols, acts etc., and results from missions of inspections or evaluation for authorization.

**Non-proliferation control**, and comprising to other international conventions and treaty are one of the main frequently duties of TSO activities, especially type NGO. These domains are in the area of interest for many registered in the country NGO.

**Contributed factors to TSO development in the Republic of Moldova.** As was mentioned above, development of TSO is based as on economic, social, as on scientific reasons. Therefore, when we passed to the single regulation body in nuclear field, existing earlier regulatory structures, was not transferred obligatory to the new regulatory body. Sometime it draws intra-departmental control functions (for example Ministry of Health, Ministry of Agriculture and Food Industry). In other cases, its began specialized and recognized TSO (e.g. metrological entities, specialized measurement laboratory, quality control and quality assurance service, evaluation of physical protection, training of staff, attestation of RPO, etc.). The next solution is changing of activity, non liaison in the future with radiological and nuclear fields. In the last case, such structure will be automatically eliminated from the national nuclear infrastructure.

Such factors as insufficient budget, limited staff of the National Agency may motivate delegation of limited functions to other state or non-state institutions or organizations. For example, individual dose monitoring may be delegate to the National Scientific Practice Center of Public Health, which deal with this subject many years, and which supervise intra-departmentally one of the biggest nuclear sectors as medicine. Monitoring of radioactive fond in environment at present time is the duty of the State Service *Hydrometeo*, and in our opinion must remain the subject of its activity, because it based on the extend network placed in all territory. Also, is necessary to delegate to the Department of Civil Protection and Emergency Situations certain functions of monitoring of implementation and as focal point regarding a number of International Conventions from nuclear fields. Thus, we will benefit fully from its non-stop operative service.

Educational and scientific factors are dominants for development of TSO infrastructure in the nuclear field, and without these are difficult to conceive implementation of nuclear technologies for peace full purposes and in fully respect of international requirements regarding radiation protection and safety. European strategy of development to economy and society based on knowledge (we mean science, education and innovation) has first of all as argument synergy of investment in mentioned domains. On the national level such strategy may give any form, in any sector, involve regulation of nuclear activity. Interface of interaction of state sectors, non-state organizations, scientific, didactic resources related to the fields is necessary to have operationally.

**Current status of nuclear regulatory body vs TSO.** In small countries like Moldova the regulatory body hasn't adequate number of staff necessary to cover all regulatory and affiliated aspects. For example, is difficult to assure necessary multi-side training in nuclear field, attestation of RPO, specialized measurement of various ionizing spectra, determining of any kind of radioactive isotopes, etc. In such cases, a considerable contribution will have recognized TSO from the scientific and educational domains (like specialized university chairs, accredited laboratories, non-state center of education, etc. Of course, recognizing of its will be done by the National Agency, after respective evaluation of curriculum. At present time, the National Agency has signed the Memorandums of Understanding with the Chairs Hygiene of Radiation from the State Medical and Pharmaceutical University, and with the Chair of Medical Engineering from the Technical University from Moldova. These Memorandums underline necessity of upgrade of curriculum regarding training of engineer, medical physics, and doctor liaisons with activity with ionizing radiation sources. New approved and coordinated by regulatory body curriculum will pay more attention to radiation protection, nuclear safety, domestic regulatory norms.

Obtained Certificate after graduate of the training, will be recognized officially by the regulatory body during assignment of certificate e.g. of RPO.

Recognizing by the National Agency of the Metrological Laboratory of the Department of Civil Protection and Emergency Situations, and of the Laboratory of Ionizing Measures of the National Institute of Standardization and Metrology are in processes of evaluation.

The first NGO *Inoteh Co.*, with the duties to many-side sustaining of the National Agency, was registered in 2008 year. As results were elaborated and promoted approving of the necessary regulations and norms for the inspection, authorization, inventory, safe management of radioactive waste, etc. The regulatory body cooperates efficient with US NRC, European Commission through Inoteh Co and organizes for operator two domestic seminars, with the subjects about new approved norms and regulations in nuclear field. Recently has started work regarding review of the existing Web page of the National Agency. Additionally, was elaborated, for the first time, volume I of the Acta Nucleara & Radiologica, which comprise all legislative acts and norms emitted in the country during last two years. This collection was printed with support of the Moldovan Ecologic Fund of the Ministry of Environment and of the Department of Technical Cooperation and disseminated gratis to the domestic operators.

**Instead of summary.** Development of TSO infrastructure in the country is caused first of all by legal framework, which forms in general lines the TSO-regulatory body interface. We would like to mentioned that development of such infrastructure lies in major interest of the country, because facilitate involving of everybody interesting qualified specialist, of non-budget additional financial support in interested fields. Involving of non-state funds and human resources in such important field as nuclear safety assurance impose higher professional education, transparency in activity and usually more agreed common vision of solution for certain difficult problems. Any delegation of functions from regulatory body to specialized organizations may be done only on the base of very clear agreement. In this case the legal person must presents periodically to the regulatory body all necessary information regarding received authorized obligations.