Nicolae Victor ZAMFIR[*], Raluca Iuliana Stoicea EPUREANU[**]

NUCLEAR RESEARCH: LEGAL AND PRACTICAL ASPECTS

Abstract: Nuclear research, as a field belonging both to scientific research and to nuclear field, has to comply with two types of applicable legislation: on one hand the scientific research regulations and on the other hand the principles, rules and procedures governing the nuclear field (activities with radioactive materials and/or in radiation environment). This paper follows a brief review of some important regulations from both scientific research area and nuclear field which, simultaneously acting on the nuclear research domain, underscore the importance of considering the field as a distinct and complex type of activity.

I GENERAL CONSIDERATIONS

Nuclear scientific research is a system of acquiring knowledge about nuclear structure; the strong force that binds nuclear components together and the energy released from the nucleus are the main objectives of the nuclear researchers. Nuclear research implies, like other research fields, two directions: basic (fundamental) nuclear research aimed at increasing scientific knowledge and applied nuclear research aiming at developing new processes, products or techniques. The most known application of nuclear physics is nuclear energy. Due to its specificity, nuclear research follows two sets of rules: the general rules of conduct and behavior in scientific research, similar to other natural sciences and engineering researches, and, due to the activities in nuclear environment, the specific regulations concerning radioprotection, security and safety. The nuclear scientists are trained on procedures and restrictions that have to be strictly respected in their research activities. In the last 60 years, since the nuclear research and nuclear energy developed dramatically, along with economic and practical advantages of using nuclear energy, there is an increase in security and safety concerns. A number of bodies and au-

[*] Romanian Academy, National Institute of Physics and Nuclear Engineering, Bucharest-Magurele, Romania

[**] University of Bucharest, National Institute of Physics and Nuclear Engineering, Bucharest-Magurele, Romania

thorities have been established and strengthened to coordinate and monitor these activities. A set of regulations establishing principles and rules have been adopted and implemented through joint efforts and major policies.

These are the main reasons for which, in the narrow sense of the concept, the *nuclear research* has become a distinct domain which, although being part of two large areas of concern (scientific research and nuclear activity) got its own personality and generated a unique and complex regulatory framework. Both at the European and national level regulations, the two types of rules are harmoniously combining, at least in the established legal framework and in the frame of principles.

II EUROPEAN LEGAL FRAMEWORK

As shown above, besides the rules applying in scientific research in general (conduct, methods of work and evaluation, principles etc.) nuclear research is, additionally, subject to very specific rules due to the risks involved in nuclear activities. The rules related to environment, to personnel and to radioprotection and also to the management of the radioactive waste are mandatory for all activities in nuclear field including nuclear research. Nevertheless activities in nuclear research reactors have to comply with very restrictive rules for operating such important installations which are very similar with the ones applying for activities of nuclear power plants.

As the activity in nuclear field is unique from the perspective of methods, rules, instruments, installations etc. it is understood that the national regulatory framework has to cover all the above mentioned rules and also has to be fully integrated in European and international nuclear regulatory framework. Convention on the civil liability for nuclear damage (1963), Convention on the Physical Protection of Nuclear Material (1980), Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (1997) and Convention on Nuclear Safety (1994) are only examples of important international principles of conduct and behavior in nuclear field.

At European level, the reference document in the nuclear field is The Treaty establishing The European Atomic Energy Community, signed on March, 25th 1957, with the declared task of "*contributing to the raising of the standard of living in the Member States and to the development of relations with the other countries by creating the conditions necessary for the speedy establishment and growth of nuclear industries* and mentioning as a first pursuit in accomplishing these task *the promotion of research, establishing uniform safety standards to protect the health of workers and of the general public and ensure that they are applied"*. Further, Title II from the Treaty "Provisions for the Encouragement of Progress in the Field of Nuclear Energy" dedicates Chapter 1 to the "Promotion of Research" establishing the directions and concrete actions of the Commission in coordinating and complementing research undertaken in Member States. It is obvious also in this domain that the European Union continuously manifests its intention to have a unique and coherent European Nuclear Research where rules, programmes, actions, behaviors should be harmonized and fully integrated. In this respect, The Contracting Par-

ties of the Euratom Treaty have empowered the European Atomic Energy Community with specific duties in accomplishing the task of creating the conditions necessary for the speedy promotion and the cohesion of European research. It is interesting to note that the Euratom Community did not hesitate to assume, in fact, the role of a supreme European nuclear authority. The content evolves gradually from defining a guiding body whose role was to establish general principles and scopes to finally appoint a very well organized structure endowed with all necessary levers for making the European nuclear policy and for assuring that all national nuclear communities comply with it. Thus, it can be easily noticed that in order to be recognized as *Europeans* all national research communities have to comply with the rules established by European bodies, such as reconsidering their scientific interests in accordance with the directions of research indicated by the European Commission (approaching the sectors which, from the Commission's point of view, are insufficiently explored and quitting the ones considered unnecessary duplications) and following the scientific research programmes determined by the Council. As we will show in the following, the Euratom Community is mostly preoccupied to create a distinguish European nuclear research incorporating the national efforts and to establish an unified European nuclear policy. The level of detnd ail in defining the specific tasks of the European Bodies shows, without any doubt, that nuclear research of the European states means, in fact, European nuclear research.

The period starting from the date the Euratom Treaty was adopted is characterized by an abundance of secondary European laws, most of them directives. The Community understood that, prior to every step in achieving the goals mentioned in the Treaty, a strong and unitary legal framework had to be created. Consequently, basic actions were dedicated to join the actions of the international community in nuclear safety[1] and also to set up specific principles of European cooperation in the field. As mentioned before, most of the European legislation in nuclear field comprises directives in respect with the rule establishing that in this field the competences are shared between the European Union and the European states, which means, theoretically speaking, that the European Union should exclusively establish, by virtue of the principle of subsidiarity, the accomplishment of the objectives that cannot be best achieved, due to their complexity and results at national level, but on the European one. Yet, many times, the objectives declared in the European legislation are accompanied by extremely detailed and explicitly clauses whose tendency of reducing any actions of the member states is obvious. In this respect, in the recent years, the European directives consists of increasingly more clauses which approach them to European regulations, abounding in very detailed actions and leaving to the states very limited options in appreciating anything else than choosing the instruments, mostly in terms of bodies for implementing the steps to be followed.

[1] e. g. Commission Decision 1999/819/Euratom of 16 November 1999 concerning the accession to the 1994 Convention on Nuclear Safety by the European Atomic Energy Community (Euratom)

It is also to be noted that although the meaning of the nuclear domain is closer to fulfill goals than imposing rules with direct applicability, the European legislation in the field has many documents with the value of law. Like the environment field, most of the acts of European institutions aiming of specific obligations of states have been adopted mostly after 1992, the previous period consisting especially of atypical acts such as programs, resolutions, recommendations, declarations. In this respect, important documents have been adopted in the field of nuclear research establishing programs and institutions having specific tasks in developing the scientific research activities and, in this sense, the collaboration between European states. Thus, the Council has issued several successive decisions regarding the adoption of multiannual programs of scientific and technical development[2] and also decisions defining the activities and attributions of bodies with specific tasks at European level. We mention as an example the Council Decision adopted in 2006 regarding the specific program to be implemented, through direct actions, by Joint Research Centre under the EU 7th Framework Program of the European Atomic Energy Community for research activities and training in nuclear field[3]. The European Commission, at its turn, adopted decisions establishing specialized European bodies having the role of assisting and consulting it in taking the appropriate measures in the nuclear field[4] or imposing procedures in the field of transportation of radioactive waste.[5]

An important directive which is worth to be mentioned is Council Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations in whose text by *nuclear installation* is understood also the *research reactor facility*. It is obvious that nuclear research is related first of all, from the nuclear energy point of view, to the nuclear research reactors. However, although it is not expressly mentioned, all the activities associated with nuclear re-

[2] Council Decision of 26 June 1975 adopting a programme on the management and storage of radioactive waste (75/406/Euratom), Council Decision of 12 March 1985 adopting a Research And Development Programme On The Management And Storage Of Radioactive Waste (1985 To 1989) (85/199/Euratom), Council Decision of 15 December 1989 adopting a Specific Research and Technical Development Programme for the European Atomic Energy Community în the field of management and storage of radioactive waste (1990 to 1994) (89/664/Euratom)

[3] Council Decision of 19 December 2006 concerning the Specific Programme to be carried out by means of direct actions by the Joint Research Centre implementing the Seventh Framework Programme of the European Atomic Energy Community (Euratom) for nuclear research and training activities (2007 to 2011), Official Journal of the European Union L 400/434, December 30

[4] Commission Decision of 17 July 2007 on establishing the European High Level Group on Nuclear Safety and Waste Management, Official Journal of the European Union L 195/44, July 27

[5] Commission Decision of 5 March 2008 establishing the standard document for the supervision and control of shipments of radioactive waste and spent fuel referred to in Council Directive 2006/117/Euratom, Official Journal of the European Union L 107, April 17

search are subject to all the rules dedicated to ensure the *nuclear safety* as it is defined in the same directive.

Starting with the definitions above mentioned, we can appreciate that nuclear research can be regarded, in the vast domain of nuclear energy, firstly as an instrument for identifying the principles in dealing with nuclear energy and, secondly, as an independent field which is also subject to safety and security rules applying to all activities using nuclear installations.

As we have already mentioned, The European Union is constantly preoccupied to identify proper instruments for accomplishing its unifying policy. The rule applies also in the nuclear field including the specific research. As an example we bring to attention the Proposal for a Council Directive (Euratom) setting up a Community framework for nuclear safety where is very clearly specified that "Nuclear energy plays an important role in the EU energy mix, supported by a firm commitment in research and promotion of technological developments, aimed at further enhancing its safety and security." and the Proposal for a Council Directive (Euratom) on the management of spent nuclear fuel and radioactive waste where it is said that "The Commission shall identify common areas of research and technological development that could be coordinated at the Community level, taking fully into account the activities under the research and training programmes (…)"and that "The Commission shall encourage co-operation between the Member States in common areas of research and technological development (…)"

As we have noticed the evolution of the regulatory framework adopted under the Euratom Treaty have extended fundamentally its role and mission, as it is recognized at the European level where it was said that "If initially the goal was to ensure the coordination of the research programs of Member States for peaceful use of nuclear energy, these days the Treaty helps to sharing the knowledge, infrastructures and funds in nuclear energy field, ensuring the security of atomic energy supply in a centralized monitoring system"[6].

III CONCLUSIONS

The nuclear energy is one of the most complex issues of the modern human society. It addresses a variety of levels: scientific, technical, political and social. The European community created a very broad legal framework whose goal is to find in a unified way the best directions, in terms of rules, principles, institutions and programmes, in order to ensure the sustainability of the nuclear field. In this respect, considering the extremely important issue of the public acceptance, the European Union is taking important steps in the establishment of a solid base of security and safety of the entire nuclear domain. In this respect, all the legal and institutional coherent measures that have been taken since the Euratom Treaty was adopted have the capacity to demonstrate that a very sensitive domain can be accepted and proper appreciated by the society if it is well governed.

[6] http://ec.europa.eu/energy/nuclear/euratom