THE PROBLEM OF NUCLEAR ENERGY UTILIZATION - LEGAL ASPECT

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Abstract: *The sudden development of the peaceful uses of nuclear energy and the threat of its possible military use have created numerous problems which require the passing of the legislation to cover all the activities directly connected with the peaceful use of nuclear energy. Although the efforts of the jurists to make the legislation as up-to-date and as close to real life as possible, the problem is still the discrepancy between the development of the legislation and technology. It is the technology which is at least a step ahead of the legislation. And it is this step that sometimes is a problem.*

The purpose of the paper is an analysis of the foundations of the nuclear energy legislation as a relatively new area of investigation accompanied by definitions, development and problems of nuclear energy utilization, stressing especially monitoring and environmental impact assessment, as well as the public participation and right to information.

Keywords: *Nuclear Energy, Peaceful Use, Legislation, Right to Information.*
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I. INTRODUCTION

The sudden development of the peaceful uses of nuclear energy and the threat of its possible military use have created numerous problems which require the passing of the legislation to cover all the activities directly connected with the peaceful use of nuclear energy. Although the efforts of the jurists to make the legislation as up-to-date and as close to real life as possible, the problem is still the discrepancy between the development of the legislation and technology. It is the technology which is at least a step ahead of the legislation. And it is this step that sometimes is a problem.

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II. DEFINITIONS

The term "***nuclear energy***" derives from the Latin adjective, *nuclearis* (meaning nuclear), that is, the noun *nucleus* (meaning nucleus), and the Greek noun, *energeia* - activity (that is, en - in + ergon - labor) and refers to the energy released through the splitting of the nucleus of the atom and the transformation of the atom into some other forms.

A ***nuclear reactor*** has been defined by the Law as a facility containing nuclear fuel arranged in a manner which enables the chain reaction of nuclear fission without additional source of neutrons.[1] This is a device for continuous nuclear processes and release of nuclear energy.

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[1] Article 2, paragraph 5. of the Law on the responsibility for the nuclear damages.

Radioactive material is the material containing one or more radionuclides whose total and specific activity is higher than the prescribed levels.[2] Article 2 of the Yugoslav Law on the Transport of Dangerous Materials [3] defines, as class 7 of the dangerous materials, the radioactive materials with specific activity higher than 740 Bq (0.02 microcurie) per gram. Dangerous materials are also the raw materials for the production of dangerous materials and wastes - provided they have the characteristics of those materials.

When people say ***ionizing radiation***, they usually mean: 1) radioactive materials reaching the environment as the result of nuclear explosions or some other causes of unknown origins, 2) nuclear reactors and other devices in nuclear facilities containing radioactive materials, 3) irradiated nuclear fuel, 4) X-Ray devices, accelerators and other devices and machines creating or which might create ionizing radiation, 5) radioactive materials and devices with radioactive materials, 6) uranium and thorium mines and other mines where ionizing radiation exceeds the prescribed level, uranium and thorium processing plants, as well as the plants where nuclear raw materials are obtained from other ores and raw materials containing radioactive materials, and 7) radioactive waste materials.

Sources of ionizing radiation could be divided into: sources of overall radiation - covering the whole population, and sources of partial radiation - covering only part of the population.

Sources of overall radiation include:

- natural sources (cosmic radiation, naturally occurring radionuclides in the environment),
- global (stratospheric) fall-outs from nuclear explosions,
- nuclear power plants as industrial radiation sources.

Sources of partial radiation include:

- medical radiation (radio-diagnosis, radio-therapy and nuclear medicine),
- professional irradiation, and
- other sources (radioactive lightning rods, ionizing fire detectors, color TVs, instruments with lighted panels, watches with phosphorescent dials etc.).[4]

The problem with radiations is the fact that not one of our senses can detect them although they are all around us.

Radioactive waste is unusable waste matter created in nuclear reactions or the material contaminated by radionuclides, whose basic characteristic is that they are the sources of ionizing radiation. The definition of radioactive waste can often be found in national legal texts: "all those materials containing or contaminated by radionuclides in the amounts which the responsible government authorities consider higher than that is acceptable for materials which may be left alone without control and which are not intended to be used".[5] Radioactive waste materials must be treated in a manner which provides adequate protection of the environment and an acceptable level of protection of the population.

III. DEVELOPMENT AND PROBLEMS OF NUCLEAR ENERGY UTILIZATION

The first peaceful use of nuclear energy is believed to have been an event in 1951 when the reactor at the English research center, Harwel, using the central heating installations, started heating the premises of the center. The first nuclear reactor was constructed in the Second World War in the United States of America and commissioned on December 2, 1942, under the management of Enrico Fermi. So far, hundreds of nuclear reactors have been constructed. The nuclear reactor in Vinča, near Belgrade, was commissioned in Serbia in 1959.

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[2] See: article 2, paragraph 4. of the Law on the protection from ionizing radiation, “Official Gazette of the FRY”, no. 46/96.

[3] “Official Gazette of the SFRY”, no. 27/90, 47/90; “Official Gazette of the FRY”, no. 24/94, 28/98.

[4] Tomić N, Some normative solutions of the nuclear energy use, "Strani pravni život", no. 3/97, Belgrade, p. 37.

[5] Belgium: King's decree dated March 1981, defines the role and sets the manners and financial means for the activities of the Government organization for the management of radioactive waste and the fissionables.

The problem of storing radioactive waste today has become greater and more expensive than the costs of producing nuclear energy, particularly for highly developed countries. Excluding the dangerous materials created in the production of nuclear weapons, research activities and medical applications, it is believed that, from the production of nuclear energy up to the year 2000, there had been collected 200 thousand metric tons of used up reactor fuel of high radioactivity (the fuel which has not been processed but simply put away). In the developed western countries, radioactive waste from nuclear facilities makes up only half of the total amount of waste material, while the second half comes from hospitals, research institutes, industrial installations and state institutions. The high radioactivity, long half-life and the dangerous characteristics of most waste materials are a challenge of scientific and technological, but also of political nature, as far as the safety of the storage of these materials is concerned.

For a large number of countries faced with the problem of domestic nuclear waste the challenge is not individual, but collective; the countries with these problems should face the challenge together. And, as the political and scientific discussions concerning the issue continue, the concerns with the across-the-border risks grow as the national storage of radioactive wastes are located near the borders and international dried river-beds, and the suggestions to use state lands for the purpose of storing nuclear wastes are contested. Some countries have opted for a strategy of disposal which includes, indirectly, a reprocessing of the used up fuel, while across-the-border trade in used up fuel and reprocessed waste materials is on the increase.

Some 15 years ago, in Yugoslavia, nuclear waste materials were stored mostly in the following four places: the Institute in Vinča (near Belgrade), the Ruđer Bošković Institute in Zagreb, the Institute in Ljubljana and in the nuclear power plant in Krško.[6] The fate of radioactive waste in our country,[7] as a "nuclear target" near Belgrade, [8] was described as a considerable "nuclear load" from all over the country which has been left to the Institute in Vinča, the leading research center in former Yugoslavia. The used up fuel has been stored in the underground pools of the reactor, switched off since 1984, but under constant supervision of the home experts and the inspectors of IAEA who, once a month, carry out a detailed inspections (used and unused up fuel). However, this temporary storage will meet the needs of the country for a short time period only.

After that, it will be necessary to choose a place for a permanent disposal of the nuclear waste and carry out comprehensive investigation. Thereafter the decision is made as to the manner of disposal, underground or above-ground disposal. For the purpose of disposal of the liquid and solid nuclear waste which is not stored under the necessary conditions, it is necessary to complete the construction of the installations envisaged for this purpose. Radioactive waste, stored in Vinča so far, should be transformed into the long-term safe form and composition for the disposal in the Institute or in a permanent storage facility.

Radioactive contamination implies every unwanted presence of ionizing radiation in an environment above the natural level of radiation or above the prescribed level of radiation. Contamination with radio nuclides may be caused in various situations, and the exposure of the population to radiation depends on a series of factors, like the amount and the type of radio nuclides in the soil and the amount of radio nuclides entering the organism with the air, food and water.

The harmful effect on the human organism depends on the half-life of the radioactive element taken into the organism,[9] on radiation energy and the localization of the radioactive element in the organism. The latent period precedes the appearance of the first changes in the cells,

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[6] In the nuclear power plant Krško, nuclear waste is stored in concrete bunkers in 7,238 200 liter containers and, due to the lack of space for their storage, 1,751 containers with nuclear waste were pressed with a thousand ton press.

[7] In Vinča, all radioactive waste ever since the first days of application of nuclear energy, for 40 years already, has been stored in 2000 metal casks of 200 liters each in the old and the new warehouses (the first one built in 1969 and the second in 1982). The liquid, low radiation waste is stored in underground pools and amounts to 350 cubic meters and should be, using the cement procedure, transformed into solid waste and packed into metal casks, as per regulations.

[8] Written by Stojiljković Stanko, »Politika«, 30. of October 2000, p. 12.

[9] The shorter the half-life, the lower the danger.

the so-called "primary damages". While the acute radiological damages are caused by the single intensive doses of irradiation in a short time period, chronic diseases are the results of a number of repeated small doses of irradiation.[10]

Although 20 years have passed since the Chernobyl incidents, the interest in the effects on the local population, on the survivors and the new generations has not diminished. According to the world standards, of the total number of people suffering from malignant diseases, the ionizing radiation is responsible for approximately 5% to 10% of the cases.[11]

When nuclear energy is concerned, ecological catastrophes recognize no borders and every pollution of the environment in one country or region would threaten the population of much broader areas. Have you ever wondered how good and reliable is the safety of the nuclear power plants in our surroundings?

At the time of the design it is necessary to ensure a reliable system for controlling the reactor, the system which makes it possible to examine and remove faults which might lead to critical situations. The tendency is toward the improvement of the components so as to reduce the number of times the reactor is closed down due to the breakdown of the control system. The control devices and the whole system of monitoring radioactivity in the water and the air have achieved such a degree of development that their elements are wholly transistorized and made so as to be capable of being built easily into any type of system.

Separate programs envisage the storage of radioactive wastes. For the purpose of ensuring the protection of life and health of the people and the environment the user of a nuclear facility is obliged to provide separate storage areas for nuclear materials and their packaging materials which are produced and maintained in accordance with the prescribed standards, technical regulations, that is, the norms of quality and services.

It is a well-known fact that Serbia was contaminated with radioactive materials in 1986, the materials which originated in the accident of the Lenin nuclear power plant in Chernobyl when the presence of, primarily, cesium-137, stroncium-90, iodine-131 was detected. Unfortunately, in order for the radiation of radionuclides of cesium-137 to become harmless, 210 years will have to pass. The Federal Committee for Labor, Health and Social Welfare has prepared a study of the levels of radioactive contamination of the environment and of irradiation of the population due to the accident in the Chernobyl nuclear power plant.[12] It is estimated that, in the course of 1986, on the territory of the Socialist Federal Republic of Yugoslavia, approximately 2.3% of the total radiation from the nuclear power plant in Chernobyl was deposited.[13]

Irrespective of the protective and safety measures, reactors in nuclear power plants even in normal operating conditions emit a certain amount of radioactive material which is decreasing over the years.[14]

All radiation is dangerous regardless of its quantity, even every minute exposures have the ability to cause biological and chemical changes that may lead to biological damage. The number one radiation protection rule is the ALARA concept, which means that any dose of radiation should yield the lowest amount possible with the highest degree of radiation protection available. ALARA (As Low as Reasonably Achievable) *means that all people who may be or are exposed to any type od radiation should be protected by any means possible in order to keep their exposure to an absolute minimum, as long as the means of protection does not interfere with the reason for the exposure.*

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[10] The acute forms of irradiation were unknown until August 1945, and there were two deaths during the construction of atom bombs in Los Alamos; while a greater number of these acute forms were present after the bombardment of Japanese cities.

[11] The data are based on the World consensus on the protection from radiation.

[12] Jovanović M, *Biomedical and sociological importance of incidental human radiation***,** Belgrade, 1989, p. 26.

[13] In fact, approximately 5% of the emitted iodine-131 and approximately 10% of the emitted cesium-137 (Jovanović M, B*iomedical and sociological importance of incidental human radiation*, Belgrade, 1989, p. 27).

[14] See: Marković S, Spaić R, *Radiation and health,* Society for biomedical engineering and medical physics of FRY, Arandjelovac, 2001, p. 75.

IV. CONCEPT OF NUCLEAR ENERGY LEGISLATION

The legal standards may be an important means for the containment of the phenomena which the uncontrolled development of contemporary technology threatens to bring about only if the legislative organs passing the legal standards were prepared to respond in time and if the executive organs were ready to apply the environment legislation. It is necessary to undertake the necessary comprehensive measures and, should the violations of the legal standards occur, through the application of the various sanctions, the repressive measures should be applied.

Too long, in many countries, the legislation concerning the protection of the environment has been limited, unsatisfactory and out-dated and thus incapable of meeting contemporary demands of the protection of the environment. In connection with the legal provisions which should regulate and prevent the danger of the pollution of the environment, an issue is raised of whether the law could be used to control contemporary technology which, on one hand, offers man many benefits, but also, from the other, threatens his survival.[15]

The fundamental purpose of any regulatory regime is to balance social risks and benefits. Basic feature of nuclear energy legislation is its dual focus on risks and benefits. Risk-benefit approach is central to managing activities that present both hazards and advantages for social and economic development. Fundamental requirement that both the risks and the benefits of nuclear energy well understood and taken into account with a view to achieving a sensible balance in the framing of legal or regulatory measures.

The safe and peaceful use of nuclear energy in any State can only be assured with the promulgation and implementation of an effective national nuclear legal infrastructure. Nuclear energy legislation must take its place within the normal legal hierarchy. Over the past decades the IAEA's Office of Legal Affairs has provided assistance to Member States in the development of their individual national nuclear legal infrastructures.

The legal norms for the regulation of nuclear energy are part of the State's general legal system. To the extent that a nuclear related activity is adequately covered in other laws, it should not be necessary to promulgate new legislation. However, from the earliest days of its development, nuclear energy has been considered to require special legal arrangements in order to ensure that it is properly managed. Nuclear energy legislation is recognized as a part of general national legislation, while at the same time comprising different rules required by the special nature of the technology. The special legal norms relate to conduct of legal persons, including commercial, academic, scientific and governmental entities, as well as of individuals.

According to some authors nuclear law can be defined as: the body of special legal norms created to regulate the conduct of legal or natural persons engaged in activities related to fissionable materials, ionizing radiation and exposure to natural sources of radiation.[16]

It is necessary to provide a legal framework for conducting activities related to nuclear energy and ionizing radiation in a manner that adequately protects individuals, property and the environment.

The use of nuclear material involves security risks that do not respect national borders. A large number of international legal instruments have been promulgated to codify the obligations of States in the nuclear field. The terms of those instruments may limit the discretion of legislators in framing national legislation concerning some matters covered by them.

A. Monitoring and environmental impact assessment

For the purpose of determining the state of the environment of the whole country, in the State Union of Serbia and Montenegro, now both states independent [17], a monitoring is being established for the purpose of following across-the-border pollution, namely: the degree of air pollution, the pollution of the soil, bio-diversity, forests, waters, coastal waters of interest for the

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[15] Popović, S., "On the role of executive branch of Government in the protection of the environment", Faculty of Law, University of Sarajevo, Sarajevo, 1974, p. 269.

[16] Stoiber C, Baer A, Pelzer N, Tonhauser W, Handbook on Nuclear Law, Vienna, 2003, p. 5.

[17] From May 2006.

whole country, international waters, climatic changes, ozone layer, ionizing radiation, as well the undertaken obligations from international agreements. Monitoring is defined as a systematic and regular observation and measuring of the parameters of the environment (water, air, soil, bio-diversity and the like) and the changes of the quality and quantity of the environment, emissions of pollutants and the use of natural resources.[18] The radiation monitoring of the area should comprise the measuring of radiation doses, activities in the air and surface contamination.[19]

The control of the level of radioactive contamination of the environment in the neighborhood of a nuclear facility is carried out through the control of emissions and imissions under normal conditions and in the event of an accident. The level of radioactive contamination in the neighborhood of a nuclear facility is assessed on the basis of the measurements of the level of exterior radiation and determination of the content of radionuclides in the air, precipitation, running water and the sediments, tap water and the food chain, as well as the determination of other parameters influencing the content and distribution of radionuclides in the environment.

The measurements of the emissions in the neighborhood of a nuclear reactor comprises all installations, that is, the sources of emissions within the perimeter of the nuclear facility which it is believed, under normal conditions, contribute considerably or comparatively to the emissions and exposure of the population to ionizing radiation, or might do it in case of an emergency. These installations, that is, sources of emissions, are: the reactor facility in the narrow sense, storage of used up nuclear fuels, storage of radioactive waste, storage of radioactive material, storage of nuclear material, radio-chemical installations, accelerator or other types of installations.[20]

Toward the end of the year 2000, the Atomic Energy Agency of the United Nations sent out an invitation to initiate the project of monitoring of the system of sources of ionizing radiation for the territory of our country which was "frozen" with the sanctions and which is based upon the method of measuring of gamma radiation from the air originating from various industrial installations, like nuclear reactors. A revival is planned for the project of our experts (Milan Milojević and Velizar Štrumberger) devoted to the monitoring and measuring of dangerous contamination and for the making of charts showing contamination by uranium, thorium, cesium-137 (after the accident in Chernobyl) and other artificial isotopes.[21]

It is a well-known fact that the nuclear reactor in Vinča (***Serbia***) has been out of commission since August 1984, and still in the Institute for Nuclear Research Vinča, there is a latent danger from radioactive materials, as well as the readiness to initiate nuclear cleaning, that is, storage and removal of nuclear waste of low and medium radioactivity coming from the material used in the preceding period for medical purposes and from industrial applications. The construction of an up-to-date waste storage on a different location, away from Vinča and Belgrade, is being planned.

It was believed that the Federal Government, the user of the nuclear installation and other users of the sources of ionizing radiation, would provide the conditions for a final disposal of radioactive waste within five years from the date the Law on the Protection from the Ionizing Radiation went into effect.[22] However, the envisaged deadline has expired. Today, it is obvious that the Government, by October 4, 2001, had to bring a final decision on the further construction of the accelerator installation in Vinča, that it is necessary that it paid its debt to the Institute for Nuclear Research in Dubna (Russia) for the delivery of the necessary equipment, all this for the purpose of the revival of this regional center for research and for the production of radioisotopes for medical

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[18] See: article 8, paragraph 14. of the Law on the environment, "Official Gazette of the Republic of Monte Negro", no. 12/96.

[19] Savković M, Mataušek M, "Technical, technological and regulatory aspects of designing and exploitation of the facilities for storing used up nuclear waste from research nuclear reactors, "*Nuklearna tehnologija"*, no. 2, Belgrade, 1997, p. 25.

[20] See Article 30 of the Decision on the manner and conditions of the systematic investigation of the presence of radionuclides in the environment in the neighborhood of the nuclear facility, "Official Gazette of the Federal Republic of Yugoslavia", no. 42/97.

[21] This method is used to investigate soil, water, air, precipitation, plants, animals and food.

[22] Compare: article 52. of the Law on the protection from ionizing radiation, "Official Gazette of the FRY", no. 46/96.

purposes relying on expert assistance from abroad. So far, this has not been done.

B. The public and right to information

The right to ecological information at the international level has been precisely defined by the Århus Convention. According to this Convention, in case of immediate danger to human health or the environment, irrespective of whether the danger was caused by human activities or had natural origins, the public must be given, immediately and without any delays, all the information necessary to undertake measures for the purpose of prevention or alleviation of the consequences of the said dangers.[23]

Along with the provisions of the Constitution of the Federal Republic of Yugoslavia defining the right to a healthy environment, the Federal Constitution (article 52/1992) and the Constitution of the Republic of Montenegro (article 19/1992) contain the right of the public to be informed, in time, on the state of the environment, while the Constitution of the Republic of Serbia (article 31/1990) speaks of the right of the citizens to a healthy environment, but the right of the public to be informed is not mentioned, which is certainly an oversight. Also, it has been envisaged for the activities of the federal organs to be accessible to the public and that the public access to the activities of the federal organs may be limited or curtailed only in cases prescribed by the federal law.[24] Article 4 of the Århus Convention contains provisions concerning exceptional cases when ecological information may be refused. This is the case, among others, when the issuance of the information might threaten international relations, national security of public safety.

The Federal Republic of Yugoslavia (FRY) has not participated in the preparations for the signing of the Århus Convention, has not attended the Århus Convention nor participated in later activities concerning the Convention and carried out at the level of the states. International practice has proved that every across-the-border movement of radionuclides is a legitimate issue of international interest. Accordingly, the state disposing of the waste is obliged to assess the possibility of across-the-border influence, provide information and offer suggestions to every neighboring country that might be endangered always when its activities carry the risk of across-the-border emissions of radionuclides. In addition to this, the state would be obliged to supply information on any chance across-the-border emission or the risk of radioactivity due waste disposal "which might be of radiological interest to the other state". This obligation represents the corner stone of the Convention on early warning about nuclear accidents from 1986 and has become, in the meantime, a part of international law.

The data on the state of the environment are accessible to the public.[25] The competent state organs inform the public, in time and impartially, on the state of the environment and on the pollution which might represent a danger to life and health of the people and for the environment.[26]

In view of the fact that the data on the state and quality of the environment and on emissions of pollutants are public, nobody has the right to hide them or in any other way make them inaccessible to the public.[27] For the performance of the activities leading toward pollution of the environment it is necessary to prepare an estimate of their influence on the environment.[28] The list of activities which require an estimate on their influence on the environment, the procedure and the manner of preparation of the estimate, as well as the content, is determined in accordance with the

[23] See: article 5, paragraph c of the Århus Convention.

[24] See: article 122. of the Constitution of FRY, "Official Gazette of the FRY", no. 1/92.

[25] Article 12. of the Law on the basis of protection of the environment, "Official Gazette of the FRY ", no. 24/98.

[26] Article 13. of the Law on the basis of protection of the environment, "Official Gazette of the FRY ", no. 24/98.

[27] See: article 28. of the Law on the environment, "Official Gazette of the Republic of Monte Negro", no. 12/96.

[28] Compare: article 7, paragraph 4. of the Law on the environment, "Official Gazette of the Republic of Monte Negro", no. 12/96.

law. In case of across-the-border pollution, it is the federal ministry which is responsible for the exchange of information with the competent organs of other countries.[29]

The legal or physical person responsible for across-the-border pollution of the environment is obliged to undertake immediate measures for the removal of the pollution and prevention of further negative influence upon the environment and to inform, immediately, the competent federal organ on the pollution and the steps taken in this regard. Also, the legal or physical person responsible for across-the-border pollution of the environment shall bear all the costs of cleaning and the damages caused with the said pollution and the costs in connection with the measures undertaken for the removal of the danger from pollution, in accordance with the law.[30]

Still, in the introduction to the latest issue of the book "Radiation and Health"[31], the contributors note that, although the operative safety of the installations is at an enviable degree and constantly improving, and the state and international supervision permanent, and the human knowledge handling them almost ideal, possibilities of a massive accident of continental proportions which would include our country have not been eliminated.

V. CONCLUSION

Homo quantum scit, tantum potest (Man is capable of doing only what he knows)

Despite the issued operation licenses, many installations have caused lower or higher level accidents and thus endangered the lives of many people, but also the quality of the system of protection which remains to be perfected. Permanent legislative activity so far, at the international and national level, has failed to convince us of the quality of the established safety, while legal control over the use of nuclear energy represents an area which requires considerable improvements.

In 1996, the Secretariat of International Atomic Energy Agency carried out comprehensive preparations and a process of revision of the safety standards. In order to accomplish this goal, a series of consulting bodies was established intended to assist in the preparation and revision of all the documents, namely: Consulting Commission for safety standards, Consulting Committee for nuclear safety standards, consulting Committee for radiation safety standards, Consulting Committee for waste safety standards and Consulting Committee for transport safety standards.

Atomic energy, of and by itself, is neither good nor bad. Whether it will play the role of "the evil giant or Prometheus in the history of man" will depend on how men will use it, what purpose they will give it.[32]

There is no harmless radiation, only tolerable and justifiable, namely, the radiation used for medical purposes, either for diagnosis or therapy. The prospects for the application of nuclear energy in medicine is conditioned on a well-developed research activity.

A period of complete secrecy in the fifties preceded the exchange of the knowledge among the scientists. Today, it is clear that co-operation between experts in joint ventures and scientific and research activities, in the technological development and application of the results are really necessary.

Anyhow, international decision at the global level recognizes the stand that it is strictly forbidden to use any type of radiation that brings no benefits. The legal provisions defining the control and sanctions must be based on practical experience in order to be efficient and not be a hindrance to the development of nuclear science and technology.

The demand for storage of radioactive waste has increased due to the closing-down of a large number of reactors.[33] The member states which have no installations for the production of

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[29] See: article 20. of the Law on the basis of protection of the environment, "Official Gazette of the FRY", no. 24/98.

[30] Compare: Article 36 of the Law on the basis of protection of the environment, "Official Gazette of the FRY", no. 24/98.

[31] Marković S, Spaić R, "Radiation and health", Society for biomedical engineering and medical physics of FRY, Arandjelovac, 2001.

[32] Vukasović V, Development of science and technology and international law: some of the basic characteristics of the influence of science-technological development on the international law, Belgrade, 1978, p. 184.

nuclear energy have, for the time being, given up the plans for the disposal of their own radioactive waste. Three states (Italy, Netherlands and the Great Britain) have decided to postpone the disposal of their own highly radioactive waste for a period between at least 50 and more than 100 years.

Still, people are not giving up on nuclear power plants although anti-nuclear movement in the world today is very strong and has influenced the construction of the new power plants and the closing-down of the existing ones.

Recent international legal solutions insist on the use of nuclear energy for constructive purposes of the universal world wide proportions. This influences the manifestations of international legal foundations of cooperation in the proclamation and implementation of the objectives and principles of international law which suit all the countries irrespective of the degree of their development in nuclear area.

In Serbia, jurisprudence has not given enough attention to the problems of nuclear legislation so that the number of articles on nuclear legislation, with the exception of a few authors, is relatively small. The efficiency of the legal and administrative solutions of the problems created by the peaceful use of nuclear energy will depend to a large extent on the corresponding adaptation of the relevant legal areas so that the legal norms can keep abreast of scientific developments and reality. It is necessary to adopt better solutions in this area having in mind the oversights of the preceding period.

Serbia has not as yet depleted its natural resources and does not have to rush with the construction of nuclear power plants. Moreover, the majority opinion is that the construction of nuclear power plants is unavoidable so it is better to get ready for the time that will surely come.

The problem of isolation and keeping of radioisotopes, as well as a safe storage of dangerous materials, is a challenge because the number of nuclear reactors and their power grow from year to year. The characteristics of the nuclear reactors are a large quantity of radioactive materials which are, objectively, dangerous, but also the harmful influence of radioactivity upon human health and the environment which is a cause for great concern for the safety of nuclear reactors. European or worldwide environmental legislation is necessary, but also the modern environmental education.

We live in an age of general insecurity and uncertainty that is spreading all over the world. A new division of power has occurred. The attitude toward the various uses of nuclear energy has become one of the major bones of contention in the foreign policy affairs and international activities of the countries in general.

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