Shared Radwaste Repository –
Do we need Update in International Law?

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Abstract

In construction and use of nuclear power plants we could see the cycles of ups and downs. These cycles are connected to regional political situations, financial crisis, natural disasters and accidents in power plants. Use of atomic energy is mainly an economic question but, due to consequences of involuntary radiation from this form of energy, also political question. Nuclear power plants operation post numerous problems about their safety and security. All these questions are short term questions and concern only the generation that gains from their production. And all these questions could be resolved at the time they arise and with the use of knowledge available at that time. Greater problem presents the question of radioactive waste management. Radioactive waste problem would affect not only the generation that gains from nuclear power plants production but also some next generations that wouldn’t have any gains from the power plant. The main question about radioactive waste is whether such material should be treated as a waste or a secondary raw material. Some things which from today’s technology are treated as a waste, tomorrow could be reused. One of the law-political question is the appropriate regulation of radioactive waste management and its storage or disposal. Because of high costs (including the environmental rent) of radioactive waste management, there is a tendency to promote shared radwaste repositories for several countries. This tendency is seen also in EU directives that regulate the radioactive waste. Submission is divided in four parts.

First part presents the regulation of radioactive waste management within international legal system. It displays main principles and ideas of radioactive waste management within international agreements and EU regulations. Second part deals with conflict between the obligation of safe radioactive waste management and right of local population to clean and safe living environment. This part presents also court cases from European court of human rights (from here on ECHR) that deals with the right to clean environment. There are more and more court decisions in which ECHR recognizes that one of basic human rights is also a right to clean and safe environment. So these cases could mean the difficulties to find the proper location for the power plant and also the repository. Third part deals with the ideal of shared radwaste repositories. Such idea could be tempting, because the costs of building and maintaining such repository could be lower than in a cases where each county (even with small nuclear program) make its own repository. On the other hand such solutions could hide some troubles. There is a mismatch between the conventions and international agreements that regulate responsibility for environmental damage and conventions and agreements that allow the possibility for common repositories. Problem is presented also through analysis of bilateral agreement between Slovenia and Croatia in the field of responsibility for nuclear waste from Krško’s power plant. Fourth part deals with the possible legal solutions that could solve the abovementioned mismatch.

1. Introduction

Despite some nuclear accidents (Three Mile Island, Chernobyl, Fukushima) nuclear energy is still remains highly recommended option to solve energy needs of modern society. Nuclear power plants post numerous daily problems about their safety and security. All these questions are short term questions and concern only the generation that gains from their production. And all these questions could be resolved at the time they arise and with the use of knowledge available at that time. Greater problem presents radioactive waste management. Radioactive waste problem would affect not only the generation that gains from nuclear power plants production but also some next generations that wouldn’t have any gains.

On the international level the problem of radioactive waste management is regulated by two main legal documents:

• The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management – the first legal instrument to directly address these issues on a global scale;

Both legal documents addresses the problem of radioactive waste management in same way. The main principles, regarding the subject of this article, of both international legal documents could be summarized in following statements:

• The main responsibility for the radioactive waste is on licence holder – state responsibility for such waste management is secondary;
• Member states should implement internal legislation in such way that licence holder has enough human and financial resources for decommissioning and safe management of radioactive waste;
• Declaration of nuclear cycle and of radioactive waste is internal affair of each member state;
• The main difference between storage and disposal is the possibility of retrieval;
• The operating licence should be granted only if the operator presents also plan of decommissioning and radioactive waste management;
• The main responsibility for appropriate legislation and regulation of radioactive waste management is on the state in which the radioactive waste is produced.

Both international documents have notion of the shared repository. But we should not neglect the fact that shared repository is mentioned in the preamble of both documents and not in the main text of agreement or directive.

Talking about radioactive waste management in international context brings out two important questions. First is: “What is radioactive waste?” Second is: “How to implement the obligation not to interfere to the rights of future generations in the field of disposal of radioactive waste?”

Radioactive waste, by definition, is unneeded material that contains unstable elements that decay by emitting alpha, beta or gamma emissions. The main difference among definitions is whether spent fuel is categorized as high level waste or not. Some definitions see spent fuel as an energy source. So it’s on each state how to declare spent fuel. The legal definition of spent fuel has influence on the type of repository and costs of decommissioning. Different definitions of radioactive waste in different countries, brought out also a model of waste substitution connected with nuclear reprocessing. Nuclear reprocessing is the technical and chemical process whereby spent fuel is separated from useful fuel, the latter of which can, if necessary, be used again in nuclear reactors. Originally, the reprocessing process was a military technology used to recover plutonium for use in nuclear weapons.

The answer on the second question is even more complex. The level of radioactivity and half-lives of radioactive isotopes in low-level radioactive waste are relatively small. Storing the waste for a period of 10 to 50 years will allow most of the radioactive isotopes in low-level waste to decay, at which point the waste can be disposed of as normal refuse. So, after the period of 50 years, most of this material could be reused.

Taking into account the technical development, we could expect that, with the technology of 22nd Century, also the rest of low-level radioactive waste could be reused. So the border between storage and disposal of radioactive waste is not so clear. EU legislators answered this issue by introducing term of long-term storage as an interim solution, but not as alternative to disposal.

Since the world’s first disposal of radioactive waste in Oak Ridge, Tennessee, in 1944, considerable experience has been acquired in the field. The first disposal site — intended for “actively contaminated broken glassware or materials not sufficiently clean to be used in other work” — was a simple trench filled with unconditioned waste located on the Oak Ridge site. Similar approaches were adopted by other nuclear facilities and waste generators in the United States and other countries during the early phases of nuclear power’s development.

2. ECHR and right to a healthy environment

ECHR hadn’t dealt with environmental matters till the beginning of 1990’s. Right to a healthy environment is not a special right mentioned in European convention of human rights. The first environmental case Powell & Rayner v. UK, 1990 started a new ECHR’s practice. For the first time in its history the ECHR showed intention to accept that environmental issues may be linked to complaints grounded on Article 8 of the Convention.

First case that dealt with the question of healthy environment was Hatton and others v. UK, 2001. In this case the ECHR underlined that environmental protection must be envisaged by states when they act within their margin of appreciation, but that they do not have the task to adopt a special approach as regards a „special status” of environment-related rights. ECHR stated that the horizontal effect of the Convention, the state had positive obligations to take reasonable and appropriate measures in order to protect these rights. In both contexts – whether there is an interference or a positive obligation – a fair balance must be stricken, between the conflicting interests of individuals and of the community as a whole. But the ECHR pointed out one more condition to be successful in such cases – applicants must show the illegality of state actions. The ECHR underlined that environmental protection must be envisaged by states when they act within their margin of appreciation, but that they do not have the task to adopt a special approach as regards a „special status” of environment-related rights.

Lopez Ostra v. Spain, 1994, was the first in the ECHR’s case-law where it admitted a complaint for indirectly breaching the right to a healthy environment. The failure of the national authorities to protect the applicants...
against serious chemical pollution was deemed as a breach of the positive obligation of the state, arising from Article 8 of Convention.

In Guerra v. Italy, 1998, the ECHR developed another positive obligation of the authorities, related to environmental pollution that was maintained as a standard during its following case-law in this field. The ECHR uses article 10 of Convention to establish the obligation to inform the affected persons on the potential effects of dangerous industrial activities which take place in their areas of living and on the procedures to be followed in cases of emergency.

In Fadeyeva v. Russia, 2005, the ECHR established that the exposure of the applicant to toxic industrial waste over the accepted limit, for a long period of time and with the authorities’ knowledge, represented a violation of Article 8: such an exposure made the applicant vulnerable to more diseases and affected her quality of life in a sufficient measure as to be able to invoke Article 8 of Convention.

The ECHR’s case-law did not recognise the right to a healthy environment (e.g. the right to be protected against the effects of a nuclear plant, case Athanassoglou a.o. v. Switzerland, 2000, on the ground that applicants had rights under internal procedure legislation.

By presented case law, we could see three main requests for the states in the field of healthy environment:

- States have especially positive obligations, to take appropriate measures able to protect the individuals against the adverse effects on their rights of environmental pollution of different kinds (noise, chemical, industrial), such as: creating a comprehensive legislative and administrative framework on environmental protection, ensuring the “horizontal effect” of the Convention;
- States have obligation to inform the public about the risks of serious pollution caused by industrial or other activities, dangerous to the environment;
- States must ensure a fair balance between the economic interests and welfare of the community as a whole and the individual rights and interests.

3. Shared repositories

Siting a radioactive waste disposal facility refers to the process of selecting a suitable location that must take into account technical and other considerations. Technical factors cover a long list: geology, hydrogeology, geochemistry, tectonics and seismicity, surface processes, meteorology, human induced events, transportation of waste, land use, population distribution, and environmental protection. Another key factor today is public acceptance, particularly in industrialized countries where a locality’s “not-in-my-backyard” attitude can hinder the siting of all types of industrial waste facilities, not just radioactive waste sites. This has caused planners to focus greater attention on societal factors during early phases of the siting process [4]. Figure 1. shows main factors that influence siting an type of repository.

Public conflict over siting noxious facilities is the rule rather than the exception. A major strategy often recommended by developers and other industry proponents has been to compensate those who would be affected through economic benefits or incentives. Public education is a second strategy, often used in conjunction with economic compensation [5]. Proponents point out that the strategies devised to overcome opposition to hazardous waste sites are based on genuine concerns about the potential harm that would result from failure to construct storage and/or treatment facilities. Risks and costs increase severe for all when delays in developing facilities occur [5]. To solve this questions the concept of shared facility was born.

![Figure 1: Factors influencing sitting and type of repository](image-url)
The concept of a shared facility is known under several different names: international repository, regional repository, multinational repository, all with a slightly different meaning. The latter seems to be the most universal and has lately been widely accepted [6]. The multinational repository concept assumes that the waste originating from more than one country is being disposed in a common repository. Any country - regardless of geographical location - may participate in such a collaborative scheme. In contrast to this, the regional repository concept involves only countries that belong to the same geographical region [6].

In practice of multinational repositories we could find the following scenarios [7]:

- Add-on scenario – the repository remains effectively a national repository, but with a part of the waste inventory coming from abroad.
- Co-operation scenario – one or more other countries interested to dispose their waste in the potential hosting country or countries will be involved directly in repository development and implementation.
- International scenario – the host country would effectively cede control of the necessary siting area to the international body. This scenario seems unlikely in the foreseeable future because such transfer of sovereignty is of extreme political sensitivity.

Advantages of shared repositories would be [8]:

- Economy: it is mainly due to economic reasons that have led countries, especially the smaller ones, favouring the idea of shared multinational repositories. It is obvious that each country participating in a common project could gain significant financial advantages due to the large economies of scale in constructing and operating repositories.
- Access to safe disposal facilities: some countries may not be able to afford to implement safe disposal facilities on their own. Some countries will, for economic reasons, wait several decades before constructing repositories, using the intervening time to accumulate the necessary funds. Shared repository can provide access, or earlier access, to safe repositories for these countries.
- Enhanced global nuclear security: the term security is used in connection with the prevention of misuse of nuclear materials by terrorists or potential weapons states. Safeguards control for one site is simpler than for many scattered sites and, again, may be realised sooner through cooperation.
- Lower environmental impact: the construction of a disposal facility instead of several reduces the negative conventional impacts of such a facility on the environment.
- Expanded range of geological options: if several countries participate in shared repository, a larger geological area may be examined and a larger choice of geological formations is available. Simple geological environments that are particularly suitable for repositories may not be available in small countries with complex geologies.
- Increased technical capacity: scientists and specialists from several countries can cooperate and share their knowledge and experience in pursuit of a common goal.

Opponents to international disposal argue that the responsibility for the disposal of high-level radioactive waste must be with the State of origin having drawn an advantage out of the use of nuclear energy in the first place. However, the question is how the term ‘responsibility’ is to be defined in this context. Responsibility within the framework of final disposal of high-level radioactive waste can only mean to choose the safest solution for both mankind and environment from today’s point of view. This means that under certain circumstances a national solution might be ruled out, because e.g. the respective State does not have suitable geological conditions for a safe final repository [9].

4. Open-site open problems of regional repositories

This last part of submission deals with a case study of potential shared or regional repository in the case of Nuclear plant Krško. Nuclear plant was built in former Yugoslavia. By dissolution of old federal state the 1990’s plant itself became a prestigious question for all political parties in Slovenia as well in Croatia. It took 12 years before both states signed and ratified bilateral agreement solving the relations regarding the nuclear plantxv. Mentioned agreement introduced the principle of parity and equality. The main idea of agreement is similar to the idea of common ownership within the marriage. So all the obligations and rights are divided into exact half. And all the decisions about the plant and decommissioning (from the ownership point of view) should be accepted unanimously. In some way (regarding certain statutory questions – regulated by bilateral agreement) nuclear plant is treated as extraterritorial person. Slovenia has the solemnly right of administrative control over the plant.
Decommissioning and radioactive waste management are covered in Articles 10 and 11 of mentioned treaty. Main obligations from these articles are:

- Decommissioning of plant and radioactive waste management is common obligation of both states;
- Both states ensure to find effective common solution for decommissioning and radioactive waste management;
- Location within the plant could be used for storage of radioactive waste till the end of regular operation life;
- If there would be no common solution for radioactive waste, than in two years following the year of end of regular operational life, each party will take over and take away half of waste in the storage of the plant;
- Each party takes the responsibility to provide sufficient money to finance decommissioning and radioactive waste management, Both states are solidary responsible to cover all the expenses for decommissioning and radioactive waste management.

At the time of ratification of bilateral agreement the nuclear plant licence was valid until 2023. So 2025 was the last date in which the radioactive waste from nuclear plant store should have been moved in one regional depository or half of it in Slovenian depository and half of it in Croatian depository. The fact is, that radioactive waste management is also a prominent political question that could be used for internal political prestige. Till now there has been found no common political solution for decommissioning and radioactive waste management. So far both countries dealt with the problem in its own way (or in no way). So what are possible legal solutions if no common solution would be find and in case that one of the parties wouldn’t be able to accept the radioactive waste from nuclear plant?

No matter of the bilateral agreement the main responsibility for decommissioning and radioactive waste management is on the licence holder. That means that nuclear plant should find the appropriate repository and hand over the ownership of all radioactive waste to chosen repository. So it’s on Slovenian supervisor authority to issue the order for mentioned radioactive waste. So the main payee for disposal will be licence holder – nuclear plant. Bilateral agreement could not override the international agreements. And licence holder obligation could not be taken over by other persons.

So mentioned bilateral agreement widens the circle of the persons who are responsible to cover costs of decommissioning and radioactive waste management. The only question will be either to use court in Slovenia or arbitrage. Due to some inconsistency between concluded treaty and other EU directives that regulate the field of energy production and transmission, after
Croatian entering into EU, both states in relation to nuclear plant are not any more states as sovereigns but states as entrepreneurs. So, if the solution wouldn’t be found under the bilateral agreement all open questions will be solved in national courts or EU court. By the end of the day licence holder will be responsible to find the solution within Republic of Slovenia and it legal system.

What if Croatia in 2023 would not be ready to accept half of radioactive waste? Would be in accordance with law that the Croatian half will still be in storage within the Nuclear plant Krško? By my opinion, no. The order issued by Slovenian authority to the nuclear plant will be for all the radioactive waste and not only for half. The nuclear plant will then be in position to deal this question with its owners. Non-compliance could bring at the end also to the closing of nuclear plant and shareholder lawsuits for negligence.

On the other hand also the residents from Krško would have open way to start lawsuits against Croatia in front of European court of human rights and in front of EC Court. Due to the international agreements and conventions signed by Slovenia and Croatia, the bilateral agreement could not be seen as a legal instrument to bypass the obligation of licence holder. So in the case of nuclear plant Krško the answer about regional repository is still in the magic ball.

Nevertheless of bilateral political importance how to solve the “one-million USD” question on radioactive waste from nuclear plant, two critical questions for international law arises out. First question addressed would be the unique definition of radioactive waste. By my opinion the necessary changes in international law, regarding radioactive waste management, would cover the terminological questions. So there would be a common understanding, taking into consideration the development of technology, what could be defined as radioactive waste.

Second question should address the essence of long-term storage of radioactive waste. We should look how long the long-term storage is acceptable from economic, environmental and technological point of view. It’s not acceptable to treat equally the short-term and long-term storage. And it should be responsible to present and future generations to set the border between long-term storage and disposal. Otherwise we’ll put the burden of radioactive waste to the future generations.

Disclaimer

This submission was prepared or accomplished by author in his personal capacity. The opinions expressed in this article are the author’s own and do not reflect the view of the ARAO.

References


The applicants referred to the WHO guidelines on noise levels values, established to avoid sleep disturbance during the night, which would have had to be of max. 60 decibels and they claimed that the Government did not do enough research as to support

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1. Everyone has the right to respect for his private and family life, his home and his correspondence.
2. There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others [14].

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i We should bear in mind that states enter into “contracts” to further interests; they enter into “covenants” to manifest normative commitments [12].


iii Austria’s first nuclear power plant at Zwetendorf, for example, has never operated. It stands idle as a result of a referendum in November 1978 in which voters acted to prevent the plant’s operation because no clear method for the disposal of its waste was in hand. In Sweden, a 1977 law prohibiting construction or operation of any new reactors unless plans are provided for the absolutely safe disposal of their wastes has prevented operation of two fully-constructed facilities for nearly a year and delayed construction plans for a number of other plants. West Germany has also suffered a reactor construction moratorium because of the lack of an acceptable nuclear waste disposal program [11].

iv A few international institutions and issue areas approach the theoretical ideal of hard legalization, but most international law is “soft” in distinctive ways. The term hard law as used in this special issue refers to legally binding obligations that are precise (or can be made precise through adjudication or the issuance of detailed regulations) and that delegate authority for interpreting and implementing the law. The realm of “soft law” begins once legal arrangements are weakened along one or more of the dimensions of obligation, precision, and delegation. This softening can occur in varying degrees along each dimension and in different combinations across dimensions [12].

v By agreement between the UK and Japan, the spent fuel to be reprocessed and the waste produced by reprocessing is still the property of the customer, i.e. the Japanese nuclear companies such as INFL (Japan Nuclear Fuel Limited) and Tokyo Electric and Kansai Electric. However, many reprocessing customer nations, in agreement with the operator nations, have pushed for terms of operation whereby the latter will accept a certain specified substituted waste for the actual waste that they own. For example, in the case that this article addresses, Japan is a customer nation that has sent spent fuel to the UK to be reprocessed. Instead of sending back the intermediate level waste that reprocessing has produced, the UK, in cooperation with the Japanese nuclear authorities and companies, wants to send back smaller amounts of high level waste as a substitute [2].

vi To begin with, the radioactive waste management approach is to consider the nature of radioactive elements involved in terms of their half-lives and then choose the appropriate method of handling. If the concentrations of radioactive elements are largely short lived, then one would resort to what is referred to as ‘delay and decay’ approach; that is, to hold on to such a waste for a sufficiently long time that the radioactivity will die in the meanwhile. A second approach is to ‘dilute and disperse’ so that the hazard in the environment is minimized. But when the radioactivity is long-lived, the only approach that is possible is to ‘concentrate and contain’ the activity. In order to carry out concentrating the waste (generally the sludge), chemical precipitation, ion exchange, reverse osmosis and natural or steam evaporation, centrifuging, etc. are resorted to. The resulting solids are highly concentrated in radioactivity [3].

vii The U.S. Nuclear Regulatory Commission (NRC) has considered two types of storage for LLRW at a nuclear power plant:
   • Interim contingency storage, for up to five years, and
   • Long-term storage, for over five years.

Due to current uncertainties regarding the availability of LLRW disposal capacity, the NRC is aware that extended storage of LLRW may be pursued by nuclear power plants and by other NRC licensees which generate LLRW [13].

viii The applicants, whose homes were situated nearby London Heathrow Airport, right underneath the flight routes, claimed that their right to respect of private life, more precisely their quality of life as well as the right to enjoy their own home, were affected by the noise caused by planes. The Court admitted the major economic importance of Heathrow airport, arguing that the existence of international airports in very populated urban areas became a necessity for the country’s economic welfare.

ix Article 8 – Right to respect for private and family life.
1. Everyone has the right to respect for his private and family life, his home and his correspondence.
2. There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others [14].

x The applicants referred to the WHO guidelines on noise levels values, established to avoid sleep disturbance during the night, which would have had to be of max. 60 decibels and they claimed that the Government did not do enough research as to support...
its opinion that the actual levels of 80 decibels were tolerable. In the applicants’ view, this amounted to an interference with their right to respect of private and family life and of their homes.

The applicants’ home was situated in the immediate vicinity of a plant treating leather industrial waste, which produced toxic gas. The continuous situation (over five years) determined the applicants to leave their home and move to an apartment, at the expense of local authorities.

The chemical plant in the case had been open in the 1970s, and a law of 1988 imposed this obligation to inform; however, the applicants haven’t been offered any information until 1995, their health and homes being seriously affected by arsenic pollution.

The case concerns an application brought by a Russian national, Nadezhda Mikhail Fadeyeva, who was born in 1949 and lives in Cherepovets, a major steel-producing centre situated around 300 km north-east of Moscow. In order to delimit the areas in which pollution caused by steel production could be excessive, the authorities established a buffer zone around the Severstal premises - "the sanitary security zone". This zone was first delimited in 1965. It covered a 5,000 metre-wide area around the territory of the plant. Pollution levels are officially monitored within the security zone. The applicant submitted that, from 1990-1999 the average concentration of dust in the air was 1.6 to 1.9 times higher than the "maximum permitted limit" (MPL); the concentration of carbon disulphide, 1.4 to 4 times higher; and, the concentration of formaldehyde, 2 to 4.7 times higher. Atmospheric pollution from 1997-2001 was rated as "high" or "very high". In particular, an excessive concentration of hazardous substances (such as hydrogen sulphide, ammonia and carbolic acid) was registered.

The applicants live in the villages of Villigen, Würenlingen, Böttstein and Kleindöttingen, situated in zone 1 in the vicinity of unit II of a nuclear power plant in Beznau (Canton of Aargau). They either own or rent property. The Beznau II nuclear power plant consists of a dual-loop pressurised water reactor. The site is situated five kilometres from the German border. They opposed the application for an extension of the operating licence because of the risks which they maintained such an extension entailed for their rights to life, to physical integrity and of property. According to them, the nuclear power plant did not meet current safety standards on account of serious and irremediable construction defects and, owing to its condition, the risk of an accident occurring was greater than usual. They also requested that in the meantime certain provisional measures be taken. The complainants also disputed the impartiality of the administrative bodies involved in the proceedings.