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Definition “Spent Nuclear Fuel” in EU Law and Russian Legislation

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Abstract. The purpose of the study is a comparative research of two legal approaches to define term “spent nuclear fuel” in Russian and EU law. The Russian legislature has determined that spent nuclear fuel (SNF) is not radioactive waste (RW), but it is an independent object of legal regulation and it is subject to further processing for further use as fuel for nuclear power plants. This study analyses the dual-track approach to SNF in EU law, which is enshrined in the EU Directive 2011/70, since some European countries consider spent nuclear fuel as RW, others as a renewable resource. This article supports the idea of adoption a new legal definition of “spent nuclear fuel” in the Russian Federation, which will give an additional impetus to develop the energy dialogue and further cooperation in the nuclear field between the EU countries and Russia; but it also will exclude environmental damage.

Keywords: legal definition of “spent nuclear fuel”, EU law, Russian law “On the use of atomic energy”, COUNCIL DIRECTIVE 2011/70/EURATOM establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste, Energy Strategy of Russia for the period up to 2030, MOX fuel for BN-800 fast reactor.

Research area: international law. EU Law.

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Правовое определение «отработавшего ядерного топлива» в праве ЕС и законодательстве Российской Федерации

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Аннотация: Целью работы является сравнительное исследование двух правовых подходов к формулировке правового определения «отработавшего ядерного топлива» в российском законодательстве и праве ЕС. Российский законодатель определил, что отработавшее ядерное топливо (ОЯТ) не относится к радиоактивным отходам (РАО), а является самостоятельным объектом правового регулирования и подлежит дальнейшей переработке с целью последующего использования в качестве топлива для АЭС. Анализируется двоякий подход к ОЯТ в праве ЕС, который закреплен в Директиве ЕС 2011/70, так как одни европейские страны ОЯТ рассматривают как РАО, другие как возобновляемый ресурс. Проводится идея принятия в Российской Федерации нового правового определения «отработавшего ядерного топлива», которое даст дополнительный импульс для развития энергетического диалога, дальнейшего сотрудничества в атомной сфере между странами ЕС и Россией и исключит злоупотребления и нанесение ущерба окружающей среде.

Ключевые слова: правовое определение «отработавшее ядерное топливо», право ЕС, российский закон «Об использовании атомной энергии», Директива ЕС об отработавшем ядерном топливе и радиоактивных отходах, Энергетическая стратегия России на период до 2030 года, ядерное МОКС-топливо для реакторов на быстрых нейтронах.

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Introduction

At the end of the 20th century – at the beginning of the 21st century, the scope of application of “atoms for peace” significantly expanded, in particular, in storage systems for electricity (hydrogen powerbank), in security (wireless highly sensitive capacitive strain sensors), in nuclear medicine (the use of radiopharmaceuticals, currently work is underway to create the first Center for Nuclear

Medicine in Irkutsk in Russia), ionizing radiation treatment of agricultural products, composites, rubber, in space exploration (compact radioisotope generators), in the creation of nuclear navy and floating nuclear power plant (floating nuclear power plant “Akademik Lomonosov”), and finally, nuclear technology has made a significant contribution to the fight the COVID-19 pandemic in 2020 (creation of the “Tianox” device for therapy with

nitric oxide, sterilization of medical equipment, masks, instruments, special clothing, dressings). In connection with the expansion of the use of nuclear technologies, the volumes of radioactive waste and spent nuclear fuel are increasing. Therefore, the adoption of the legal definition of “spent nuclear fuel”, as one of the main conceptual tools in legal regulation in this area, provides a unified approach to understanding the key phenomena occurring in society.

1. Statement of the problem

In Article 1 paragraph 2 «*Scope of application*» of Federal Law No. 190-FZ “On radioactive waste management and on amendments to certain legislative acts of the Russian Federation” of 2011, it was stated, “the provisions of this Federal Law do not apply to relations in the field of spent nuclear fuel management”¹.

Thus, the legislator has determined that spent nuclear fuel does not belong to radioactive waste, but spent nuclear fuel is an independent object of legal regulation. In this connection, the adoption of a new legal act is required, which would formulate a legal definition of “spent nuclear fuel” and which would regulate the management of spent nuclear fuel. And such an attempt was made on April 22, 1999, when the text of the draft federal law «On industrial processing and storage of spent nuclear fuel»² was introduced to the State Duma. For the first time a Russian legislator in Article 1 of the draft law proposed a legal definition of «spent nuclear fuel», defining it as “assemblies of fuel elements removed from nuclear reactors, the further use of which in nuclear re-

actors without reprocessing is not provided»³. The State Duma did not pass draft law; because the delivery to Russia additional volumes of spent nuclear fuel from other countries would worsen the environmental situation in the country. Another reason for refusing further consideration and accepting it was the active position of the Russian public, which organized the collection of signatures of more than 2.5 million Russians for holding a referendum on the question: «Are you in favor of the ban on the import of radioactive materials from other states into the territory of Russia for storage, disposal or processing?» (Iablokov, 2001)

Although the draft law has not been adopted, the understanding that managing the amount of accumulated spent nuclear fuel and developing technologies for its reprocessing led to the adoption of the Energy Strategy of Russia for the period until 2030⁴. In the Energy Strategy of Russia, in Section 8 “Nuclear Fuel Cycle and Nuclear Energy”, it was noted that the development of the production base in Russia in the nuclear industry until 2030 will be carried out on the basis of the creation of a nuclear power plant cycle management infrastructure based on the creation of unified state systems for managing spent nuclear fuel, radioactive waste management and the development of decommissioning technologies for shutdown nuclear power plants.

3. Discussion

3.1. Legal definition of «spent nuclear fuel» in Russian legislation

But the definition «spent nuclear fuel» was enshrined in law by the Russian legislator only in 2016 (Federal Law No. 74-FZ on March 30, 2016, which made amendments and additions to the 1995 Federal Law of the Russian Federa-

¹ Federalniy Zakon ot 11.07.2011 № 190-FZ «Ob obrashchenii s radioaktivnymi otkhodami I o vnesenii izmenenii v otdel'nye zakonodatel'nye akty Rossiiskoi Federatsii», Sobranie zakonodatel'stva RF, 2011, № 29, St.4281 [Federal Law of July 11, 2011 N 190-FZ "On Radioactive Waste Management and on Amendments to Certain Legislative Acts of the Russian Federation", Collected Legislation of the Russian Federation, 2011, N 29, Art. 4281.]

² Proekt federal'nogo zakona No. 99043110–2 O promyshlennoi pererabotke i khranении otrabotavshogo iadernogo topliva, vnesennyi 22.04.1999 goda v Gosudarstvennuiu Dumu RF [Draft Federal Law No. 99043110–2 On industrial processing and storage of spent nuclear fuel, submitted on April 22, 1999 to the State Duma of the Russian Federation]. SPS “Konsul'tant Pljus”.

³ Proekt federal'nogo zakona No. 99043110–2 O promyshlennoi pererabotke i khranении otrabotavshogo iadernogo topliva, vnesennyi 22.04.1999 goda v Gosudarstvennuiu Dumu RF [Draft Federal Law No. 99043110–2 On industrial processing and storage of spent nuclear fuel, submitted on April 22, 1999 to the State Duma of the Russian Federation]. SPS “Konsul'tant Pljus”.

⁴ Rasporiazhenie Pravitel'stva RF Ob Energeticheskoi strategii Rossii na period do 2030. No. 1715-r. 13.11.2009 [Government Act of the Russian Federation On the Energy Strategy of Russia for the period up to 2030. No. 1715-r. 13.11.2009.] SPS “Konsul'tant Pljus”.

tion «On the Use of Atomic Energy»). Art. 3 of the Federal Law of the Russian Federation «On the Use of Atomic Energy» gives the following legal definition «spent nuclear fuel» – a «nuclear fuel irradiated in the reactor core and finally removed from it»⁵.

The legal definition of spent nuclear fuel was taken from Art. 2 of the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, which Russia ratified in 2005⁶. This legal definition is narrowly technical. Thus, the legal definition of spent nuclear fuel adopted by the Russian legislator does not reflect the concept of a closed nuclear fuel cycle, which was adopted in the USSR since the formation of the country's atomic energy and which the Russian Federation adheres to the present (Kudryavtsev, Gusakov-Stanyukovich, 2012). In contrast to the USA, Canada, Sweden, Finland, Spain and a number of other European countries, which adhere to the concept of an open nuclear fuel cycle, which is much simpler and shorter. But an open nuclear fuel cycle is economically high-cost, and at the same time it is more difficult to ensure environmental safety, since it requires long-term isolation of spent nuclear fuel from the biosphere. As S. Zhiznin and V. Timokhov rightly point out in their work «Nuclear Aspects of Energy Diplomacy», a closed nuclear fuel cycle has both advantages (providing nuclear power plants with fuel for hundreds of years with any increase in demand, reducing the volume of high-level waste) and disadvantages (environmentally hazardous radiochemical production). In 2018, Mining and Chemical Combine part of state nuclear corporation «Rosatom» in Zheleznogorsk (Krasnoyarsk Territory) successfully carried out a pilot reprocessing of spent nuclear fuel

⁵ Federalnyy zakon "Ob ispol'zovanii atomnoi energii (s izmeneniyami i dopolneniyami) ot 21.11.1995. № 170-FZ [Federal Law "On the Use of Atomic Energy" (as amended and additional) of November 21, 1995, No. 170-FL]. SPS "Konsul'tant Pljus".

⁶ Federalnyi Zakon ot 04.11.2005 № 139-FZ «O ratifikatsii Ob"edinennoi konventsii o bezopasnosti obrashcheniia s otrabotavshim toplivom i o bezopasnosti obrashcheniia s radioaktivnymi otkhodami [Federal Law of November 4, 2005 N 139-FZ On Ratification of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management] SPS "Konsul'tant Pljus".

from a VVER-1000 power reactor of Russian nuclear power stations⁷. The performance of the unique technologies, that do not pose any risks to the environment, has been fully confirmed. Since the legal definition of "spent nuclear fuel" was adopted in 2016, and «Rosatom» tested new technologies in 2018, the Russian legislator, accordingly, did not formulate in the term that spent nuclear fuel can be used as fuel for a nuclear power plant again, subjecting it to the next cycle enrichment. Although thanks to the development of Russian science, this became possible by turning spent nuclear fuel into a product that has economic value for the nuclear market.

Many Russian researchers (Supotaeva, 2009, Grishchenko, 2010, Grishin, 2011) note the need to adopt a federal law on the management of spent nuclear fuel and formulate a new legal definition of «spent nuclear fuel» based on modern technologies used in the nuclear industry of Russia at the present.

In practice, spent nuclear fuel becomes a renewable resource used in a closed nuclear fuel cycle, which does not reflect the existing legal definition in Russian legislation. Technological changes in the nuclear industry inevitably entail changes to the regulatory and legal framework of nuclear law as a consequence of the response to the change, improvement, development and application of new technologies that require appropriate legal confirmation.

3.2. The legal definition of «spent fuel» to the EU law

Although Euratom and all EU member states have signed and ratified the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, in which Art. 2 gives the definition of «spent fuel» as «means nuclear fuel irradiated in the reactor core and finally removed from it»⁸. However, this legal defi-

⁷ Rosatom gotov nachat' "zelenuiu" pererabotku otrabotavshogo iadernogo topliva [Rosatom is ready to start "green" reprocessing of spent nuclear fuel] Available at: <http://www.rosatom.ru/journalist/smi-about-industry/rosatom-gotov-nachat-zelenuyu-pererabotku-otrabotavshogo-yadernogo-topliva/> (accessed 13 October 2020)

⁸ Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, Com-

dition is of a purely technical nature and the EU member states in their national legislation initially adopted the broader wording of «spent nuclear fuel».

Thus, the approach of various European countries (Sweden, Finland, France, Bulgaria, Hungary, Romania) to the definition of «spent nuclear fuel» was different. In EU law, during the development of EU Directive 2011/70 during the development of the legal definition of spent nuclear fuel, a discussion took place between the proponents of the closed nuclear fuel cycle and the open nuclear fuel cycle (Rodriguez-Penalonga, Moratilla Soria, 2017, Shant Krikorian, 2019). The difference is that for some EU Member States that use a closed nuclear fuel cycle, spent nuclear fuel is a resource for reprocessing to produce new fuel for nuclear power plants. For other EU member states that use an open nuclear fuel cycle (or once-through fuel cycle), spent nuclear fuel is radioactive waste that must be stored without reprocessing pending final disposal.

The discussion between the supporters of a closed nuclear fuel cycle and an open nuclear fuel cycle in EU law continues to this day. The legislation of European states in the field of the nuclear industry reflects these different approaches. Moreover, the current EU Directive 2011/70 on spent nuclear fuel and radioactive waste secured the compromise. Article 3 paragraph 11 of EU Directive 2011/70 «spent fuel» defines «nuclear fuel that has been irradiated and permanently removed from the reactor core. Spent nuclear fuel can also be considered as a renewable resource that can be reprocessed or disposed of as nuclear waste»⁹.

EU law details the legal concept of «spent nuclear fuel» from the perspective of various political, economic and scientific-technical approaches in the EU member states. For example, the French law school (Schneider, Marignac, 2008) considers spent nuclear fuel as a raw material with a renewable resource

in a closed nuclear fuel cycle due to the possession of the latest technologies in the field of processing spent nuclear fuel into new fuel for subsequent use at nuclear power plants. For countries such as Sweden, Finland (Larsson, Andersson, Wingefors, 1968, Stendahl, 2009, Lanaro, Brewitz, Brunk, Carlvik, Hedberg, Mörtberg, Ragnarsdotter Thor, Zika, 2015, Vilhunen, Kojo, Litmanen, Taebi, 2019) spent nuclear fuel is already waste for storage without further processing due to their political and economic approaches to this issue. For Bulgaria, Hungary and Romania (Tomov, 2015, Glodeanu, Patrascoiu, 2019, Takáts, Buday, 2003) spent nuclear fuel is nuclear waste for storage without further processing due to the fact that these countries do not have the latest reprocessing technologies due to a weak scientific, technical and economic base, since the process of reprocessing spent nuclear fuel is expensive and energy-intensive.

4. Conclusion

At present, the Russian Federation has begun industrial production of MOX nuclear fuel for fast reactors from spent nuclear fuel. In this regard, it would be worth considering the possibility of bringing the legal definition of «spent nuclear fuel» in the current Federal Law of the Russian Federation «On the Use of Atomic Energy» in accordance with new technologies (including the use of «voloxidation») in a closed nuclear fuel cycle. The following legal term can be proposed: *spent nuclear fuel is nuclear fuel that has been irradiated and finally removed from the reactor core, which is a renewable resource, and which can be further processed in a closed nuclear fuel cycle.*

Such a clearer legal definition of «spent nuclear fuel», in comparison with the current definition in Russian legislation, will make it possible to develop more productively the energy dialogue and mutually beneficial nuclear cooperation between the EU and Russia, showing more clearly the difference in approaches between closed nuclear fuel cycle and once-through fuel cycle. Such a legal approach, on the one hand, will make it possible to avoid double interpretation of spent nuclear fuel and legal gaps when concluding international treat-

pendium of International Legal Instruments in the Nuclear Energy Field, Part I, International School of Nuclear Law, University of Montpellier, AEN NEA, France, 2008 Session, p.68

⁹ Council Directive 2011/70/EURATOM of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste. Official Journal of the EU 199, 2.8.2011, pp.48–56

ties on the issue of spent nuclear fuel management.

A clear legal formulation of «spent nuclear fuel» will not make it possible to replace spent nuclear fuel with radioactive waste (for example, during transportation from third countries to the territory of the Russian Federation), to interpret the legal definition of «spent nuclear fuel» more broadly, including a number of radioactive waste, which in turn will help to avoid environmental crimes.

On the other hand, the content and context of Russian legislation can support innovation in the energy economy, and at the same time prevent abuse and damage to the environment, as well as lay down new principles for the func-

tioning of the system for the non-proliferation of fissile nuclear materials – uranium and plutonium.

In modern conditions of technological civilization, Russia's entry into the era of fast neutron reactors and the prospects for the construction of a molten salt reactor in the near future, are the events that oblige the legislator to be ready for the changes that have come and to timely prepare the legislative basis for the legal implementation of developing high-tech processes in the Russian nuclear industry and prevent environmental violations, thereby protecting future generations from radiation contamination of soil, air and water on the territory of the Russian Federation.

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