

NEW REGULATORY APPROACHES FOR MANAGEMENT OF RADIOACTIVE AND DECONTAMINATION WASTES IN REPUBLIC BELARUS

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ABSTRACT

Management of radioactive waste generated during decontamination and rehabilitation work after the Chernobyl accident requires a review of the existing regulatory framework, and the preparation of new regulatory documents and control procedures to ensure that the decontamination and rehabilitation work is accomplished in a safe and effective manner. The previously existing waste management work had been performed under conditions that allowed for control of quality and volumes of waste generated. Now, within the framework of the Chernobyl accident conditions, the decontamination work is conducted in a less flexible situation for directly controlling waste volumes and their radiochemical characteristics. These changed conditions require the establishment of more specific approaches for the collection, treatment, conditioning and disposal of waste, including specific procedures for regulation, guidance and control. New regulatory framework should be established also in connection with planned nuclear energy program development in Republic Belarus.

INTRODUCTION

Management of the territories contaminated after Chernobyl accident depends on many factors, the main of which is the level of contamination. The legal status of these territories is defined by the national legislation, which was prepared and adopted by the Supreme Soviet of Republic Belarus in 1991. According to this legislation these territories are divided into five zones depending on the level of their contamination (Table I).

Evacuation of population from the first zone has been performed immediately after the accident. Evacuation from the second zone has been completed later on. A lot of people are relocated also from zones 3 and 4. However in zone 3 about 45,000 families are still living and they are not going to leave this territory and relocate to uncontaminated territories because of many reasons. These people are living close to the border of zone 4 where agricultural activities are going on during the entire period of time after the accident. This means, that appropriate social activities should be continued on the territories of zone 3.

Since a lot of people are living (and working) on the contaminated territories (zones 3, 4 and 5) and their relocation from these territories is not foreseen in the near future there is a need for decontamination and rehabilitation of these territories to reduce risk of radiation exposure of the population. In the long run the problem is to return the contaminated territories as much as possible to some restricted or not restricted use.

Decontamination work with different stages of intensity has been performed during almost all periods of time since the accident occurred. As a result of this work about 1 million cubic meters of wastes with different levels of contamination were generated. These wastes are stored at the 67 storage places, which does not have appropriate technical barriers to prevent migration of the radionuclides beyond the storage places. The practice shows, that efficiency of the decontamination work was not very high and now a lot of efforts are undertaken to improve it. Difficulties in solving this problem associating not only with technical aspects, but also with some organizational aspects, in particular with the absent of clear

well justified concept for decontamination and rehabilitation of these territories, as well as imperfect standards, guidance and rules for implementation of this work, and as a result - imperfect mechanism for regulation and control of this work.

Management of waste generated during decontamination work requires to review existing regulatory basis, to prepare new regulatory documents and procedures for control, which should provide and a guarantee necessary level of safety for population and operational staff. This new regulation should be the basis for establishing efficient, consistent and defensible practical decisions related to human health and environmental risk associated with application of protective measures, decontamination, rehabilitation and use of contaminated territories.

The necessity for development of new regulatory basis is obvious, since previously accepted roles and norms have been developed for the conditions, when radioactive waste was generated at the controlled conditions of industrial activity or scientific research. At these conditions quantity and quality of waste generated could be controlled considerably even at the stage of their generation. Following treatment procedures volume of these wastes could be substantially reduced and the property of wastes could be brought to the conditions, which secure their acceptance for disposal. Disposal of the conditioned waste is carried out in a special engineered facilities located on the clean territory.

In case of decontamination waste the situation is completely different. To control quality and in some instance quantity of waste in this case is practically not possible. Quantity of decontamination waste depends mainly upon the scale of decontamination work and not much depends on some variation of used methods, since they are mainly mechanical in nature. The level of activity of decontamination waste as a rule is relatively low. At the same time possibilities for their volume reduction and activity concentration by treatment are practically very limited or economically not acceptable. Disposal of this waste is practiced on the territories, level of contamination of which is comparable with level of contamination of waste itself. All this means, that regulatory framework which was developed for management of so to call

TABLE I
Classification of Contaminated Territories

Type of zone	Level of Contamination
1. Evacuation zone 2. Zone of initial evacuation	30 km zone around Chernobyl NPP more than 1.48MBq/m ² of Cs-137 or more than 0.11MBq/m ² of Sr-90 or more than 3.70kBq/m ² of Pu
3. Zone of subsequent evacuation	between 0.55 - 1.48MBq/m ² of Cs-137 or between 74 - 110kBq/m ² of Sr-90 or between 1.85 - 3.70kBq/m ² of Pu
4. Zone of voluntary evacuation	between 0.18 - 0.55MBq/m ² of Cs137 or between 18 - 74kBq/m ² of Sr-90 or between 0.74 - 1.85kBq/m ² of Pu

"civilized radioactive waste", in case of chernobyl decontamination waste is not applicable. It is necessary to develop special new regulatory framework - norms, regulations and guidance for decontamination waste, which could correspond real conditions of work, property of generated waste, provide appropriate level of safety, and which could be economically feasible. For today such regulatory system in Belarus does not exist. Existing system for classification of waste also hardly applicable for decontamination waste. As a temporary decision additional two categories of waste are proposed to the existing categories, namely:

- "conventionally radioactive waste", and
- "conventionally clean waste" (Table II).

About 80% of waste generated today during decontamination work belongs to these new categories of waste.

Practical work on decontamination, treatment and disposal of generated waste is regulated today by simplified temporary orders and instructions, which "temporarily" close this gap. Difficulties for development of new regulatory framework for decontamination and management of decontamination waste are dealing with many reasons, many of which are:

- absence of appropriate legislation,
- absence of corresponding regulatory infrastructure,
- shortage of qualified staff for solving these problems. The existing national legislation, named "Legal statute of the territories subject to radioactive contamination as a result of catastrophe at the Chernobyl NPP" contains some contradictions and uncertainties, which make use of this legislation rather difficult.

Preparation of two new laws started in 1993: "Law on Radiation Safety" and "Law on Use of Nuclear Energy and Radiation Protection". The first law has been approved by the Counsel of Ministers and sent for consideration of the Su-

preme Soviet of Republic Belarus. At the present stage this draft law has the following structure:

- Section 1 defines the main goals and objects of legislation and provides glossary of terms.
- Section 2 describe the scope of state regulations, regulatory bodies and their responsibilities, system for licensing, expertise and control.
- Section 3 defines regime of radiation sources use, main requirements for siting, commissioning, operation and decommissioning of nuclear and radiation facilities, rights and responsibilities of corresponding organizations and institutions. Section 4 establishing rights and responsibilities of citizens in connection with radiation safety.
- Section 5 defines social, legal and administrative responsibilities for violation of legislation on radiation safety. Section 6 deals with social and legal responsibilities of operators.
- Section 7 justifies mechanism for implementation of international cooperation in the area of radiation safety.

The second law also was drafted in 1993. This law includes the following special sections:

- Basic national strategy for peaceful use of nuclear energy;
- Principles of state regulation of nuclear energy use, control of nuclear and radiation safety;
- Management of radioactive waste;
- Physical protection of nuclear material and facilities;
- Transportation of nuclear and radioactive materials;
- Export/import of nuclear materials.

TABLE II
Classification of Solid Decontamination Waste

Type of waste	Level of Contamination (activity)		
	γ (Cs-137)	β (Sr-90)	α (Pu)
Radioactive waste			
Conventionally radioactive waste	more than 9.6kBq/kg	more than 74kBq/kg	more than 7.4Bq/kg
Conventionally clean waste	less than 0.96kBq/kg	less than 7.4kBq/kg	less than 0.74kBq/kg

However, taken into account social-psychological situation in the country in connection with the consequences of the Chernobyl accident, it is not intended in the near future to promote this law for further consideration. The next step in preparation of this law will be undertaken only after positive decision on nuclear power program development in Belarus. The necessity and feasibility of this program is now under investigation and evaluation.

The important part of new legislation should be establishing of new regulatory infrastructure. The existing one was developed many years ago at former USSR. At that time all regulatory requirements for nuclear and radiation safety has been prepared in the centralized bodies of the USSR, and the local authorities at the republic level were responsible only for control of implementation of the established regulatory requirements. In Belarus these functions were commissioned to

the "Inspection on Nuclear and Radiation Safety", which was, and still is part of the "Republic Belarus State Committee on Supervision of Industrial and Nuclear Safety". This structure does not correspond with today's requirements, which should implement the state competent authority, responsible for nuclear and radiation safety. The previous legal and regulatory framework on radioactive waste management does not correspond with the existing situation in the republic and needs substantial revision. It is necessary to review and improve the existing roles and regulations in accordance not only with new conditions and new statute of the republic, but also with new obligations of republic in connection with different international and bilateral agreements, conventions and treaties, as well as new international recommendations for safety of nuclear, radiation and waste management facilities.