

Russian Experience in the Regulatory Supervision of the Uranium Legacy Sites – 12441

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ABSTRACT

Management of the uranium legacy is accompanied with environmental impact intensity of which depends on the amount of the waste generated, the extent of that waste localization and environmental spreading. The question is: how hazardous is such impact on the environment and human health? The criterion for safety assurance is adequate regulation of the uranium legacy. Since the establishment of the uranium industry, the well done regulatory system operates in the FMBA of Russia. Such system covers *inter alia*, the uranium legacy. This system includes the extent laboratory network of independent control and supervision, scientific researches, regulative practices.

INTRODUCTION

There are many uranium legacy sites currently decommissioned in Russia. These are: Lermontov PA "Almaz"; Novotroitsk ore management involved in the thorium ore mining in Balej city of Chita region; Stepnoye ore management in Kalmykia; Radium production "Progress" plant in Vodnyj village of Ukhta region in Komi Republic (radium production has initially been performed from the ground water, while then – from the uranium waste conveyed from the uranium mines); many places where the geological parties carry out their pilot industrial operations, and Aldan deposition in Sakha (Yakutia) Republic is the largest of them. There are also many operational uranium mines and uranium milling facilities. After termination of the operational life of some mines, cyclic decommissioning of the spent facilities is to be carried out. Today, the listing of the federal significant entrails sites includes 135 uranium depositions over the Russian territory. The large operational enterprises are: Priargun Mountain Chemical Association, Krasnokamensk, Chita region, Malyshevskoye ore management, Malyshevo village, Sverdlovsk region, Machinery plant in Electrostal city, Chepetsk mechanical plant in Glazov city. Since 2013, development of the new Elkon deposition in Yakutia is in plans.

THE PUBLIC RADIATION EXPOSURE

The radiation situation in regions of past and current uranium manufactures is specified by the following features:

1. Increased levels of natural radionuclide contents in soil and consequently increased gamma dose rates, radionuclide concentrations in agricultural and animal products. These are areas of the tailing dumps, local parts contaminated due to spillage induced by the ore transportation and strait of mine water. For example, in the area of the Priargun Mountain Chemical Association, maximum dose rate values are registered near the cinder/calcine storage facility at the west direction ($1.12 \div 2.15 \mu\text{Sv/h}$), due to high soil contamination (A_{eff} varies over the range 850-7800 Bq/kg). In the vicinity of Vodnyj village, 155 abnormal parts have been found of total area above 30 km² with dose rate level from 0.20 to 525 $\mu\text{Sv/h}$.

2. The increased contents of natural radionuclides in the ground water and in water of the open reservoirs and, respectively, increased radionuclide concentrations in drinking water and in fish.
3. Increased radon levels both on-site and in buildings and constructions.

The most important is the public exposure due to radon in dwellings, mainly, because the uranium mines are located in the known radon hazardous uranium bearing areas. Unsatisfactory situation exists in Ochyabrsky village and in Lermontov city. In Ochyabrsky village located on the territory of the largest Russian Priargun uranium combine, the elevated radon values in comparison with the established one have been registered (200 Bq/m^3) in 39 % of the residential area. The situation in Lermontov city is connected with the operation of the ore milling facility "Almaz". The aggravator in this case is the fact that: the rock dumps and ore waste were used for the purpose of the city roads bedding and of the baseline and coverage construction. On the base of research findings and directions of the FMBA of Russia, the decision was made on re-settlement of the residents in Krasnokamensk city. In Lermontov, where about 1000 rooms are radon-unhealthy; this problem is still to be solved.

THE CURRENT REGULATION

Important regulatory tasks during the environmental remediation of the uranium legacy sites are: full account of the requirements of the actual radiation safety regulation; development of the supervision and control functions; development of the insufficient documentation; review of the projects on the uranium legacy and discussion with the stakeholders.

Taking into account that medical support and regulation of the uranium mining facilities of the former USSR was the responsibility of the Third Chief Directorate of the Ministry of Health of the USSR (today FMBA of Russia), the accumulated potential and many results in radiation safety are already in use and will be used for the purpose of development of measures on the uranium legacy. In the ex-soviet republics in 1990 and following years and in Russia up to 2010, the regulatory rules were and are in use in the field of: design of the facilities; arrangement and operation of facilities for the uranium underground and heap leaching; operation of the uranium mines; closure, conservation and change of functions of the facilities for the radioactive ore mining and milling.

The following regulative documents (Rules) were and are in force in the republics of the Former Soviet Union and in Russia:

- Nuclear Facilities and Installations Designing, 1977.
- Arrangement and Operation of Facilities for Underground and Heap Leaching, 1983.
- Uranium Mines Operation, 1986.
- Closure, Conservation and Change of Functions of Radioactive Ore Mining and Milling Facilities, 1991.
- SanPiN 2.6.1.2800-10 "Hygienic requirements for limitation of the public exposure induced by the radiation sources".

Now, the new document is under development "Requirements for Design and operation of the uranium ore mining and milling facilities (SP UR-11) – Rules".

OUTLOOKS OF THE FUTURE REGULATION

The current Russian normative and legal basis of the regulation and its application practice has a number of problems relating to the uranium legacy, connected firstly with the environmental remediation.

To improve the regulatory system, the urgent tasks are:

- To introduce the existing exposure situation into the national laws and standards in compliance with the ICRP system.
- To develop criteria for site remediation and return, by stages, to uncontrolled uses. The similar criteria have been developed within the Russian-Norwegian cooperation for the purpose of remediation of the sites for temporary storage of SNF and RW.

- To consider possibilities and methods of optimization for the remediation strategies under development.

- To separate the special category - RW resulted from uranium ore mining and dressing.

The current Russian RW classification is based on the waste subdivision in terms of the specific activities. Having in mind the new RW-specific law, we receive the opportunity to separate some special category – RW originated from the uranium mining and milling. Introduction of such category can simplify significantly the situation with management of waste of uranium mining and milling processes. Such approach is implemented in many countries and approved by IAEA. The category of “RW originated from uranium mining and milling” is to be introduced as the legal acts and regulatory documents.

The recent ICRP recommendations provide the flexible approaches for solving of such tasks.

The FMBA of Russia recognizes the problems of radiation safety assurance related to the legacy of the former USSR in the uranium mining industry. Some part of the regulatory problems assumes to be solved within the EurAsEC inter-state target program «Reclamation of the territories of the EurAsEC member states affected by the uranium mining and milling facilities». Using the example of the uranium legacy sites in Kyrgyz and Tajikistan which could result in the tran-boundary disasters and require urgent reclamation, the experience will be gained to be used in other states as well. Harmonization of the national legislations and regulative documents on radiation safety assurance is envisaged.