FEDERAL ENVIRONMENTAL, INDUSTRIAL AND NUCLEAR SUPERVISION SERVICE OF RUSSIA
(ROSTECHNADZOR)

Contribution of Rostechnadzor in Implementing the State Nuclear Safety Policy

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International Conference on Effective Nuclear Regulatory Systems: Sustaining Improvements Globally

Vienna, 11-15 April 2016

Fundamentals of the State Policy in the Field of Nuclear and Radiation Safety of the Russian Federation up to 2025, approved on March 1, 2012 by the President of the Russian Federation

Objective - gradual reduction of risks related to man-induced impact on the public and the environment in the field of the uses of atomic energy, and prevention of emergencies and accidents in nuclear and radiation hazardous facilities

- Improvement of state safety regulation in atomic energy uses is one of the main areas of state nuclear safety policy

- State programs, including Federal Target Programs aimed at accomplishing tasks related to nuclear and radiation safety, are a key tool for the implementation of the Fundamentals of the State Nuclear Safety Policy of the Russian Federation

The first Federal Target Program for Nuclear and Radiation Safety for 2008 and up to 2015 was completed last year

Its main objective was comprehensive solution of problems related to nuclear and radiation safety in the Russian Federation, including the following:

- spent nuclear fuel and radwaste management
- decommissioning of nuclear and radiation hazardous facilities
- enhancement of systems needed for nuclear and radiation safety assurance and control

The main results of Federal Target Program (1)

- SNF long-term storage facilities with a total capacity of 30.9 thousand tones
- 23.8 thousand spent fuel assemblies were removed from NPPs and located for central storage
- The Techa Cascade was transferred into a safe state
- The closure of LRW open storage pools was completed; Karachai pool was closed
- Installations preventing LRW discharge into Mayak pools were constructed

The main results of the implementation of the Federal Target Program (2)

- Inventory of 270 nuclear and radiation hazardous facilities
- 188 nuclear and radiation hazardous facilities prepared for decommissioning
- 42 nuclear and radiation hazardous facilities liquidated
- 502 radioisotope thermoelectric generators put out of service and 446 radioisotope thermoelectric generators disposed of
- 1.5 million square meters of contaminated territories remediated
- Experience with decommissioning of large facilities
- 7 local and 25 regional subsystems under Unified State Automated Radiation Situation Monitoring System (USARSMS) established

The achieved results enabled to enhance the level of nuclear and radiation safety in the majority of nuclear legacy sites

The main results of the implementation of Rostechnadzor responsibilities whithin 2008-2015 Program

Activity: Scientific, information and analytical support in the field of safe management of spent nuclear fuel and radioactive waste

- Federal Codes and Regulations related to safety assurance in RW management at all stages up to the disposal

- problem-oriented informational system, supporting regulatory decisions during SNF transportation

The main results of the implementation of Rostechnadzor responsibilities whithin 2008-2015 Program

Activity: Scientific, information and analytical support to solve problems in the field of nuclear and radiation safety

- permanently updated information resource, containing data on accumulated RW storage/disposal facilities
- assessment of long-term safety of more than 300 RW storage facilities for further regulatory decisions
- assessment of maximum individual doses of public exposure under normal transportation conditions for different SNF schemes of RBMK-1000, VVER-1000, VVER-440, EGP-6 reactors and other nuclear research installations

The main results of the implementation of Rostechnadzor responsibilities whithin 2008-2015 Program

Activity: Justification of principles and development of recommendations for optimizing environment radiation monitoring regulation at nuclear facilities

- safety guide "Regulations for improving the accuracy of prognostic assessments of radiation characteristics of environmental contamination and radiation burden on personnel and public" (RB-053-10)
- safety guide "Recommendations on assuring safe reprocessing of repatriated products of irradiated fuel assembly to the supplier state" (RB-092-13)
- proposals on enhancement of radiation situation monitoring at nuclear facilities, including requirements for instrumentation of continuous monitoring of gas aerosol emissions of radioactive substances into the atmosphere for NPPs

The main results of the implementation of Rostechnadzor responsibilities whithin 2008-2015 Program

Activity: Development of methodology and creation of information computer support system for regulatory activities under normal operation of nuclear facilities and in case of accidents

- experimental assessments and development of recommendations for making ageing forecast of VVER non-replaceable equipment (in particular, reactor vessels) exposed to radiation
- system of informational support of Rostechnadzor Information & Analitical Center
- Verification of PSG-2/Serpent software, used for research activities and Keff alternative assessments in the framework of Rostechnadzor technical and scientific support

The main results of the implementation of Rostechnadzor responsibilities whithin 2008-2015 Program

Activity: Development of the assessment methodology of radiation safety status at radiation hazardous facilities related to historical and current activities

- further harmonization of radiation hazardous facility emergency preparedness issues of the state safety regulation system with IAEA requirements
- support of Rostechnadzor Information & Analitical Center operation in emergency response mode in case of accidents at NPPs
- experimental investigations of explosion risk of extraction agents and uranyl nitrate mixtures, as well as of fire/explosion risk of sorption systems during SNF reprocessing; recommendations for fire and explosion safety of NFC radiochemical production facilities

The main results of the implementation of Rostechnadzor responsibilities whithin 2008-2015 Program

Activity: Development of safety assessment methods for nuclear fuel cycle facilities

- System of safety assessment indicators for NFC facilities
- analysis of safety assurance related to transportation of SNF of VVER-440 and VVER-1000 reactors
- conditions for the occurrence of emergency situation, and recommendations for their elimination during thermo-radiation destruction of extraction mixtures in the process of SNF processing
- systematic analysis of the methods determining resistance of civil structures and NFC facilities important to safety, also for the purposes of service life extension
- procedures of express assessment of an emission source in case of an accident at a VVER-1000 or RBMK-1000 reactor unit, which are aimed at assessing potential radiation consequences in case of accident

The main results of the implementation of Rostechnadzor responsibilities whithin 2008-2015 Program

Activity: Development of methods of integrated analysis for safety assessment of nuclear and radiation hazardous facilities

- models of cores of VVER-1000 (B-338, B-187) reactor installations for Rostechnadzor IAC support for express analysis in case of accidents at nuclear facilities
- procedural guidelines for the assessment of the life-time of VVER NPP non-replaceable equipment affected by radiation and for the forecast of critical properties of reactor vessels
- recommendations for determining the permitted specific activity of radionuclides in steam generator water of VVER-440 or VVER-1000 NPPs during coolant leackage from the primary circuit into the secondary

The main results of the implementation of Rostechnadzor responsibilities whithin 2008-2015 Program

Activity: Creation of data base on the use of federal codes and standards and on the assessment of operational events at nuclear and radiation hazardous facilities for scientific analysis, development of criteria, principles and basic requirements to nuclear and radiation safety assurance

- analysis of the use of Federal Codes and regulations requirements; systematization and summary of received proposals and comments; clarification of proposals related to certain Federal Codes and regulations
- development and maintenance of a full-text data base of legal and regulatory technical documentation in nuclear and radiation safety
- the Plan of the enhancement of the system of Federal Codes and regulations in the field of atomic energy uses for 2014-2023 and the Concept of the enhancement of normative and legal regulation of safety and standardization in the field of atomic energy uses

The main results of the implementation of Rostechnadzor responsibilities whithin 2008-2015 Program

Activity: Creation of data base on the use of Federal Codes and Standards and on the assessment of operational events at nuclear and radiation hazardous facilities for scientific analysis, development of criteria, principles and basic requirements to nuclear and radiation safety assurance (continuation)

- analysis of the current legislation of the USA, France, Germany and other countries in nuclear and radiation safety assurance, as well as a comparative analysis of Russian regulations and IAEA recommendations, containing provisions on the accounting of external natural and man-induced impacts during NF siting, construction and operation
- justifications of and proposals for the enhancement of the Russian Federaion legislation in the field of atomic energy uses

The main results of the implementation of Rostechnadzor responsibilities whithin 2008-2015 Program

Activity: Improvement of informational and analytical support to specialists supplying them with data on nuclear and radiation safety status of nuclear facilities

- regulatory and procedural basis for implementation and application of probabilistic safety analysis
- procedural basis for drafting the list of BDBA to be accounted for in NPP design
- calculation analyses of severe accidents at NPPs
- computer data base of NPP equipment and pipeline defects
- calculated analyses of the probability of fracturing of Dn300 and Dn800 pipelines of the forced circulation coolant circuit of RBMK reactors, with the major defects selected for the analysis
- software package for the calculation of cyclic damage of NPP equipment and pipeline metal

Main goals of New Federal Target Program

Relocation and disposal of legacy SNF

Establishment of infrastructure to resolve nuclear legacy issues

Removal and disposal of accumulated RW from nuclear sites

Federal Target Program for Radiation and Nuclear Safety for 2016 to 2020 and up to 2030

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State customers/ stakeholders

Rosatom, Rostechnadzor, FMBA, Ministry for Industry and Trade, Ministry of Education

Results to be achieved under New Program

Activity	Achievements			
	Program-I (2008 – 2015)	Program (2016 – 2030) (summarized)		
		2016-2020	2021-2025	2026-2030
Commissioning of capacities for final RW disposal (thousands m3)	-*	28.2	183.2	223.7
SNF relocation for central storage (FAs)	25,203	25,344	59,904	82,944
SNF Reprocessing (MTHM)	-*	394.9	1,744.8	3,081.4
Decommissioning (units)	42	25	63	82
Clean-up of territories (thousands m2)	1,482	246.5	893.5	4,259
RW final disposal (thousands m3)	-*	22.7	72.5	176.3

Activities to be performed by Rostechnadzor within New Program

- Development of integrated analysis methods for nuclear and radiation safety of nuclear facilities
- Enhancement of policy fundamentals for safety regulation at nuclear legacy cities
- Development of methods to assess and forecast radiological impact (including emergency impact) of “nuclear legacy” cities, using capabilities of Rostechnadzor Information and Analytical Centre

Thank you for your attention!

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