Federal Environmental, Industrial and Nuclear Supervision
Service of Russia

Implementation of Lessons Learnt from the Fukushima-1 NPP Accident in Rostechnadzor's Regulatory Activity

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The 1st TRM Plus
For Information Exchange on Fukushima accident,
September 2-3, 2014, Tokyo, Japan

CONTENTS

- Upgrading of the Russian NPPs robustness against extreme external impacts of natural and man-induced origin
- Improvement of the efficiency of state safety regulation in the field of nuclear energy use
- Updating of the legal and regulatory framework in the field of nuclear energy use

Upgrading of the Russian NPPs robustness against extreme impacts of natural and man-induced origin

Post-Fukushima actions of Rostechnadzor and the State Corporation ROSATOM (1/4)

The emergency operations center of the RSPEE launched monitoring and forcasting of the accident aftermath within the border territory.

The SC ROSATOM established the Emergency Response Team to fulfill the following main tasks:

- collecting and analysis of information on the accident development at Fukushima-1 NPP;
- forecasting of the accident development and analysis of the accident potential consequences;
- coordination of work among the Crisis Center of the Rosenergoatom Concern OJSC, technical support centers (IBRAE and etc.) and Rostechnadzor.

Post-Fukushima actions of Rostechnadzor and the State Corporation ROSATOM (2/4)

March-April 2011

Inspections of the Russian NPPs in the following areas:

- robustness against extreme external impacts of natural and man-induced origin;
- preparedness for management of BDBAs involving NPP blackout;
- preparedness for management of BDBAs involving loss of the ultimate heat sink;
- preparedness for management of severe accidents at NPPs.

Post-Fukushima actions of Rostechnadzor and the State Corporation ROSATOM (3/4)

2011

June	Requirements to the scope and contents of the additional analysis of robustness of the Russian NPPs in operation (on the basis of WENRA approach).
June-September	Submission of the reports on the results of the additional analysis of robustness of the Russian NPPs in operation against extreme external impacts (stress tests for NPPs in operation) to Rostechnadzor by the utility.
End of the year	Finalization of review and discussion of the results of stress tests.

Post-Fukushima actions of Rostechnadzor and the State Corporation ROSATOM (4/4)

November 2012

- Review of the stress tests for the high-power nuclear research installations.
  Discussion of the results by Rostechnadzor with the representatives of utility.

April 2013

- Stress tests for the newly constructed NPPs - completed and reviewed.

Stress tests for NPPs in operation. Main results

- The Russian NPPs comply with the requirements of the current regulatory documents in the field of nuclear energy use;

- The short-term, mid-term and long-term actions aimed to upgrade robustness of the Russian NPPs were recognized by Rostechnadzor as justified; implementation thereof to be taken under control of Rostechnadzor;

- Rostechnadzor considered it expedient to update the Russian regulatory framework in the field of nuclear energy use with the account of lessons learnt from the Fukushima-1 NPP accident.

Implementation of actions on upgrading of the robustness of the Russian NPPs against extreme external impacts

Two directions of the activity:

- actions aimed at prevention and mitigate consequences of BDBAs (including severe accidents):
  - Short-term (completed)
  - Mid-term (2014-2016)
  - Long-term (2016-2020)
- actions aimed at improvement emergency response and planning:
  - Short-term (completed)
  - Mid-term (2014-2016)
  - Long-term (2016-2020)

Actions aimed at upgrading of the robustness of the Russian NPPs against extreme external impacts of natural and man-induced origin (1/2)

- Installation of additional emergency equipment for emergency power supply and heat removal to ultimate heat sink at the NPPs;
- upgrading of localizing systems reliability;
- installation of hydrogen detection system and hydrogen recombiners to containments of reactor installations;
- installation of emergency gas scrubbers to the containments of reactors;
- installation of seismic protection systems;

Actions aimed at upgrading of the robustness of the Russian NPPs against extreme external impacts of natural and man-induced origin (2/2)

- NPP units equipping with emergency I&C designed for operation under BDBA conditions;
- introduction of the emergency and post-accident sampling;
- upgrading of MCR and SCR robustness;
- enhancement of seismic safety;
- additional safety assessments and analyses based on the results of stress tests.

Actions aimed to improve emergency response and planning

- establishment of the unified radio communication system using the standard “TETRA” on the platform of Motorola IP Dimetra Compact for all Russian NPPs;
- introduction of the mobile control posts for emergency management staff and for the leader of the NPP Emergency Assistance Group (OPAS Group);
- arrangement of redundant digital communication channels to link NPPs and the Crisis Center of the Rosenergoatom Concern OJSC;
- installation of reliable and uninterrupted power supply systems for communication centers.

Actions taken to upgrade the robustness of the Russian NPPs against extreme external impacts of natural and man-induced origin

- additional research and analysis of documentation on seismic microzonning was carried out for all NPPs;
- all NPPs were supplied with the mobile emergency equipment (mobile diesel-generators, motor pumps, mobile pump units);
- reactor seismic protection systems were commissioned at Balakovo NPP, Kalinin NPP, Novovoronezh NPP and Rostov NPP, as well as at Smolensk NPP Unit 2 and Beloyarsk NPP Unit 3;
- technical requirements were developed for the emergency I&C designed for operation under BDBA conditions.

Actions taken to improve emergency response and planning

- WANO Regional Crisis Centre for VVER NPPs was established;
- the project on the unified radio communication system using the standard “TETRA” was developed and implemented at Kalinin NPP and Beloyarsk NPP;
- mobile control posts for emergency management staff and for the leader of OPAS Group were introduced at Balakovo NPP, Beloyarsk NPP, Rostov NPP and Kalinin NPP;
- redundant digital communication channels were arranged to link Balakovo NPP, Novovoronezh NPP, Rostov NPP and the Crisis Center of the Rosenergoatom Concern OJSC;
- Severe Accident Management Guide was developed for Kalinin NPP; Balakovo NPP Unit 4 and Rostov NPP Unit 1;
- schedules of emergency response exercises were extended by the scenario of a plant-wide BDBA with concurrent involvement of all available units of mobile emergency equipment (diesel-generators, diesel-pumps, motor pumps).

Improvement of the efficiency of state safety regulation in the field of nuclear energy use

Improvement of the efficiency of state safety regulation in the field of nuclear energy use (1/2)

Modernization of the Information and Analytical Centre (IAC) of Rostechnadzor:

- renovation of the IAC premises, replacement of equipment and communication channels;
- installation of new software (domestic and foreign);
- development of fast running codes for express assessment.

Improvement of the efficiency of state safety regulation in the field of nuclear energy use (2/2)

Regular exercises to drill emergency response actions under the conditions of a NPP accident are conducted on the basis of the IAC of Rostechnadzor with the participation of the operating organization and scientific and technical support organizations.

Updating of the legal and regulatory framework with the account of lessons learnt from the Fukushima-1 NPP accident

Federal Law No. 347-FZ dd. November 30, 2011
"On Amendments to Individual Legislative Acts of the RF for the Purpose of Safety Regulation in the Field of Nuclear Energy Use"

amended the following legislative acts of the Russian Federation

- Federal Law No.170-FZ dd. 21.11.1995 "On the Use of Atomic Energy";
- Federal Law No.116-FZ dd. 21.07.1997 "On Industrial Safety of Hazardous Production Facilities";
- Federal Law No.117-FZ dd. 21.07.1997 "On the Safety of Hydraulic Engineering Structures";
- Code of Laws of the Russian Federation on Administrative Violations;
- Federal Law No.184-FZ dd. 27.12.2002 "On Technical Regulation".

Major amendments to the Federal Law "On the Use of Atomic Energy" (1/2)

- The status of "Safety Guides" issued by the Regulatory Authority was legislated;
- Responsibility for violation of legislation in the field nuclear energy use was strengthened;
- Types of activities in the field nuclear energy use subject to licensing were established at a legal level;
- The capability to obtain the combined license for carrying out of several types of activities in relation to one or several facilities was established;

Major amendments to the Federal Law "On the Use of Atomic Energy" (2/2)

- Requirements to periodical safety assessment, including the requirements to frequency of such assessments, were specified;
- The Institution of "Scientific and Technical Support Organization" for the authorized Safety Regulatory Authority was established;
- The requirement to adopt the graded approach to safety regulation depending on a potential facility (activity) hazard was established.

RF Government Decrees (1/2)

With a view to amend to the Federal Law "On the Use of Atomic Energy" the following Decrees of the RF Government were enforced:

- "Provisions on Licensing in the Field of Nuclear Energy Use" (the RF Government Decree No.280 dd. 29.03.2013);
- "Provisions on the Federal State Supervision in the Field of Nuclear Energy Use" (the RF Government Decree No.1044 dd. 15.10.2009);
- "Provisions on the Regime of Permanent State Supervision at Nuclear Facilities" (the RF Government Decree No.373 dd. 23.04.2012);
- "List of Nuclear Facilities Subject to Permanent State Supervision" (the RF Government Executive Order No.610-r dd. 23.04.2012);
- "On Specific Features of Technical Regulation in the Field of Nuclear Energy Use" (the RF Government Decree No.362 dd. 23.04.2013);
- "On Specifics of Standardization in the Field of Nuclear Energy Use" (the RF Government Decree No.173 dd. 01.03.2013);

RF Government Decrees (2/2)

- "On Development and Approval of Federal Regulations in the Field of Nuclear Energy Use" (the RF Government Decree No.1265 dd. 06.12.2012);
- "On Legal Entity Assignment to a TSO for the Authorized State Safety Regulatory Authority in the Field of Nuclear Energy Use" (the RF Government Decree No.387 dd. 30.04.2013).

Major amendments to legal and regulatory framework of Rostechnadzor

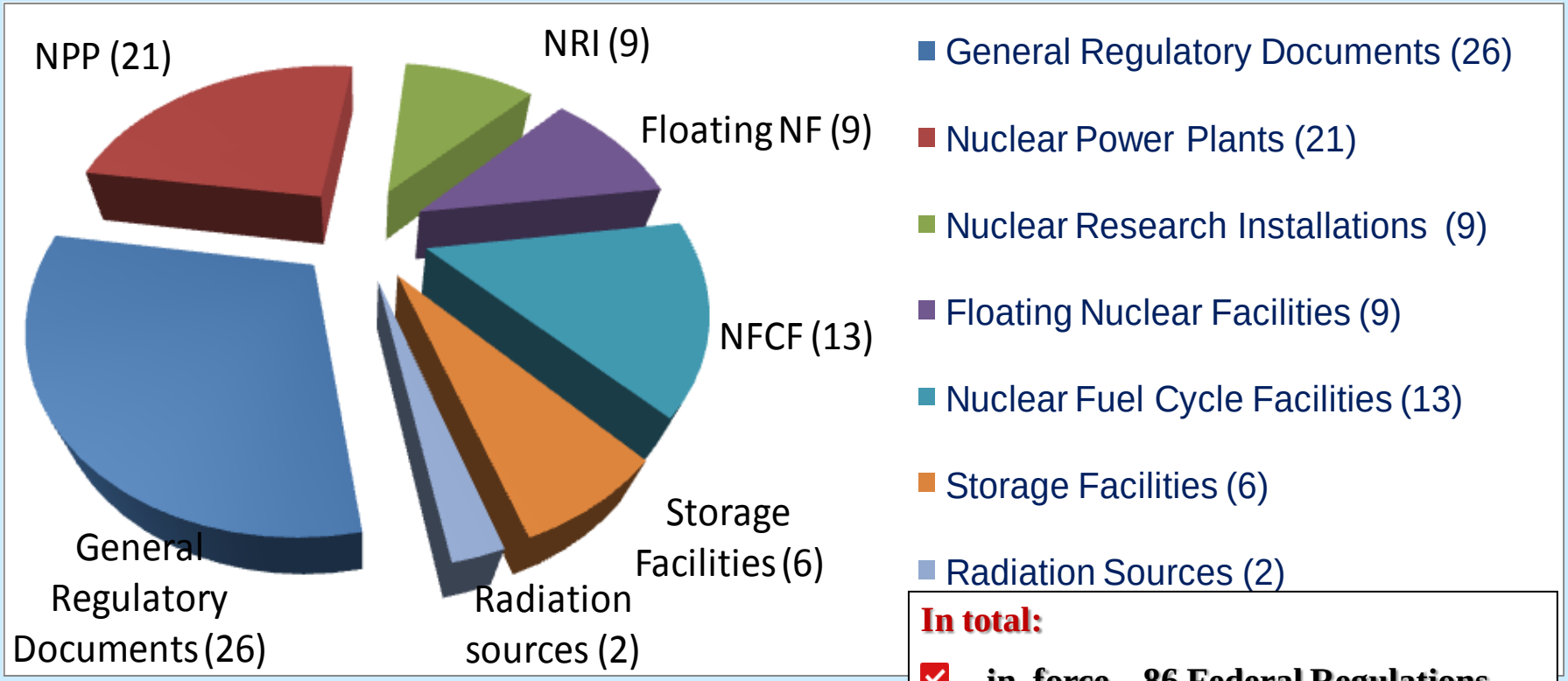
The following Rostechnadzor's Acts were approved:

- Administrative Regulation "On State Supervision in the Field of Nuclear Energy Use".
- Order of Rostechnadzor "On Submission of the Results of Periodic Safety Assessments of Nuclear Facilities and Storages by Operating Organizations of Nuclear Facilities".

Drafts of the following Rostechnadzor's Acts were developed:

- Draft Order of Rostechnadzor "On the Procedure for Safety Review (Safety Analysis Review) of Nuclear Facilities and (or) Activities in the Field of Nuclear Energy Use".
- Draft Order of Rostechnadzor "On the Procedure for Development and Approval of Federal Regulations in the Field of Nuclear Energy Use".

Federal Regulations in the Field of Nuclear Energy Use



In total:

- **in force – 86 Federal Regulations (FR)**
- **under development – 14 new FR**
- **under revision – 29 FR**

Updating of the following Federal Regulations in the field of nuclear energy use is carried out to improve the system of Federal Regulations (1/2):

- NP-001-97 (OPB-88/97) “General Safety Provisions for Nuclear Power Plants”;
- NP-005-98 “Provisions on the Procedure for Notification about Emergencies, Early Transmission of Information and Arrangement of Urgent Assistance to the Nuclear Plant in Case of Radiological Hazards”;
- NP-064-05 “Accounting of External Natural and Man-Induced Impacts on Nuclear Facilities”;
- NP-032-01 “NPP Siting. Fundamental Safety Criteria and Requirements”;

Updating of the following Federal Regulations in the field of nuclear energy use is carried out to improve the system of Federal Regulations (2/2):

- NP-031-01 “Design Standards for Aseismic NPPs”;
- NP-006-98 “Requirements to the Content of Safety Analysis Report for VVER-Type NPPs”.

New Safety Guides are under development:

- “Recommendations on the Development of BDBA Management Guide for NPPs” (both for BDBA and Severe Accidents);
- “Recommendations on BDBA Emergency Monitoring Systems for VVER-Type NPPs”.

Revision of the Russian regulatory framework is carried out with the involvement of leading specialists of the RF nuclear industry.

CONCLUSION

The Russian Federation carries out a well-planned activity on accounting of lessons learnt from the Fukushima-1 NPP accident:

- Implementation of the Action Programme aimed at upgrading the robustness of the Russian NPPs against extreme external impacts and to improve preparedness for accident management is in progress;
- Regulatory framework is being updated;
- Actions are taken to improve the regulatory authority preparedness to functioning in conditions of accidents.

Thank you for attention!