Impact of the New System of the Radiological Protection in Russia

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2. Impact of the new ICRP system on Russia
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Part 1

Regulation of radiation protection in Russia

- regulatory authorities
- legislative acts
- regulative documents
- challenges in radiation protection
State regulation of radiological protection

GOVERNMENT
Establishes Legislative grounds, Is responsible for Safety and protection regulation

OPERATORS
Responsible for Protection Assurance of the personnel and population

REGULATORY BODIES
Responsible for Support of full Governmental Supervision and control

Rostechnadzor technical regulation
Rospotrebnadzor social regulation
FMBA - regulation of nuclear energy using

Bodies for safety and protection regulation are valid within their legislative field

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Facilities under Service of FMBA

- Facilities of fuel cycle
- Agency of shipbuilding
- NPP
- Facilities of nuclear weapons complex
- Nuclear weapons test sites

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Normative Basis of Regulation

RF Laws, Orders of the RF President, RF Government Directives

Radiation Safety Standards NRB-99

Main Sanitary Rules for Radiation Safety and Protection of the Personnel and Population OSPORB-99

Sanitary Rules for Radioactive Waste Management SPORO-2002

Hygienic Requirements for Design of Facilities and Installations of Nuclear Industry SPP PUAP-03

Nuclear Power Plants

Nuclear Fuel Cycle

Assembling Enterprises

RW

Stock and Storage Facilities

Requirements, Recommendations, Guidelines

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Status of radiation safety

Average annual dose of radiation exposure ≤ 2 mSv

Chronic occupational diseases morbidity rates are lower than 1.8 - 2.0 cases per 10 000 workers
Challenges in radiation protection

4.3 million cubic meters of liquid RW
36,000 tons of solid RW
574,000 tons of non-radioactive wastes

Main goals for today

- management of nuclear legacy
- regulation of environmental remediation
- development of nuclear power generation complex

Problems

- Storage of non-isolated liquid RW
- Accumulation of RW in storage tanks
- Accumulation of SNF and RW: NPP sites, nuclear submarines
Part 2

Impact of the new ICRP system on development of radiation protection system in Russia

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New version Russian BSS
September 1, 2009

- Up-to-date nominal risk coefficients
- Limitation of natural exposure: finished production manufactured on the base of construction raw materials, mineral raw materials and agro-chemicals
- Assessment of drinking water radiation safety
- Limitation on medical exposure: criterion on discharge of the patient from the hospital after treatment with radiation sources, etc.
Main actual task in Russia (before new BSS issuing)

To investigate how new ICRP conception of Publication 103 can be effectively and successfully applied in the regulation practice

- Three types of exposure situation
- Dose constraint and reference levels for each situation
- Representative individual
- Non-human species and environment
- Weighting factors
- Selective use of collective dose value, etc.

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Radical review of current Russian system is not assumed

Arrangement of the Radiological Protection System

Evolution of the individual dose limits in Russia

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Evolutional amendments

- Application of new conceptions and terms in the Russian system must be weighted and one should avoid their formal application.

- When improving regulative documents, one should analyze carefully national experience and take into account the up-to-date social and economic circumstances.
Part 3

Examples of implementation

Optimization in the course of the Russian NPP operation

Optimization and regulation of the Russian nuclear legacy

dose constraint

reference level

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Optimization Process in NPPs

**Planned Situations**

**EXPOSURE OF THE PUBLIC**

ICRP’s Dose Limit: 1 mSv

Constraint* 0.25 mSv

Authorized Level

Optimisation

Discharge level

Day-to-day optimisation

10 µSv

*Based on past experience or generic optimisation

Public: 0.004 – 0.08 µSv a⁻¹
Optimization and regulation of the Russian nuclear legacy

<table>
<thead>
<tr>
<th>Source</th>
<th>Time period</th>
<th>Significant Nuclides</th>
<th>Mean dose (mGy, mSv)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global fallout</td>
<td>1950 - 2020</td>
<td>$^{137}\text{Cs}, ^{90}\text{Sr}, ^{131}\text{I},$</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$^{14}\text{C}, ^{3}\text{H}$</td>
<td></td>
</tr>
<tr>
<td>Techa River, Russia</td>
<td>1949 - 2020</td>
<td>$^{90}\text{Sr}, ^{89}\text{Sr}, ^{137}\text{Cs}$</td>
<td>50-2000</td>
</tr>
<tr>
<td>Chernobyl, USSR</td>
<td>1986-2056</td>
<td>$^{131}\text{I}, ^{134}\text{Cs}, ^{137}\text{Cs}, ^{90}\text{Sr}$</td>
<td>Effective – up to 500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Thyroid–up $10\cdot10^3$</td>
</tr>
</tbody>
</table>

- There is no comprehensive guidance for the existing exposure situation
- The optimized protective and remedial measures are recommended at annual dose over the range 1 - 20 mSv
- At dose >20 mSv, residence at the territory is forbidden
Regulatory Trends

Practices and Intervention in ICRP 60, 82

- Limit
- Constraints
- Optimisation

IAEA
International Atomic Energy Agency

WS-R-3 WS-G-3.1

- criterion of non-intervention 10 mSv

Existing Situations in ICRP 103

REMEDIATION
100 mSv
10 mSv
Reference level * from 1 to 20 mSv
Clean-up Level

* Based on past experience or generic optimisation

- reference level from 1 to 20 mSv

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Conclusions & Recommendations

1. Not stricter regulations but new concept
2. New edition Russian radiation safety standards
3. Publication 103 was being translated into Russia
4. Good optimization application at NPPs
5. Actuality regulation of nuclear legacy

- Harmony with the international system
- Development document on environmental protection
- Unification of current norms and rules all over the world
- International connections on studying of good experience in the radiation protection

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