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International Uranium  
Enrichment Center

# RUSSIA'S CURRENT AND FUTURE NUCLEAR BUSINESS STRATEGIES & NUCLEAR EXPORT POLICIES

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## TODAY ROSATOM SHARES:

16% of the electricity generation in Russia;  
8% of the world uranium mining;  
40% of the world uranium enrichment;

17% of the world nuclear fuel fabrication;  
13% of the world nuclear and energy machinery building;  
16 % of the world NPP's construction and engineering.

## TODAY ROSATOM OPERATES:

10 NPP with 33 reactors having total outcome 24,2 GWt (RosEnergoAtom);

One of the top-five in the world uranium mining with 5,2 million tons of uranium production per year («ARMZ» holding);

4 enrichment facilities with the modern gas-centrifuge technology and machinery building plants that produce fuel assemblies for 76 nuclear reactors PWR, BWR, VVER, BN reactors, RBMK, research reactors, EGP-6 reactors in 14 countries in the world («TVEL Fuel Corporation»);

«Atomenergomash» holding that merges more than 40 machinery building enterprises in Russia, Czech, Hungary, Kazakhstan, Ukraine, Morocco. The equipment produced is used at 13% of world NPPs in 20 countries;

«Atomstroyexport» that has 5 NPPs under the construction outside Russia (India - 2, Bulgaria-2 and Iran-1) + 2 reactors under the construction at Baltyjskaya NPP in Russia.

7 reactors under the construction in Russia plus 6 to be started in 2013-2014 (3 design –research enterprises together with two other contractors besides Atomstroyexport) + 2 reactors of floating NPP.

## 1. The designing and construction in 10- year period of the 4th –generation reactor with natural security - the project «Proryv» (Breakthrough):

- The main challenge of the project – to perform the closed nuclear fuel cycle station -operating at Beloyarskaya NPP with spent fuel reprocessing and fabrication;
- Main type of reactor: BN-1200 (fast breeder) with sodium or lead coolant;
- Type of fuel: dense nitride «U-Pt» fuel;
- Commercial operation: starting from 2020;
- Early Field Trial: 2017 (fuel testing on BN -600);
- Financing: \$ 3.3 billion (federal financing and funds of ROSATOM);

## 2. NPP construction outside Russia with technical improvements :

- Total market share in NPP construction \$70 billion by 2022;
- New type of business in NPP construction «BOO» = Built + Own + Operate;
- Confirmed 19 nuclear reactors of Russian design:
  - Turkey 4 units (BOO), VVER-1200
  - Belorussia 2 units , VVER -1200
  - Vietnam 2 units, VVER-1000
  - India 4 units, VVER -1000
  - China 2 units, VVER-1000
  - Bangladesh 1 unit, VVER-1000
  - Ukraine 2 units, VVER-1000

Main policy in the field of spent nuclear fuel management is recycling for the purposes of ecologically-safe maintenance with the products caused by nuclear decay and return to the nuclear fuel cycle of the regenerated materials.

## Current situation:

1. Spent fuel from VVER-440 and BN-600 after cooling reprocesses at MAYAK (RT-1).
2. Spent fuel from VVER 1000 after cooling is stored at GHK combine in «wet storage» and «dry storage» put in operation in 2010.
3. Spent fuel from RBMK-1000 is stored at the NPP's cooling ponds.
4. Spent fuel from EGP-6 is stored at the cooling ponds.

## Future concept:

1. Spent fuel from VVER-440 and BN-600 after cooling reprocesses at MAYAK (RT-1) as is.
2. Spent fuel from VVER 1000 stored at GHK combine in “wet storage” to be transferred to the «dry storage» and later on to be finally reprocessed at GHK (RT-2) to be constructed. Full estimated capacity to be reached by 2020.
3. Spent fuel from RBMK-1000 stored at NPP's cooling ponds to be stored at the GHK combine in «dry storage» and later on to be finally reprocessed at GHK (RT-2) to be constructed.
4. Spent fuel from EGP-6 stored at the cooling ponds – no ideas (is going to be still stored).

# INTERNATIONAL LAW AND RUSSIAN EXPORT CONTROL

Russian export control system is based on rules of international law including:

- NPT

Art.1: Each NWS - Party to the Treaty undertakes not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices ...; and not in any way to assist, encourage, or induce any non-nuclear weapon State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices,

Art 3.2: Each State Party to the Treaty undertakes not to provide: (a) source or special fissionable material, or (b) equipment or material especially designed or prepared for the processing, use or production of special fissionable material, to any non-nuclear-weapon State for peaceful purposes, unless the source or special fissionable material shall be subject to the safeguards required by this article.

- Resolutions of United Nations Security Council (i.e. resolution 1540 dated April 28, 2004);
- Nuclear Suppliers Group Guidelines (INFCIRC/254/Rev.9, Statement on Civil Nuclear Cooperation with India)
- G-8 decisions;
- etc.

# REQUIREMENTS FOR NUCLEAR EXPORT TO NON-NUCLEAR WEAPON STATES

1. Contract with foreign party for transfer of nuclear materials should have a specific provision regarding obligation of such foreign party not to use these materials for construction of any weapon of mass destruction and its delivery vehicles.
2. Recipient country (except India) should have an actual agreement with IAEA regarding safeguards applying to all its peaceful nuclear activities. Export to India is permitted only if controlled goods will be used on nuclear installations which are subject to IAEA safeguards.
3. To obtain export license for export of any controlled goods Russian exporter should present to FSTEC assurances from authorized governmental agencies of the recipient countries that the above goods or goods produced on their basis:
  - shall not be used for production of nuclear weapons and other nuclear explosive devices or for any military purpose;
  - shall be subject to IAEA safeguards;
  - shall be physically protected in accordance with the IAEA requirements;
  - shall be re-exported or transferred beyond the jurisdiction of the recipient state to any other country only on the above conditions.

All such assurances can be presented to FSTEC on spot basis or by reference to corresponding provisions of international agreement between Russia and recipient country.

# REQUIREMENTS FOR NUCLEAR EXPORT TO NON-NUCLEAR WEAPON STATES

Additionally, the authorized governmental agency of the recipient country should present assurances that without written approval of Rosatom and FSTEC:

- equipment for chemical reprocessing of spent fuel, isotopic enrichment of uranium, production of heavy water, their main components and goods produced on their basis, as well as uranium with assay of 20% or higher, plutonium and heavy water shall not be subsequently transferred to other countries;
- transferred equipment and technologies for isotopic enrichment of uranium as well as any other equipment based on such technology shall not be used for production of uranium with assay of 20% or more.

Nuclear export to the countries not having actual agreements with IAEA regarding safeguards applying to all their nuclear activities can be effected subject to:

- specific governmental decree;
- compliance with international obligations of the Russian Federation;
- assurances from the government of the recipient state that controlled goods will not be used in a way that might lead to construction of nuclear explosive device;
- supplied goods will be used exclusively for safe operation of existing nuclear installations, which should be subject to IAEA safeguards.

All such assurances can be presented to FSTEC on spot basis or by reference to corresponding provisions of international agreement between Russia and recipient country.



# ADDITIONAL REQUIREMENTS FOR EXPORT OF EQUIPMENT FOR CHEMICAL REPROCESSING OF SPENT FUEL AND ISOTOPIC ENRICHMENT OF URANIUM

Export from the Russian Federation of equipment for isotopic enrichment of uranium and chemical reprocessing of spent fuel as well as other connected equipment and technologies in any non-nuclear weapon state can be effected only if receiving state complies with all following requirements:

- receiving state is a member to NPT and fully complies with its obligations under that treaty;
- additional protocol to the agreement with IAEA on safeguards is executed and enter into force or the state is applying regional agreement approved by IAEA in order to ensure that its nuclear activities have peaceful goals;
- receiving state does not infringe its obligations under the agreement with IAEA on safeguards reflected in official documents of IAEA or previous investigations of IAEA regarding such infringements are eliminated;
- receiving state voluntarily complies with Guidelines of Nuclear Suppliers Group and presented to United Nations Security Council in accordance with its resolution 1540 dated April 28, 2004 report on application of due export control procedures;
- receiving state obliged to comply with IAEA standards of nuclear safety and other generally recognized principles and rules of international law in this field;



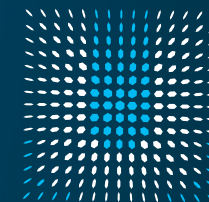
# ADDITIONAL REQUIREMENTS FOR EXPORT OF EQUIPMENT FOR CHEMICAL REPROCESSING OF SPENT FUEL AND ISOTOPIC ENRICHMENT OF URANIUM

- receiving state with regard to equipment and technologies to be exported from Russia:
  - presents assurances that such equipment and technologies as well as other equipment incorporating such equipment or based on such technologies will not be copied or modified;
  - gives the right to the Russian Federation to inspect and control the use of equipment and technologies in the receiving state with respect to safety and safeguards.

Information regarding equipment for isotopic enrichment of uranium can be transferred to non-nuclear weapon states in the minimum amount necessary for supervision or for their safe installation and maintenance without transferring information on key elements of technologies connected with such equipment.



Thank you for  
attention!



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