FSUE ATOMFLOT provides the following services:

- Ice pilotage of vessels on the Northern Sea Route (NSR) and to the freezing ports of Russia;
- Common and special technical maintenance and repair works of the atomic fleet;
- Safe Handling of nuclear materials and radioactive wastes.
FSUE ATOMFLOT operates the following vessels:

- Four atomic icebreakers with two nuclear reactors power plant 75 thousand horse power each: ib Rossiya, Sovetskiy Soyuz, Yamal, 50 Let Pobedy
- Two shallow-draught icebreakers – Taimyr and Vaygach with one nuclear reactor power plant 50 thousand horse power each;
- Atomic lighter and container carrier Sevmorput with a nuclear reactor power plant of 40 thousand horse power;
- Technological maintenance fleet: mv Rossita for transporting solid SNF and RM, two floating technical bases mv Imandra and Lotta, mv Serebryanka for keeping and transporting RM and containers with SNF, dosimetric control vessel Rosta-1
- First atomic icebreaker Lenin is converted into Arctic Exhibition Centre and is berthed at Murmansk Public Port. Atomic Industry information centre is functioning onboard;
- Two atomic icebreakers – Arktika and Sibir and two floating technical bases are in lay-up.
RTP ATOMFLOT in the early 90-s
In 1990-s ATOMFLOT was actively involved in the programs of USSR nuclear legacy decommissioning with main focus on SNF transportation from decommissioned atomic submarines and SNF accumulated in the North-West region. FTB Lotta and Imandra took part in these projects.
From 1995 till March 2012 through FSUE ATOMFLOT to FSUE Mayak the following amounts were transported:

- 65 trains with spent nuclear fuel;
- 733 containers TUK-18 with SNF (among them 25 from field branches of SevRAO);
- Reactors of 13 decommissioned atomic submarines were discharged (26 reactors in total);
- 12 containers TUK-19 with SNF from research reactor were transported from Norilsk to FSUE Mayak;
- 56 containers with SNF from research reactors in Hungary, Poland and Serbia were transhipped and sent to FSUE Mayak in 2008-2010.
Follow-up

- In 2005 the Plan to Bring the Enterprise’s Facilities Used for Handling SNF and RM to Safe State was adopted and used as a basis for a complex of measures in FPP Provision of Nuclear and Radiation Safety in 2008 and till 2015 as well as several projects of international cooperation.
International Cooperation in the sphere of SNF and RM handling started in the middle of 90-s.

One of the first projects to be realized at the Enterprise was the Modernization Project of LRW Reprocessing Plant named “Murmansk Initiative – RF”. The project was co-financed by Norway and USA. The total finance was about 6 000 000 USD and about 1 000 000 Russian roubles. Unfortunately due to low quality of design decision and organization problems the project was not completed.

According to the order of Minatom of Russia the Project of SNF Consolidating Facility Construction was completed at FSUE ATOMFLOT as part of military and ecological cooperation in the Arctic region (AMEC 1-1.1). Purpose of the project was to provide temporary transit SNF container storage before transportation to reprocessing facility. The project was financed by Norway and USA for the total sum of 1 000 000 USD. Construction of Consolidating Facility made it possible to divide maritime and railroad parts of SNF transportation in order to increase shipping capacity of SNF transshipment post at FSUE ATOMFLOT. At present the facility is actively used for the purpose of dispatching SNF from Andreeva bay and Gremikha for reprocessing.
SNF Consolidating Facility
In order to monitor works carried out at the SNF consolidating facility and to monitor flush and emission of radioactive substances while reprocessing LRW the automated system of radiation monitoring of LRW was installed in 2002-2004 in the frame of the project AMEC 1-5.1. Norwegian software complex Picasso is the core of the system. The project was financed by Norway and USA in the sum of 450 000 USD.
A series of projects to provide physical protection of nuclear facilities and the area of the enterprise were realized in 1995-2005.

- Physical Protection Systems were installed at the enterprise’s perimeter, ftb Imandra, Lotta, acc Sevmorput, atomic icebreakers Sovetskiy Soyuz, Arktika and others. These projects were financed by USA, Great Britain, Norway and Sweden.
In 2003 in order to increase the safety of nuclear materials handling and SNF discharge from ftb Lotta a decision was adopted to establish a facility of long-term unreprocessable SNF storage. This project was agreed with the Ministry of Transportation of Russia and it was offered to establish a regional NSF handling ground based at the constructed repository. Construction of unreprocessable SNF repository was funded by the Ministry of Trade and Industry of Great Britain as part of the intergovernmental agreement of cooperation in the field of peaceful atom energy use.
The Scheme of SNF Handling Complex at FSUE ATOMFLOT (Nuclear Island)

- Repository of Solidified SNF
- SNF Container Repository
- Solid Wastes Repository
- Unreprocessable SNF
- FTB Lotta
- Facility 39 Tank Facility
- Repair Workshop for Contaminated Equipment
- Repair Workshop for Clean Equipment from IB and FTB
Follow-up

- The complex will unite all facilities used to handle SNF and RM into a single one which will be provided with additional physical protection system and some elements of this complex will be developed to meet modern safety requirements in the field of atomic energy use.
Follow-up

- Install new portal crane at berth #5 with lifting capacity of 60-100 tons
- Conduct dredging at berth #5
- Repair decontamination area
- Reconstruct SRW combustion plant
- Fulfill recommendations of expert committee for installation of LRW purification plant
- Design and install at the conserved areas of Building #5:
  - Transport containers loading post
  - Spent fuel elements facility to reduce number of trains
Risk Analysis for FSUE ATOMFLOT part in SNF transportation from North-West Region

THE RISKS ARE:

1. Only 100 lifting capacity crane KONE can be used for SNF transport operations, but it is constantly used in ship repair technological process. The operational resource of the crane ran out in 2002, spare parts and accessories supply is exhausted, Rostechnadzor demands modernization in order to meet new requirements (the operation permission is issued for 1 year with compulsory survey and compensatory actions, the permission is valid till a new 100 tons crane is commissioned).

2. The network used to deliver SNF from ftb Lotta to the consolidating facility is very long.

3. Ftb Lotta accepts unreprocessable fuel that leads to frequent voyages and running out of vessel’s resource.

4. These operations can be done at berths # 3 and 4 only which are also used in atomic icebreakers repair work.

5. The depth at berth 5 is not enough for vessel with radioactive materials berthing. Dredging will allow to reduce SNF transportation chain inside the enterprise.
In order to realize the general concept of establishing Regional SNF Handling Post and to bring the matter of SNF handling at FSUE ATOMFLOT to safety standards a big volume of work financed by Russian Federation and Foreign Partners is done by 2012.

- Russian Federation provided the total funds of 1 192 mln. roubles.
- Technical Aid funds total 348 mln. USD.
The Works Financed by Russian Federation

1. Construction of special portal crane with l.c. of 100 t for the operations with RM. Total cost of works including design and engineering is 282 mln. Roubles.

2. Reconstruction of Berth #5. Total cost is 65 mln. roubles.
Follow-up

Construction of shore loading facility for SNF.
Total cost is 276 mln. roubles.
Follow-up

Works aimed at changing the SRW storage conditions and preparation for their burial.
Total finance by the present moment is 230 mln. roubles.
Modernization of production line used to handle combustible SRW. Finance total is 132 mln. roubles.
Follow-up

6 Modernization of Radiation Control System
Total finance 7 mln. roubles.

7 Repair of crane rails at 3-5 berths.
Total cost of work is about 25 mln. roubles.

8 Decommission of radiation hazardous objects.
Total finance is 1 367,1 mln. roubles.

The project draft of decommissioning ftb Volodarskiy and Lotta, the concept of atomic vessels and maintenance fleet decommissioning are designed in 2009-2011.
They are planned to be fulfilled in 2012.
Total finance till 2012 is 64,5 mln. roubles.

FTB Lepse decommission project is financed by both Russian Federation and EBRD.
Till 2012 total finance by Russian Federation is 110,6 mln. roubles.

Since the start of FPP “Provision of Nuclear and Radiation Safety in 2008 and till 2015” from 2008 till 2012 the total finance of works aimed at provision of safety of SNF and RM handling and USSR nuclear legacy decommissioning in the North-West area of Russia is about 1 192 mln. roubles for FSUE ATOMFLOT facilities and enterprises of Murmansk region.
Follow-up

Modernization of mv Serebryanka

TOTAL FINANCE IS 40 MLN. Roubles
Works financed through international technical aid

1. Project of SNF consolidating facility construction (AMEC 1-1.1)
   Total finance is 1.050 mln. USD.

2. Project of construction of automated radiation monitoring system for SNF and LRW reprocessing facility.
   Project is financed by Norway and USA in total 452 000 USD.
Follow-up

Construction of container-type SNF repository.
Total finance is 19 mln. £.
Follow-up

4. First stage of integrated FSUE ATOMFLOT physical protection system assembly (construction of guard house, local inner area, integration of this system into FSUE ATOMFLOT general physical protection system)
   Total finance is 2.9 mln. £

5. Physical protection system installation on floating objects of FSUE ATOMFLOT
   Total finance planned by US Government is 4 mln. USD.

6. Assembly of special portal crane l.c. 100 tons for the purpose of radioactive materials transhipment
   Finance is planned in total 1 mln. €.
Follow-up

International project of FTB Lepse decommissioning
Design and engineering total cost is 1,5 mln. €.
Total funds allocated 53 mln. €.
Follow-up

Building mv Rossita to transport SNF and RM
Total finance is 72 mln. €.
**Follow-up**

### Transportation of SNF from research reactors.

#### Amount of fulfilled transhipments:

<table>
<thead>
<tr>
<th>№</th>
<th>Month</th>
<th>Country of origin</th>
<th>Number of containers transhipped</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>October 2008</td>
<td>Hungary</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>March 2010</td>
<td>Poland</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>May 2010</td>
<td>Poland</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>August 2010</td>
<td>Poland</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>October 2010</td>
<td>Poland</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>December 2010</td>
<td>Serbia</td>
<td>15</td>
</tr>
</tbody>
</table>

**TRANSHIPPED TOTAL:** 56 CONTAINERS
Follow-up

10  Transportation of RTGs from the Northern Sea Route.
    More than 100 RTGs were transhipped through FSUE ATOMFLOT in the recent period.

11  Development of FSUE ATOMFLOT facilities to provide transportation of SNF from shore bases in Andreeva Bay and Gremikha.
    65 trains with SNF (83% of this with decommissioned atomic submarines fuel) were dispatched from FSUE ATOMFLOT during these years.
To complete the construction of SNF handling complex at FSUE ATOMFLOT the following is to be done:

1. **Ecological monitoring system installation**
   At present the pre-contract work is being done with the Norwegian party to provide technical aid of about 100,000 EURO in 2012. Cooperation is discussed up to 2015.

2. **Change the configuration of local protection area of the nuclear island**
   Complete reconstruction of local inner protection area in order to increase physical protection of radioactive materials when handling them.
   Total cost of design and engineering is 55,000 USD.
   Total cost of work will be defined after the design is completed.

3. **Modernization of portal crane KONE**
   Is necessary to reduce risks when transhipping radioactive materials.
   Modernization is planned after commissioning special crane with l.p. 100 tons.
Regional SNF handling complex at FSUE ATOMFLOT will secure the following:

- Nuclear and radiation safety when handling SNF will be increased;
- Physical protection of nuclear materials will be improved;
- A single logistic centre for SNF transhipment in the North-West which meets the highest international requirements in the field of RM handling safety will be constructed;
- More aid will be rendered to the process of rehabilitation of shore bases in Andreeva Bay and Gremikha;
- Radiation situation on the Kola Peninsula will be improved.
FEDERAL STATE UNITARY ENTERPRISE OF ATOMIC FLEET
FSUE ATOMFLOT

Thank you for your attention