

## Management of radioactive waste at the Rosprom enterprises and establishment of the RW management system in the North-West Region of Russia



**K. Kulikov, B. Ivanov, NIPTB "Onega"**  
**A. Anisimov, Rosprom**  
**B. V. Struev, Krylov Institute**

CEG Workshop, Oxford, March 2008  
© 5<sup>th</sup> of March 2008 NIPTB "Onega" R&D Technological Bureau

### Presentation structure

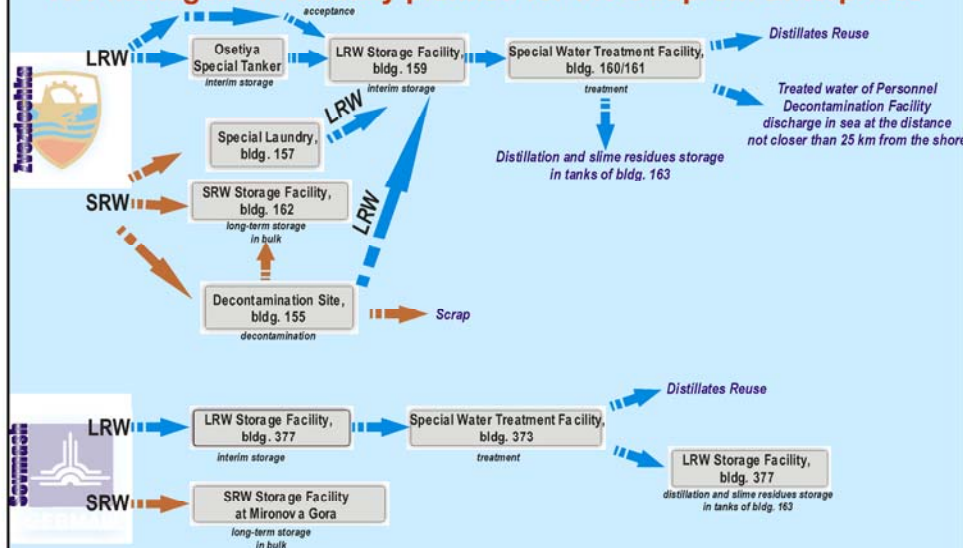
- ✓ Background
- ✓ The Existing Procedure and Infrastructure for RW Management at Rosatom Enterprises and Aspects of Its Improvement
- ✓ RW Management Improvement Activities planned by Federal Program for Nuclear and Radiation Safety for 2008 – 2015
- ✓ RW Management Problem Issues
- ✓ Conclusions

CEG Workshop, Oxford, March 2008  
© 5<sup>th</sup> of March 2008 NIPTB "Onega" R&D Technological Bureau

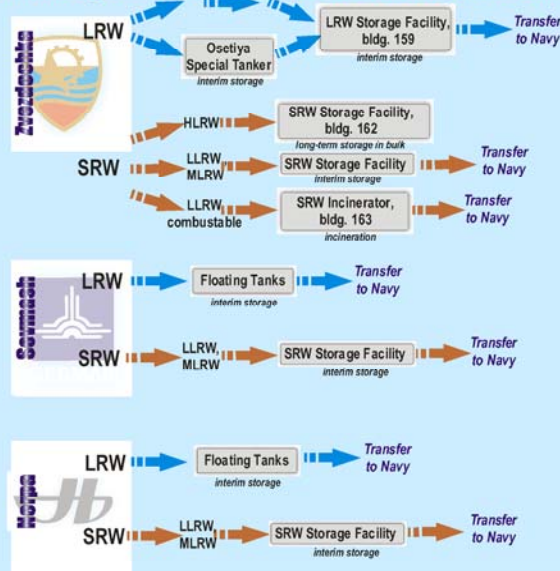
### Background

- ✓ Enterprises discussed:
  - FSUE "PO "Sevmash", Severodvinsk
  - FSUE "Shiprepairing Center (SRC) "Zvezdochka", Severodvinsk
  - Head Branch of FSUE "SRC "Zvezdochka" "Shiprepairing Yard "Nerpa", Snezhnogorsk, Murmansk region
- ✓ Initially infrastructure of RW handling at the enterprises of Shipbuilding Ministry (Minsudprom) was designed under projects as per the technical progress level achieved in 60s of XX century
- ✓ Due to accepted political decisions on RW discharge at the allocated World ocean areas some facilities for LRW and SRW handling at the enterprises were not constructed and were not commissioned
- ✓ Issue of RW accumulation at the enterprises became a problem again at the beginning of 90s of XX century upon meeting of Russia's obligations relating reduction of the strategic offensive weapons (START-1,2) and prohibition for RW disposal at sea
- ✓ Russian federal budget and International financial and technological support provided establishing generally safe management of RW at Zvezdochka, Sevmash and Nerpa, but some issues are to be resolved

### RW management initially planned for the Sudprom Enterprises



### Actual RW management procedure at Sudprom Enterprises till 1991



### The Existing Procedure and Infrastructure for RW Management at Rosatom Enterprises

#### Existing Procedure for SRW

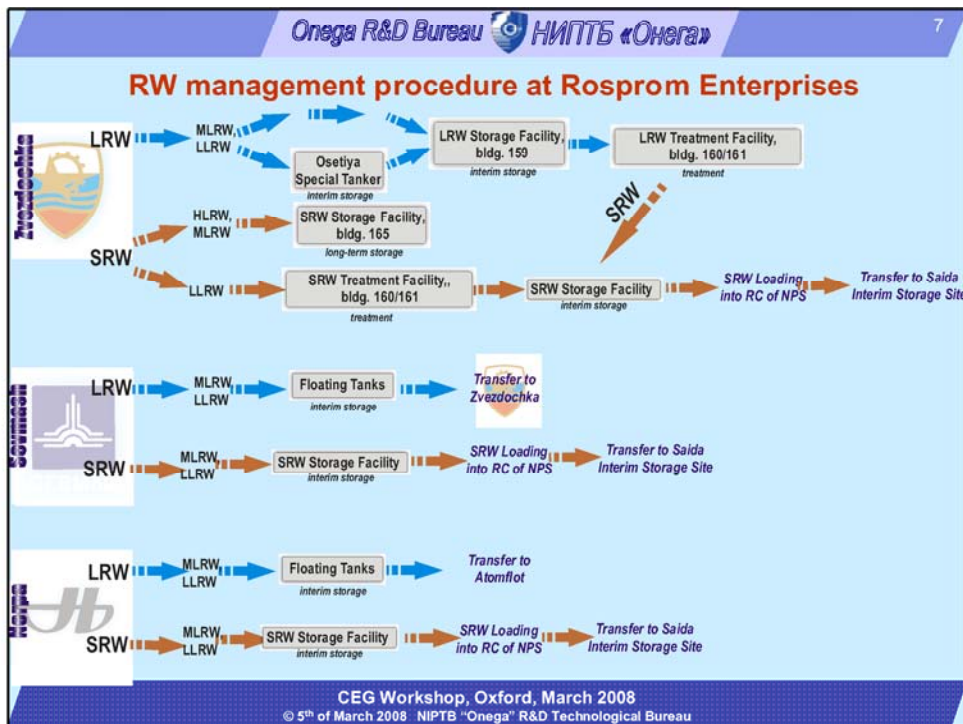
- ✓ SRW collection, packaging and storing (Nerpa, Sevmash)
- ✓ Loading to RC during NPS dismantling
- ✓ LLSRW conditioning with volume reduction (Zvezdochka)
- ✓ Open air storing

#### Existing Procedure for LRW

- ✓ LRW collection and storing aboard storage barges and vessels, transport to LRW treatment contractor (Nerpa, Sevmash)

#### General Aspects

- ✓ Only current activity needs are provided (historical waste are not in a process excluding loading to RC during NPS dismantling)
- ✓ Overall strategy for RW management is not developed yet



Omega R&D Bureau НИПТБ «Онега» 8

### Aspects of Improvement of Existing Procedure and Infrastructure for RW Management at Rosprom Enterprises

**Aspects of Improvement**

- ✓ For current activity to reduce generation of RW during current operations
- ✓ To involve historical RW management procedure
- ✓ To standardise collection and conditioning packages and procedures
- ✓ Shift to more safe final package of secondary SRW after LLRW treatment
- ✓ Stage by stage approach for improvement

**Improvements already achieved:**

- ✓ Open storage pad improvement at Nerpa
- ✓ LLLRW improvement at Zvezdochka to reduce treatment cost and to adopt process to treat LLLRW containing oil and suspended solids
- ✓ Upgrading of LRW pipelines at Zvezdochka with use of polymer materials with no excavation works on pipelines channels
- ✓ Mironova Gora storage facility insulation from the environment (Sevmash)

CEG Workshop, Oxford, March 2008  
© 5<sup>th</sup> of March 2008 НИПТБ «Онега» R&D Technological Bureau

## RW generation at Rosprom Enterprises

### LRW generation, m<sup>3</sup>

Shipyard	2004	2005	2006	2007
Sevmash	3.8	18.95	9.4	12.05
Zvezdochka	399.0	401.0	622.0	627.0
Nerpa	40.8	418.2	32.0	37.0

### LRW accumulation, m<sup>3</sup>

Shipyard	2004	2005	2006	2007
Sevmash	3,8	No	1	11,65
Zvezdochka	1802	1362	1270	1092
Nerpa	No	No	No	No

## RW generation and accumulation at Rosprom Enterprises

### SRW generation, m<sup>3</sup>

Shipyard	2004	2005	2006	2007
Sevmash	20.0	21.3	No	20.0
Zvezdochka	198.0	306.0	227.0	271.0
Nerpa	164.0	511	475.0	338.3

### SRW accumulation, m<sup>3</sup>

Shipyard	2004	2005	2006	2007
Sevmash	(353) 170	161	161	32
Zvezdochka	2286	2322	2403	2454
Nerpa	No data	No data	No data	No data

### Federal Program for Nuclear and Radiation Safety for 2008 – 2015 Directions

The program contains five directions ensuring the nuclear and radiation safety including the following:

- ✓ 1 – improvement of main infrastructure items for SNF and RW handling;
- ✓ 2 – practical solution of the problems relating the previous activities (nuclear legacy);
- ✓ 3 – establishing and improvement of the systems necessary to ensure monitoring of the nuclear and radiation safety under normal operation and under accidents;
- ✓ 4 – improvement of the personnel, population and environment protection against radiation effect;
- ✓ 5 – scientific, informative-analysis and organizational support of the activities relating the nuclear and radiation safety.

During the program development the measures of improvement of RW management system at Russia north-west were considered, such measures were specified in the Strategic Master Plan-2 (SMP-2)

### RW Management Improvement Activities planned by Federal Program for Nuclear and Radiation Safety for 2008 – 2015

Task for Rosprom enterprises	Start	Finish
Preservation of RW storage "Mironova gora" (Severodvinsk). Storage transfer in ecologically safe object	2008	2010
Reconstruction of accumulated RW handling system at "Sevmash" (LRW & SRW)	2008	2015
Reconstruction of SRW temporary storage (object 162) "Zvezdochka" with conditioning of the accumulated RW	2008	2015
Reconstruction of the special facility for the accumulated RW handling at "Zvezdochka", conditioning of the accumulated RW (LRW & SRW)	2008	2015
Reconstruction of SRW storage site with conditioning of the accumulated RW at "Nerpa"	2008	2015
Reconstruction of the accumulated RW handling system at "Nerpa" (LRW)	2008	2015
Reconstruction of the sanitary passage system during handling of the accumulated RW at "Nerpa"	2009	2010
Development of the processes and equipment to ensure activities relating decommissioning, rehabilitation, reconstruction of the radiation dangerous objects of Rosprom enterprises and treatment of the accumulated RW	2008	2015

## RW Management Problem Issues

### Final Disposal Strategy for all kind of conditioned RW and disposal accepting criteria

High Level RW – Control rods

- ✓ No General Procedure for its management
- ✓ Affecting Nuclear service ships dismantling and RW Retrieval from historical waste storages

Big size Intermediate Level RW

- ✓ No Procedure adopted for its volume reduction
- ✓ Affected Nuclear service ships dismantling

Very Low level Waste

- ✓ No General Strategy and Infrastructure (incl. disposal sites) for its management
- ✓ Affecting RW Retrieval from historical waste storages

## Conclusions

- ✓ Problem of the accumulated RW handling and rehabilitation of the historical waste storage facilities at Rosprom enterprises at Russia north-west is comprehensive and multidisciplinary
- ✓ It can not be solved completely within nearest years due to the economic and scientific-technical constraints. Significant efforts relating here were made relating NPS dismantling, and only last years
- ✓ Step by step approach should be adopted
- ✓ Strategy and procedure should be adopted for problematic RW management issues

