



Radiation Protection Regulation of the Nuclear Legacy:

Progress in Bi-Lateral Cooperation between Federal
Medical Biological Agency and Norwegian Radiation
Protection Authority



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The Russian nuclear legacy consists of



- Areas of legacy works with radionuclides
- Radiological accident areas
- Former Naval support technical bases
- Landfills for nuclear weapons and areas for peaceful nuclear explosions
- Uranium tailing dumps





FMBA of Russia – NRPA cooperation



FMBA of Russia



NRPA

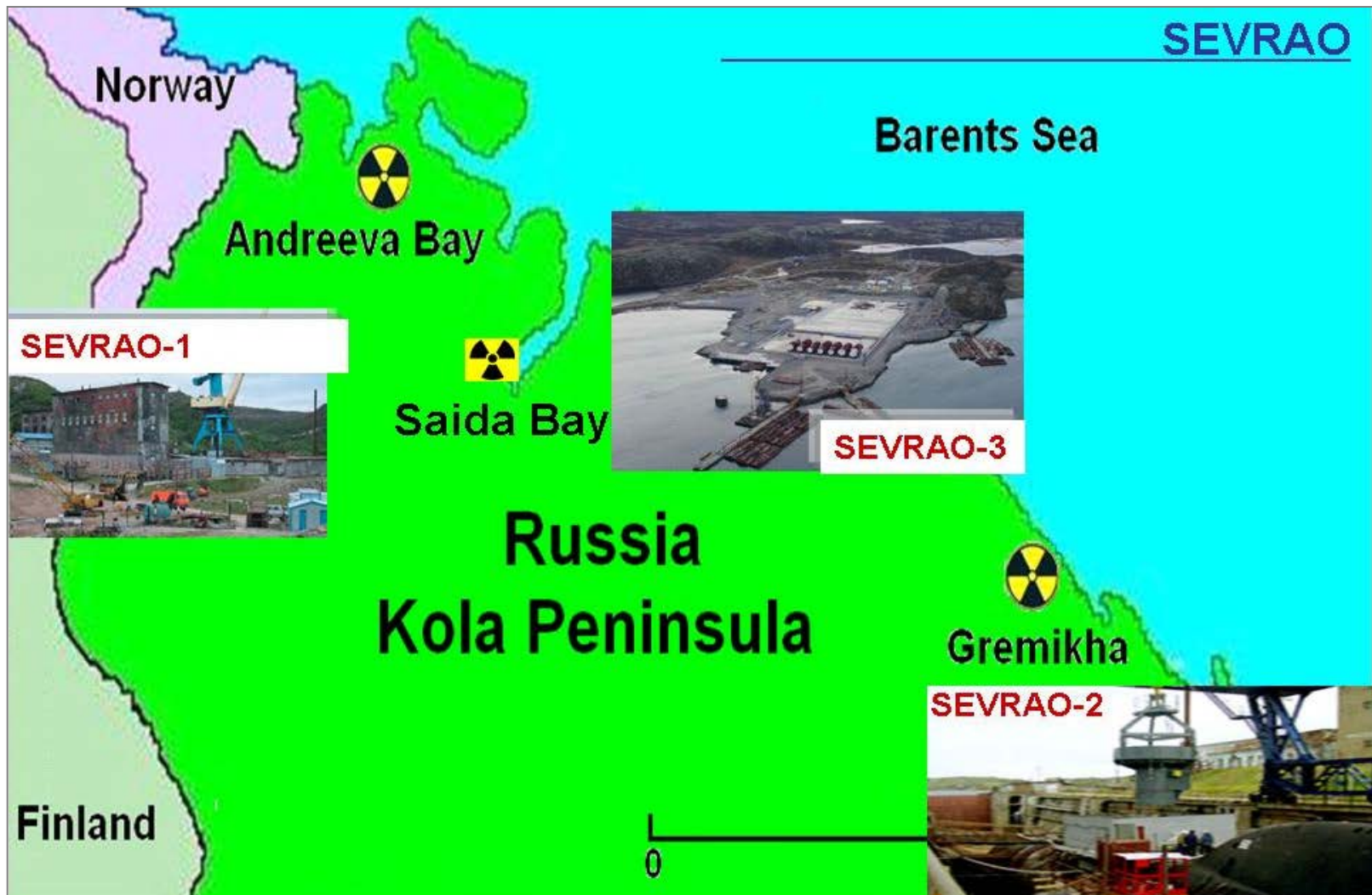
Agreement between
Russian & Norwegian
Ministries of Health



Was signed on
November 13, 2008



Nuclear legacy- former Naval bases





FMBA Regulatory supervision



- Independent analysis of the situation, dose assessment to workers and the public
- Radiological threat assessment
- Development of regulatory documents
- Supervision, control and monitoring
- Emergency response
- Review

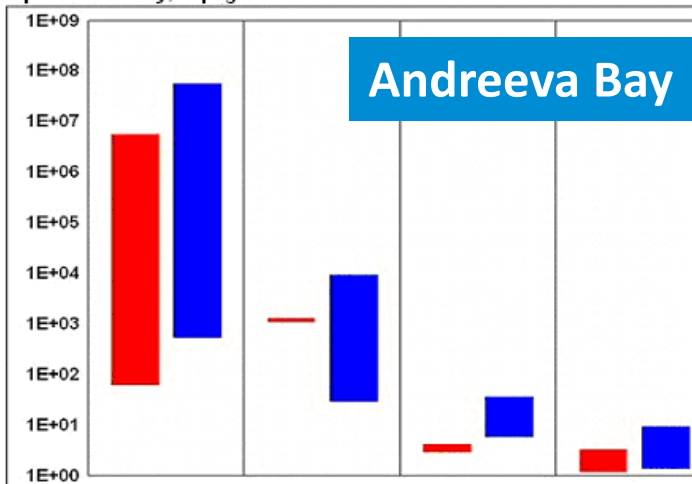




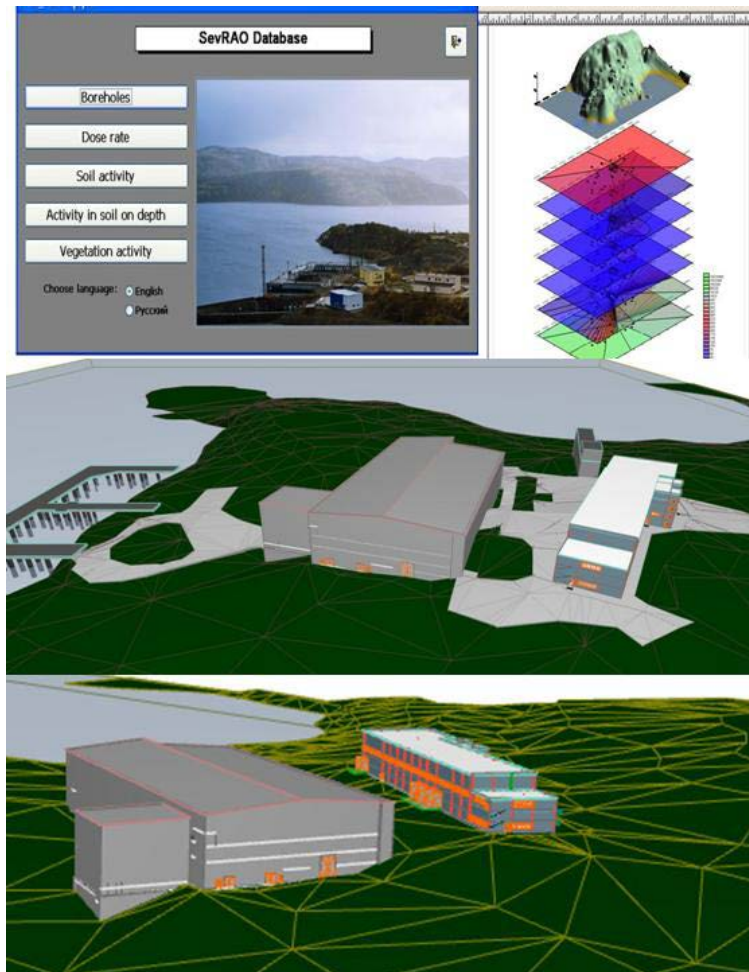
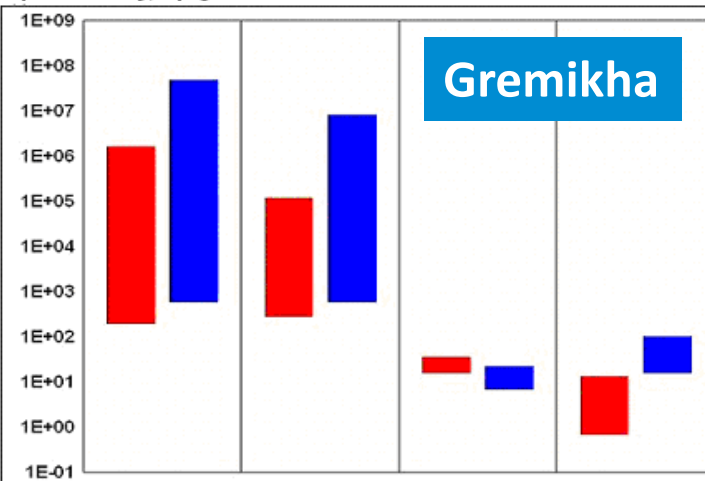
Contents of ^{90}Sr and ^{137}Cs in soil



Specific activity, Bq/kg



Specific activity, Bq/kg

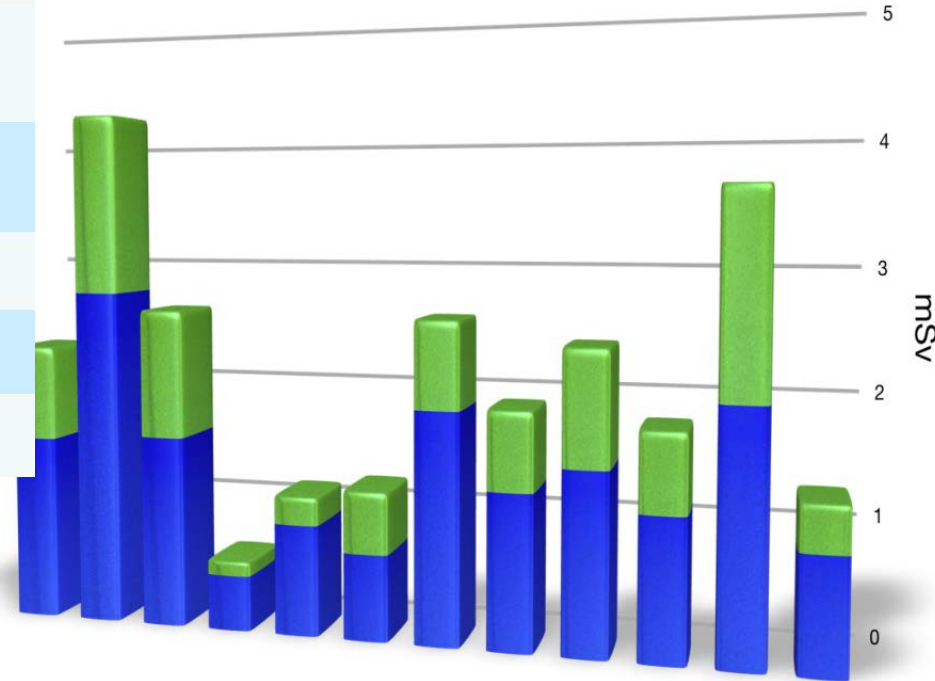




SNF removal



Working place, occupation	Doses, $\mu\text{Sv/h}$		Surface contamination level, $\text{part/cm}^2 \cdot \text{min}$	
	Reference dose rate	Real level	Reference levels	Real level
Dry storage worker, engineer, dosimetrist	500	171 – 510	10000	8000
Site under the crane Strap per, dosimetrist	15	8 – 27	< 6	< 6
Crane cabin Driver	28	62	< 6	< 6
Container vessel Driver	18	3	< 6	< 6
Serebryanka ship Master	2500	250	4000	75



Individual doses to 12 members of the Complex facility for the RW and SNF storage and management personnel



International Exercise & Training in case of emergency



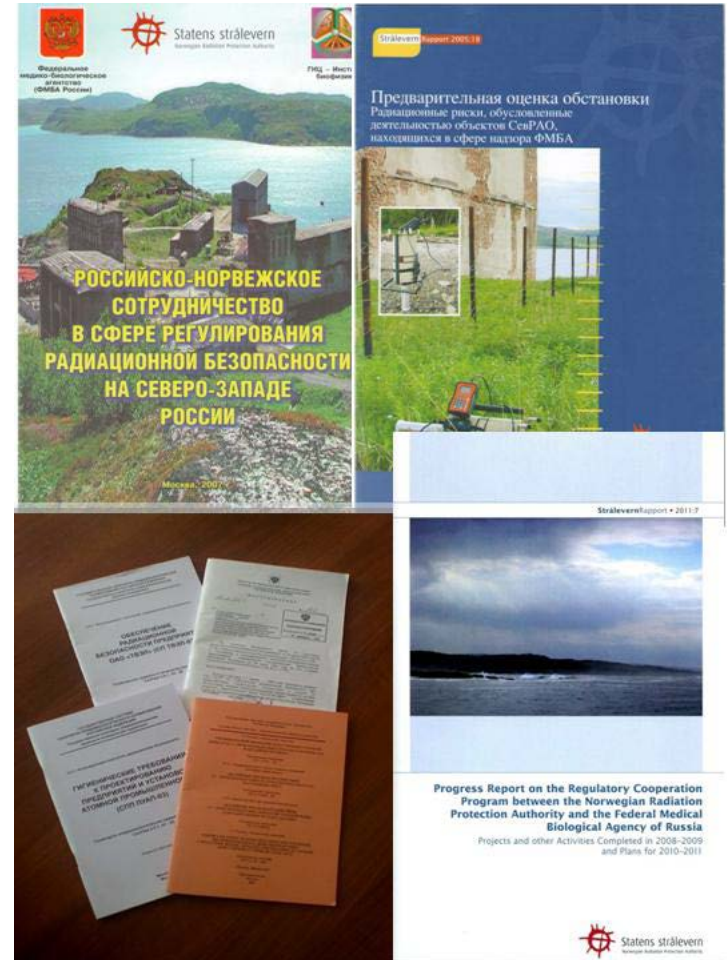
WM2014 March 2 – 6, Phoenix, Arizona, USA



New Regulatory Documents

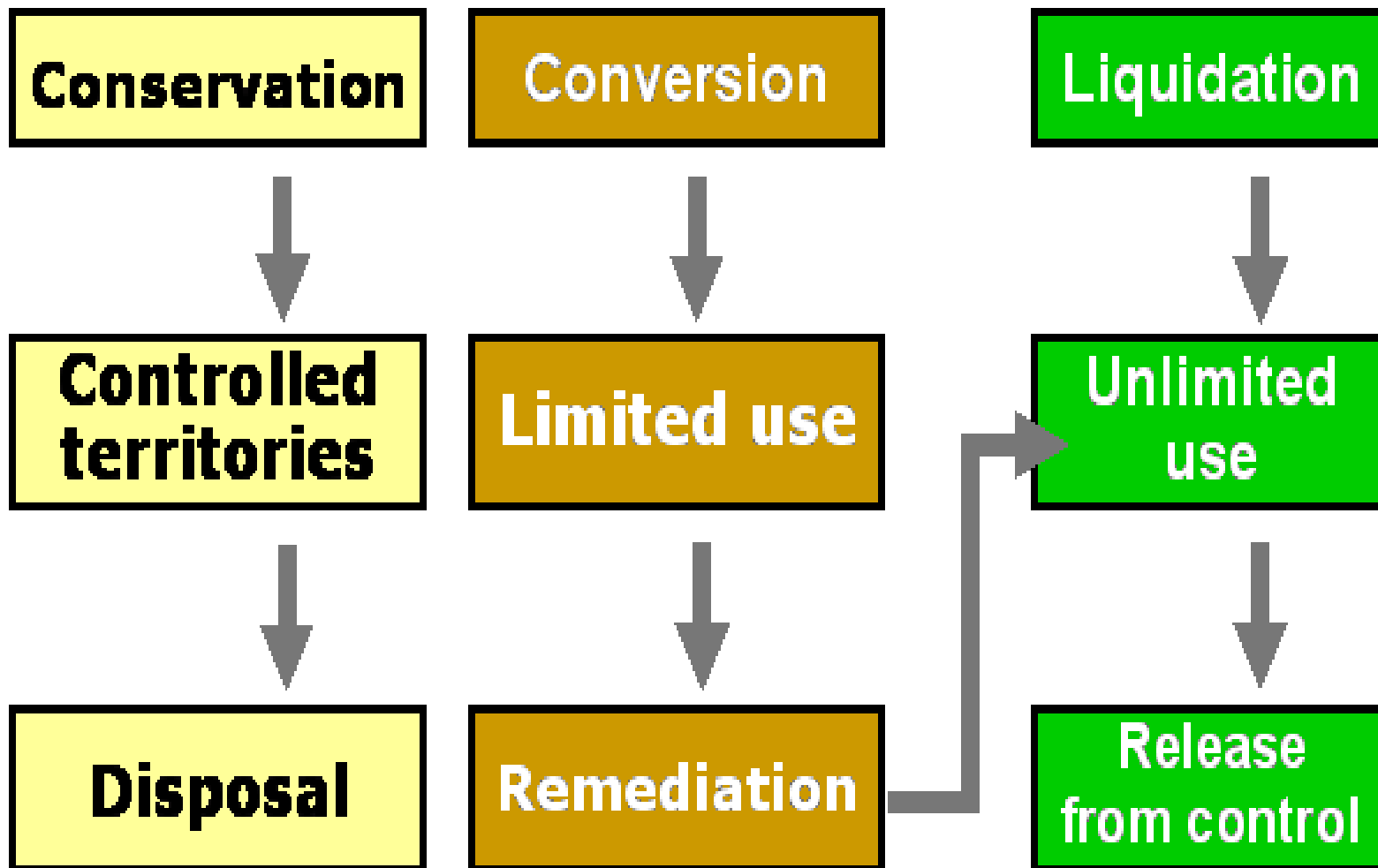


- Requirements to provide radiological protection of the personnel and the public
- Criteria and norms on remediation of sites and facilities
- Arrangement of the environmental radiation monitoring
- Requirements for industrial waste management
- The Operational Radiological and Medical Criteria for the Initiation of Emergency Protective Actions
- Requirements to support safe management of products containing nuclear materials





Three remediation options





Norms of remediation



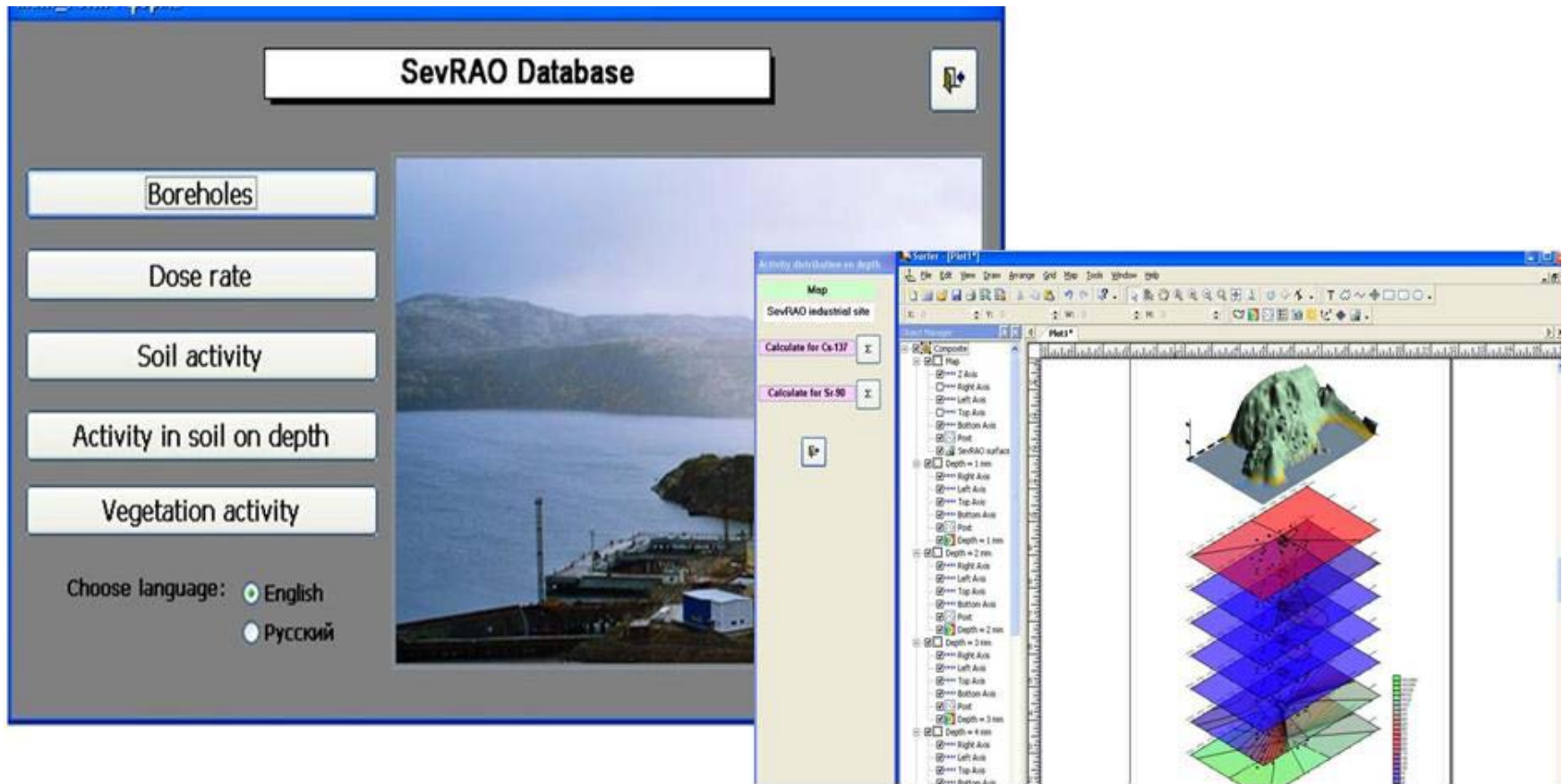
Variant of remediation	Category of persons	Dose constraint, mSv·y ⁻¹			Dose limit from (NRB-99)
		Due to residual contamination	Due to new operation involved radiation sources	Total	
Conservation	Workers	2	-	2	20
	Public (SA territory)	0,1	-	0,1	1
Conversion ("brown lawn")	Personnel group A	3	7	10	20
	Personnel group B	1	1	2	5
	Public (SA territory)	0,1	0,15	0,25	1
Liquidation ("green field")	Public (former STS territory)	1	-	1	Lack of norms in NRB-99
	Public (the rest territory)	0,1	-	0,1	



“Datamap” – 2002-2012



Computer map of radio-ecological data over the STS at Andreeva Bay has been arranged





Effectiveness of the remedial operations



Place of measurement	Dose rate, $\mu\text{Sv/h}$		Measures taken
	2009	2002	
Area near the new pier	0.15 – 0.35	0.15 – 450	Old pier dismantlement
Around Building 50	0.25 – 0.57	0.3 – 1.5	Elimination of the scrap metal landfill
Destroyed buildings near the DSF	0.38 – 1.1	0.58 – 2.7	Sand backfilling, asphalt works
Facility for motor transport decontamination and sanitary pass	0.57 – 0.7	30.7 – 2.5	Paving of the site



Radiation situation at STS in Andreeva Bay (1)



2005
0.15 – 450
 $\mu\text{Sv/h}$



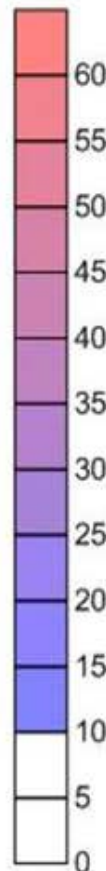
2010
0.15 – 0.35
 $\mu\text{Sv/h}$



Radiation situation at STS in Andreeva Bay (2)



2002



2010



18 collaborative projects between FMBA and NRPA (2004-2011)



- Agreements with FMBA of Russia, Rostechndazor, Ministry of Defense
- Collaborative projects on works in the Northwest Russia
- Joint visits to the legacy sites in USA and UK
- Periodic workshops





New FMBA – NRPA projects of regulatory support (2012-2014)



- **Threat** - updated threat assessment
- **Remediation** - regulation of safety and protection
- **Environment** - environmental contamination
- **Dosemap** - exposure to workers
- **Strategy** - emergency planning
- **PRM-3** - reliability of workers
- **Drive** - visualisation

