

Overview of Technology Training Courses for Operators and Regulators

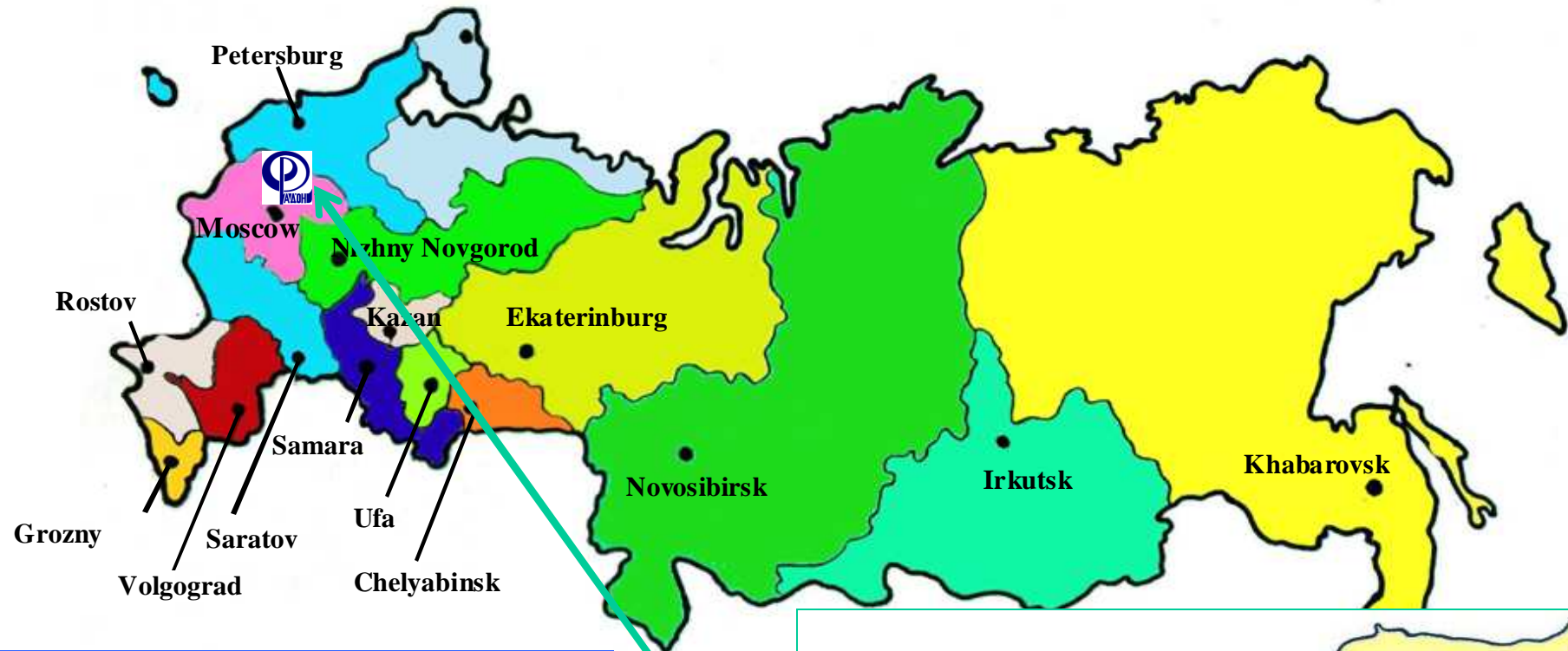
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DG Training Advisor, SUE Moscow SIA “Radon”

WM-2012, 26 February – 01 March 2012, Phoenix, Arizona

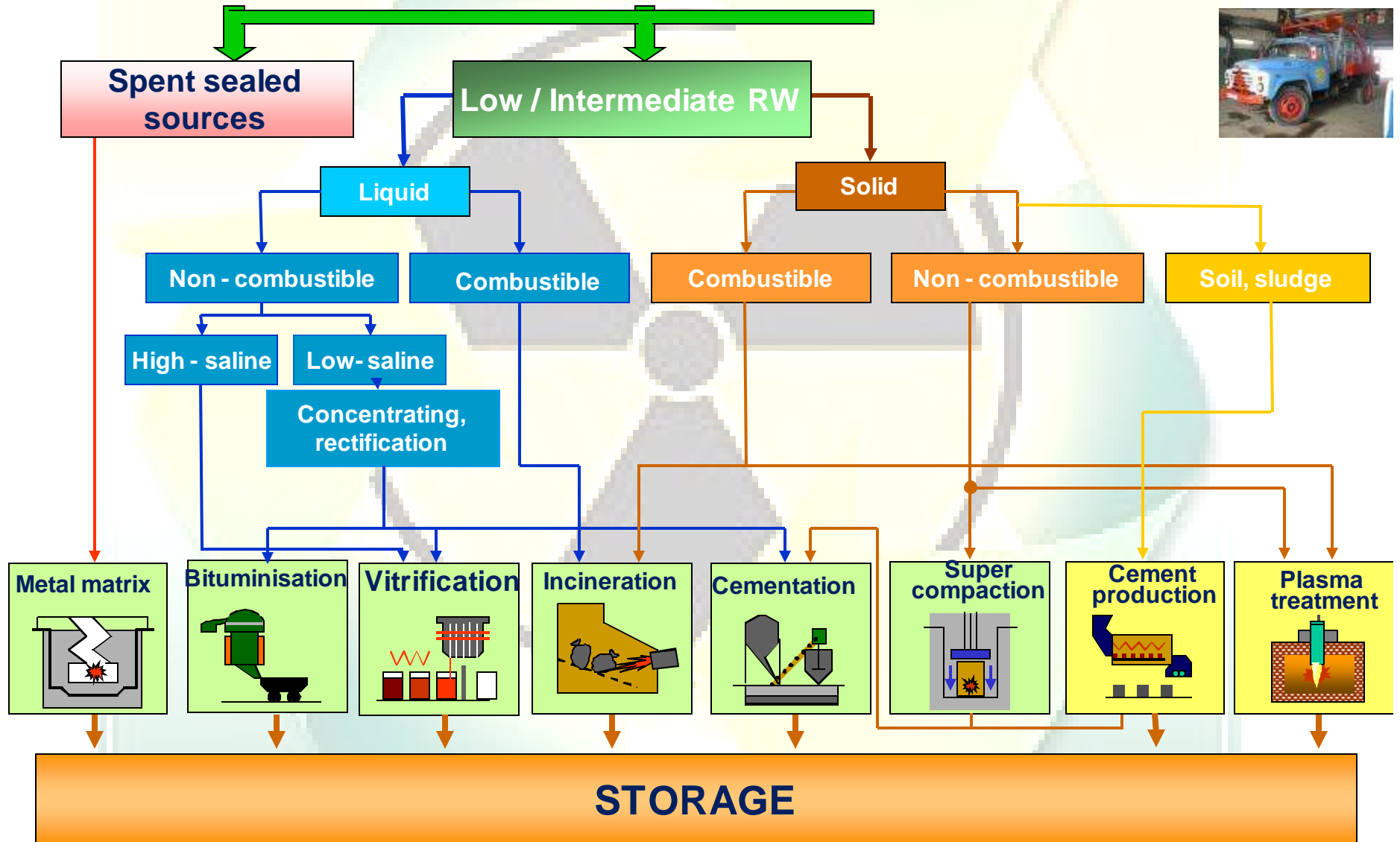
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- Background, Moscow SIA «Radon»
- Training activities in IETC
- Perspectives

"Radon" Regional Centralized Facilities for RWM in Russia



Radioactive waste management scheme



Moscow SIA "Radon" activities

- Collection, transportation, treatment, conditioning and long term storage of wastes from zones of responsibility.
- Radiological monitoring of the territory of Moscow and Moscow Region.
- Decontamination and remediation of contaminated sites.
- Research works in the specified areas.
- Training in RWM



History



The SIA “Radon” has an almost **30 years** experience in training of national specialists in the field of radioactive waste management.

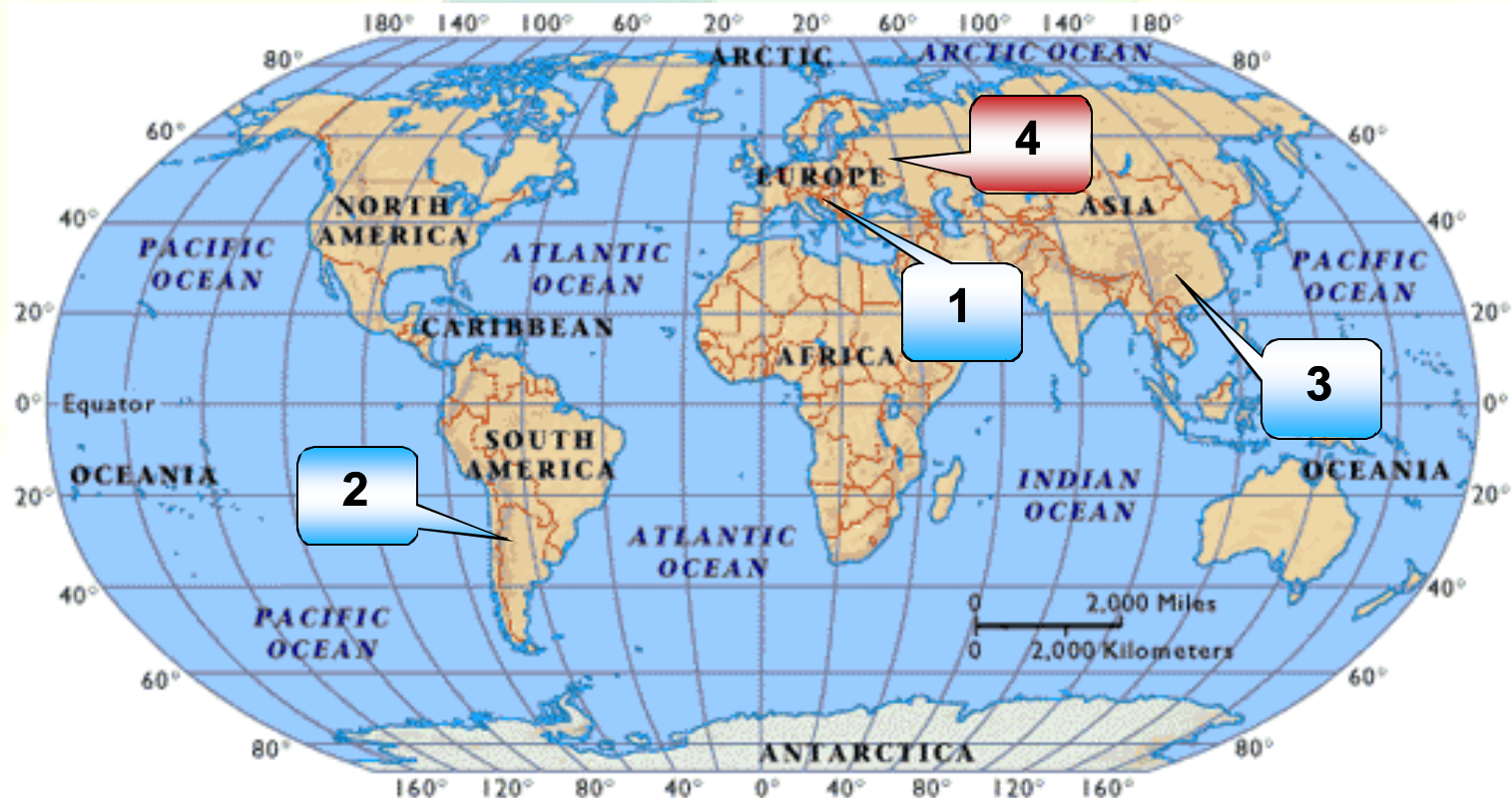
These training activities are carried out jointly with the **Lomonosov’s Moscow State University**.

During this long period a variety of training programs in the scientific fundamentals, applied research and in practical operational areas of the all pre-disposal activities of the radioactive waste management were realized.

About 650 specialists have received training certificates since the courses were established.



IAEA TRAINING CENTRES



1995 IAEA project on Interregional Training Centres

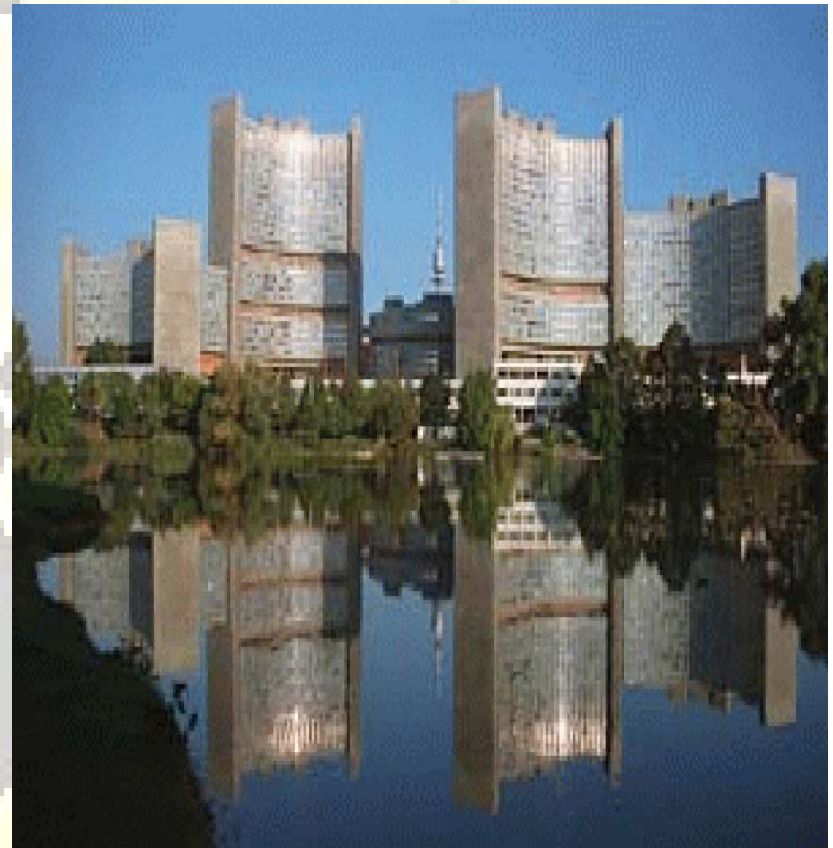
1. **1996** Turkey, Istanbul. Cekmece Nuclear Research and Training Centre (region – west Europe and west Asia)
2. **1997** Chile, Santiago. Chilean Centre of Nuclear Research in Lo Aguirre (region – the Latin America)
3. **1998** *Manila*, Philippines (region – East Asia)
4. **1999** Regional Education and Training Centre in the Russian Federation on the basis of Moscow SIA “Radon” and VNIINM named after A.A. Bochvar (region - East Europe and New Independent States)

Experience

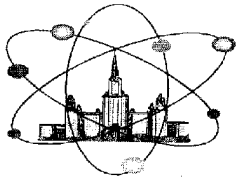
Since 1997 educational system was upgraded to internationally accepted requirements.

It now acts as the **International Education Training Centre** of Moscow SIA “Radon” under the guidance of the IAEA.

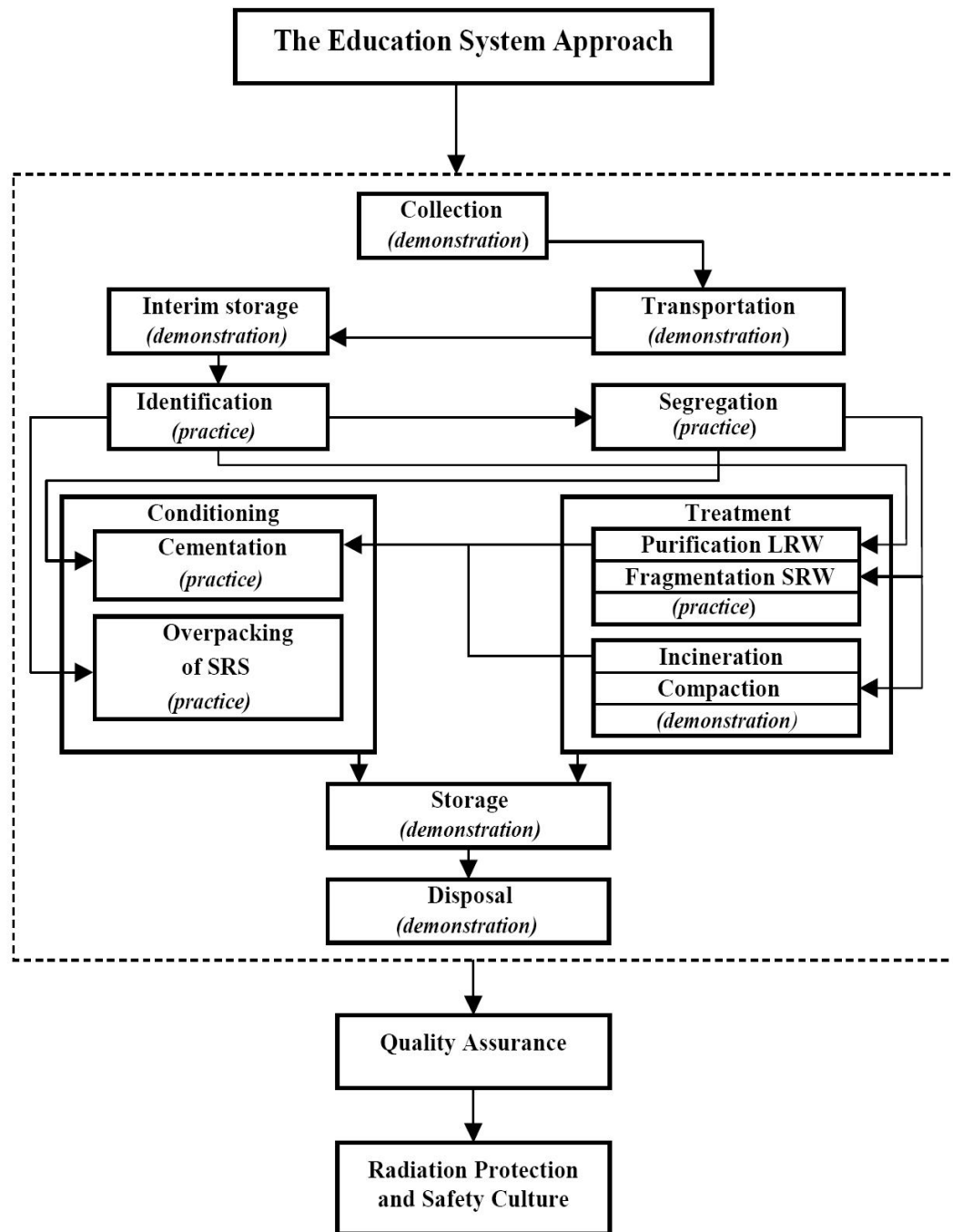
The IAEA supported a large number of specialized regional training courses and workshops, fellowships, on-the-job training and scientific visits are additional means to assure development of personnel capabilities.



Our main partners



- *International Atomic Energy Agency (IAEA)*
- *Federal Agency on Atomic Energy (Rosatom)*
- *Moscow State University named after M. Lomonosov*
- *All-Russian Scientific Research Institute of Inorganic Materials named after A.A. Bochvar*
- *Scientific and Production Enterprise (NPP "Doza")*
- *Nuclear Technology Education Consortium (NTEC), United Kingdom.*



Approach:

3 hours theory before the noon

3 hours practice in the afternoon

Visits to installations to see the working plants for
RW processing

E.g., purification of Liquid RW

E.g., cementation of solid and liquid RW

E.g. collection, identification, sorting, and storage of
spent sealed radioactive sources.

RER Training courses

Programme

Regional Workshop "Radioactive Waste Management - Predisposal/Disposal Technologies (in RADON facilities) with a focus on Sealed Sources and HLW sources" International Atomic Energy Agency, IAEA PROJECT RER3007

Moscow, Russia, 21 - 30 June 2011



Time	Tuesday 21 June	Wednesday 22 June	Thursday 23 June	Friday 24 June
09.30-10.20	Workshop Opening IAEA staff, Host org Review of Moscow SIA "Radon" technological and training activities Radon expert	Radioactive waste arising, classification, characterization and operational categorization for processing. IAEA expert	Solid radioactive waste management: Characterization and Processing of bulk solid waste-containerization. Compaction and super compaction of solid waste. IAEA expert	Management of spent sealed radioactive sources, Radon experience Radon expert
10.20-11.10	Overview of IAEA WTS activities in Waste Pre-Disposal/Disposal/Decommissioning IAEA Staff	Radioactive waste characterization and processing steps (pre-treatment, treatment, conditioning) IAEA expert	Solid radioactive waste management, Radon experience. Radon expert	
COFFEE / TEA BREAK				
11.30-12.20	Waste management principles and approaches to minimization. IAEA expert	Radioactive waste status and trends in the area of RWM in the Russian Federation. VNIINM expert	Solid radioactive waste management (transportation, collection, sorting, super-compaction) (demonstration) Radon expert	Perspective technologies for radioactive waste processing. IAEA expert
12.20-13.10	Classification of waste to promote minimization at source (clearance levels, VLLW, SLLW) IAEA expert	Characterization and Immobilization of HLW from spent fuel reprocessing. VNIINM expert		Incineration of RW (Classical, cold crucible, plasma treatment), Radon experience. Radon expert
LUNCH BREAK				
14.00-14.50	Technical tour to the facility. Radon expert	QMS and record keeping: Radon experience. Radon expert	Vitrification of liquid radioactive wastes. IAEA expert	Perspective technologies of radioactive waste treatment (lecture and demonstration). Radon expert
14.50-15.40				
COFFEE / TEA BREAK				
16.00-16.50	Welcome party	Incoming computer testing	The computer teaching programme on the solid RWM.	Incineration of RW. (demonstration)

Time	Thursday 30 June
Radioactive Radon"	Individual monitoring. Dosimeter demonstration Radon expert
Waste	Requirements for radioactive waste characterization for storage and disposal. IAEA expert
Incineration plants	General discussion. Conclusions and recommendations. Closing workshop. IAEA, Radon experts

14.00-14.50	Management of disused sealed radioactive sources. IAEA expert	Technical visit to Moscow SIA "Radon" Centre of Waste Characterization.	Containers, RW Storage/Disposal, Radon experience. Radon expert
14.50-15.40	Source categorization IAEA expert		Storage/Disposal (demonstration)
COFFEE / TEA BREAK			
16.00-16.50	The computer teaching programme on the liquid radioactive waste treatment.	Discussion/sharing experience	Calculation dose rate on packages. (seminar) Radon expert

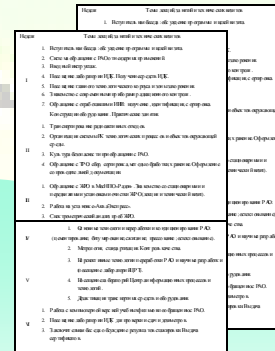
Training forms and means



Presentations, devises, pictures



Books and training manuals



Programme and curriculum



Training

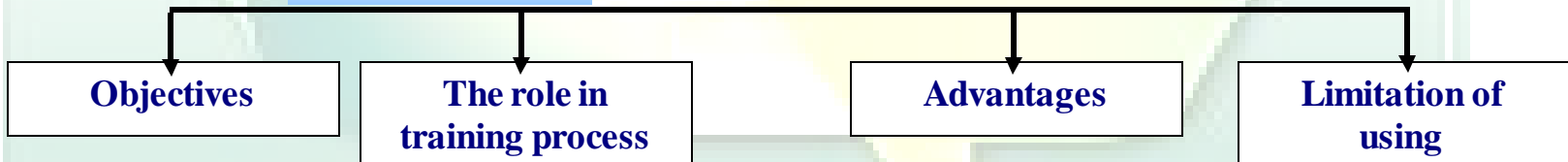


Video-film



Computer programme

Schemes of technological process



Training forms and means



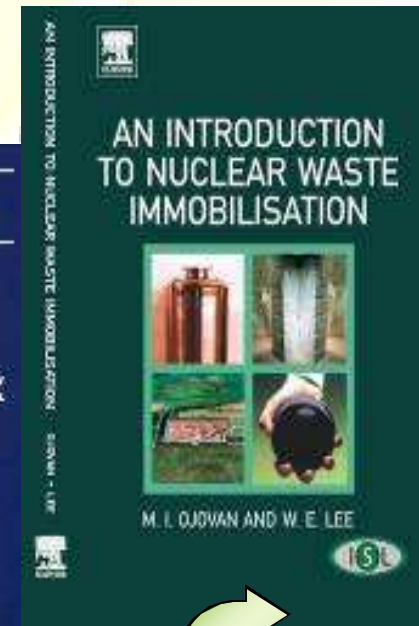
Technological basis of radioactive waste management



Basic concepts of ecological audit



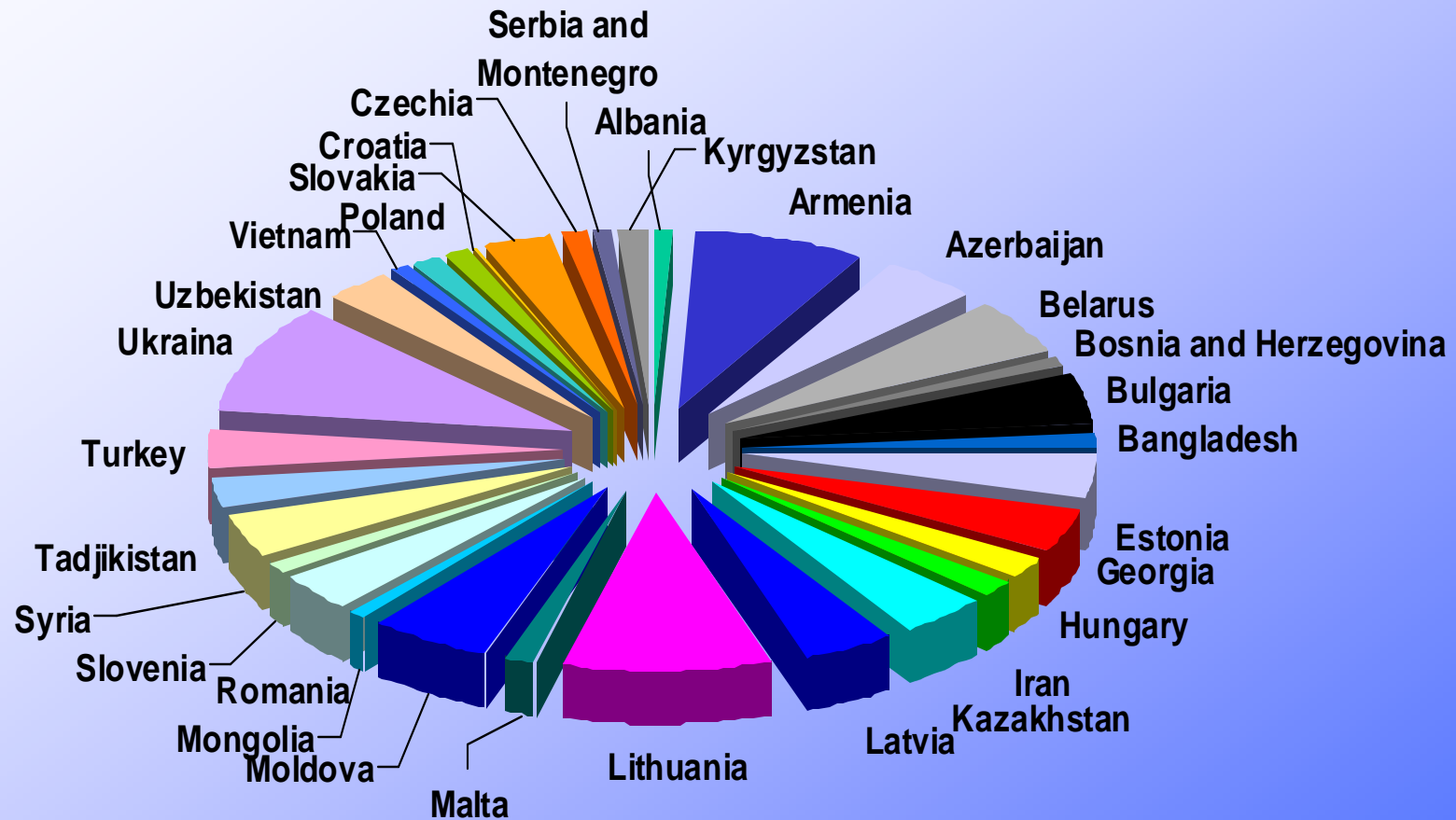
Glasses for radioactive waste



Введение в иммобилизацию ядерных отходов

Name of the IAEA Training Course	Date/#
<i>Demonstration of Predisposal Radioactive Waste Management Methods and Procedures (Project INT/4/131)</i>	1999 – 2003 (5 courses)
Safety Assessment Methodologies For Near Surface Waste Disposal Facilities <i>(Project RER/9/067, RER/9/079)</i>	2001 – 2007 (7 courses)
Searching, Identifying and Recovering Radioactive Sources <i>(Project RER/9/073)</i>	2003-2004 (6 courses)
Regional Training Course on Radiation and Waste Safety for Operating and Upgrading Centralized Radioactive Waste Management Facilities <i>(Project RER/4/026)</i>	2006 (1 course)
Regional Training Course on the Development of National Workplace Monitoring Programme by Member States <i>(Project RER 9/089)</i>	2007 (1 course)
Regional Train-the-Trainer Training Course for Radiation Protection Officers' Training <i>(Project RER 9/090)</i>	2008 (1 course)
Regional Training Course on Radioactive Waste Management - Pre-Disposal Technologies <i>(Project RER 3/002)</i>	2004-2011 (9courses)
<i>Scientific visits and fellowships under National TC Projects</i>	1999-2012

Experience



The IETC of Moscow SIA "Radon", in co-operation with the IAEA, is developing expertise and providing training to waste management personnel for over 10 years. More than 450 specialists from 35 European and Asian countries have increased their knowledge and skills in RW management.



H.Forstrom, DD



P.Salema, DD TC



Dr. I.Mele, SH



Z.Drace, V.Tsiplenkov, WTS



Dr. V.Efremenkov



Dr. S.Samanta, WTS

Invited Local Lecturers

Dr Soukhanov, VNIINM



Prof Poluektov, VNIINM



Dr Kashirin,
Analytical
Centre

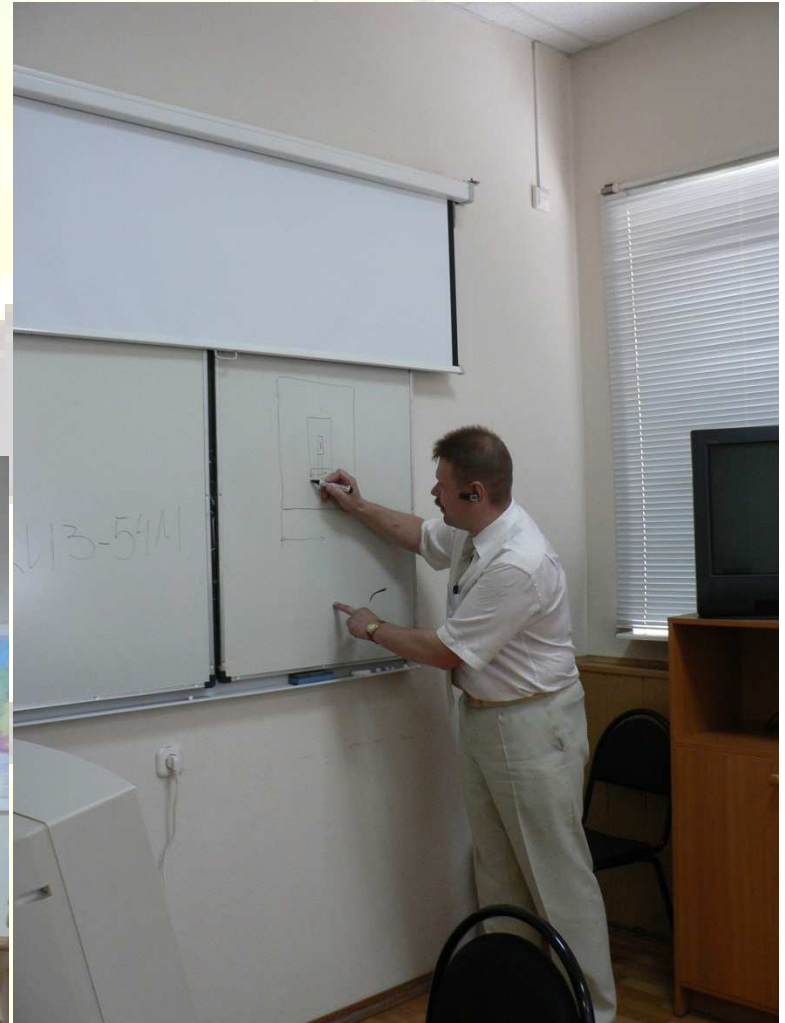


Local Experts

Management system



Safety issues



Calculation of shield thickness

Practical part was always the strong side of courses held at Moscow SIA "Radon"



1999 – 2011: **450** specialists from **35** MS-s

MS's and Radon's benefits from IAEA- courses

Moscow SIA "Radon" experts took part in IAEA expert missions to provide assistance in ensuring radiation safety of radioactive waste management in: Azerbaijan, Bangladesh, Belarus, Bulgaria, Georgia, Iran, Latvia, Lithuania, Libya, Moldova, Serbia, Montenegro, Romania, Syria, Tajikistan, Ukraine.

Moscow SIA "Radon" has delivered water-purifying facilities "Aqua-Express" in a number of MS's.

EM Works on spent sealed radioactive sources



Inspection of repository at
Novy Han (Bulgaria, 2001)

Conditioning of spent sources
of ionizing radiation at
«ECORES» (Belarus, 2003)



«Moskit-1A» at Kiev SK «Radon»
(Ukraine, 2006)

Installation «Aqua-Express» (purification capacity 0,3 m³/h)



- In 2002-2010 The installation was delivered to research centres in Azerbaijan, Bangladesh, Syria, Iran, Bulgaria, Serbia, Uzbekistan, Romania.
- In 2006-2007 to the Rostov Specialized Facility «Radon», to the Kazan SF «Radon» and to the Institute of Power and Nuclear Research (Belarus).

The new project, 2012

International Atomic Energy Agency, Consultants Meeting
“Preparation of Working Syllabus for a Four to Six Weeks Extensive
Training Course with Focus on Pre-Disposal Management of Radioactive
Waste”,
31 October-2 November 2011.

Experts:

Prof. Stepan Kalmykov,
Moscow State University,
Dr. Olga G. Batyukhnova, and
Andrei A. Goltsov, Moscow SIA
“Radon”

IAEA: *Aleksandr Bychkov (DDG),*
Susanta K. Samanta , Mikhail Ojovan,
Paul Degnan, Paul Dinner (WTS)
Monika Kinker, (WSS)



IAEA & Lomonosov Moscow State University (Chemical Department) & Moscow SIA "Radon"

TRAINING COURSE with Focus on Pre-Disposal Management of Radioactive Waste

WEEK 1 to 4: CORE COURSE IN RADIOACTIVE WASTE MANAGEMENT	
Week 1	Introduction to nuclear and radiochemistry, introduction to RWM Fundamentals
Week 2	Introduction to RWM, decommissioning
Week 3	Predisposal activities
Week 4	Storage, disposal and remediation
WEEK 5 TO 6: PRE-DISPOSAL RWM	
Week 5&6	Predisposal RWM (practical aspects)
Week 2,3,4,5,6	Technical Site Visits, Exams, Reviews



Tentative dates: 21 May – 27 June 2012



Thank you for your attention

ICEM 2009, October 11-15, 2007, Liverpool, UK