Safety and Security of Radioactive Sources Management System

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Legislation provisions

- *Law of Ukraine* “On Use of Nuclear Energy and Radiation Safety”
- *Law of Ukraine* “On Radioactive Waste Management”
- *Law of Ukraine* “On Ratification of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management” (20.04.2000)
- *Law of Ukraine* “On Permissive Activity in the Nuclear Energy Field”
- *Law of Ukraine* “On the Physical Protection of Nuclear Installations, Nuclear Materials, Radioactive Waste, Other Sources of Ionizing Radiation”

Legislation provisions

- Safety conditions and requirements (licensed conditions) of IRS use (2002)
- Safety conditions and requirements (licensed conditions) of radioactive waste processing, storage and disposal (2002)
- Requirements to the structure and content of Safety Analysis Report for
  - radioactive waste processing facility
  - radioactive waste storage facility
  - near surface disposal facility
- Basic Sanitary Rules for Radiation Safety of Ukraine (OSPU-2005)
- Norms of Radiation Safety of Ukraine (NRBU-97)

Policy of Safety and Security of RS

Illustrated within published in 2008

- **Green Paper** – Consultations on Safety Strengthening of Ionizing Radiation Sources
- **White Paper** – Safety Strengthening of Ionizing Radiation Sources

Demonstrate the main measures and perspectives to fulfil the compliance with

- Basic Safety Standards
- Code of Conduct on the Safety and Security of Radioactive Sources
- Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

Policy Objectives

To ensure that Ionizing Radiation Sources

- are used by competent licensed users with appropriate radiation protection measures
- are used only according to their purpose
- are adequately protected
- after service lifetime expiration will be transfer to specialized radwaste management enterprises for safe storage/disposal or returned to producer

To establish

- effective regulatory and control system
- comprehensive system of inventory and tracing RS from producing/purchase to storage/disposal including “legacy”;
- modernized system of DSRS management with all necessary equipment, transport means, storages, staff etc. available

Regulatory System

Is establised within State Nuclear Regulatiry Committe of Ukraine

- **8** SNRCU Regional Nuclear and Radiation Safety Inspectorates (96 new staff) established in 2006 deal with radiation safety issues, licensing and supervision of using Sealed Radioactive Sources
- SNRCU Department of Radioactive Waste and Decommissioning Safety deals with licensing and supervision of radwaste management activity including DSRS management
- SNRCU Safety Transportation Division deals with licensing and supervision of transport means and activity
- Security issues under special control of SNRCU Phisical Protection Department

Inventory keeping system

- State register of radiation sources covers all types of sources and traces sources from “cradle to grave”
  - 2004 - 2006 in research operation
  - from 2007 in full operation
  - **14 184 SRS** registred up to 2010

“Procedure for the State Registration of Ionizing Radiation Sources” approved by Governmental Resolution № 1718 dated December 16th 2000

Inventory keeping system

- State register of radioactive waste including DSRS are in operation from 1997 by State Corporation Radon

  - The Main Informational and Analytical Center

  - Regional Information Centers based on regional stare enterprises Radon

  - **348 127 DSRS** were registred up to 2010

  - retrospective data from early years still are under registration

“Procedure for the State RAW Inventory” approved by Governmental Resolution № 480 dated April 29th 1996

Inventory keeping system

Objectives:

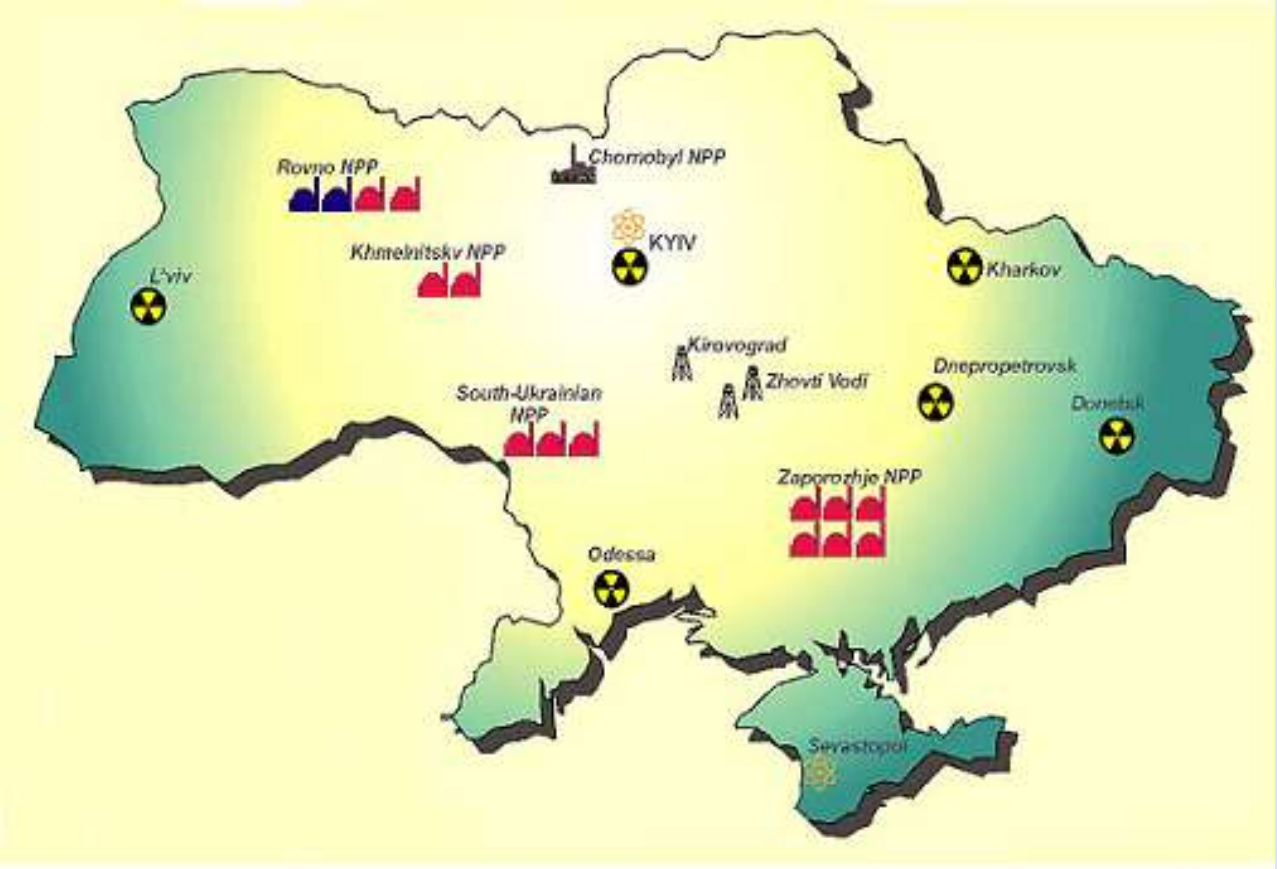
- Avoid uncontrolled collection of DSRS at the user's sites
- Storage at user's sites limited time and transfer to special radwaste management enterprises
- Control of transition and transportation of SRS and DSRS

Information management

- Information exchange procedure between both registers are established
- Response guidelines and procedures for “orphan” sources management to ensure they safety and security are **approved by Governmental Resolution № 813 dated June 2nd 2003**
- Metal scrap dealers are provided with “Reference Book of Radioactive Sources That Could Be Discovered in Metal Scrap”

Current Status of DSRS Management in Ukraine

The main installations in Ukraine



WWER-440 (Rovno NPP)
WWER-1000 (Zaporizhya NPP, Rovno NPP, South Ukraine NPP, Khmelnitsky NPP)
РБМК-1000 (Chernobyl NPP)
Research reactor (Nuclear Research Institute in Kiev, Sevastopol Nuclear Energy Institute)
State special enterprises for RW management "Radon"

Uranium mining enterprises

Current status of DSRS management

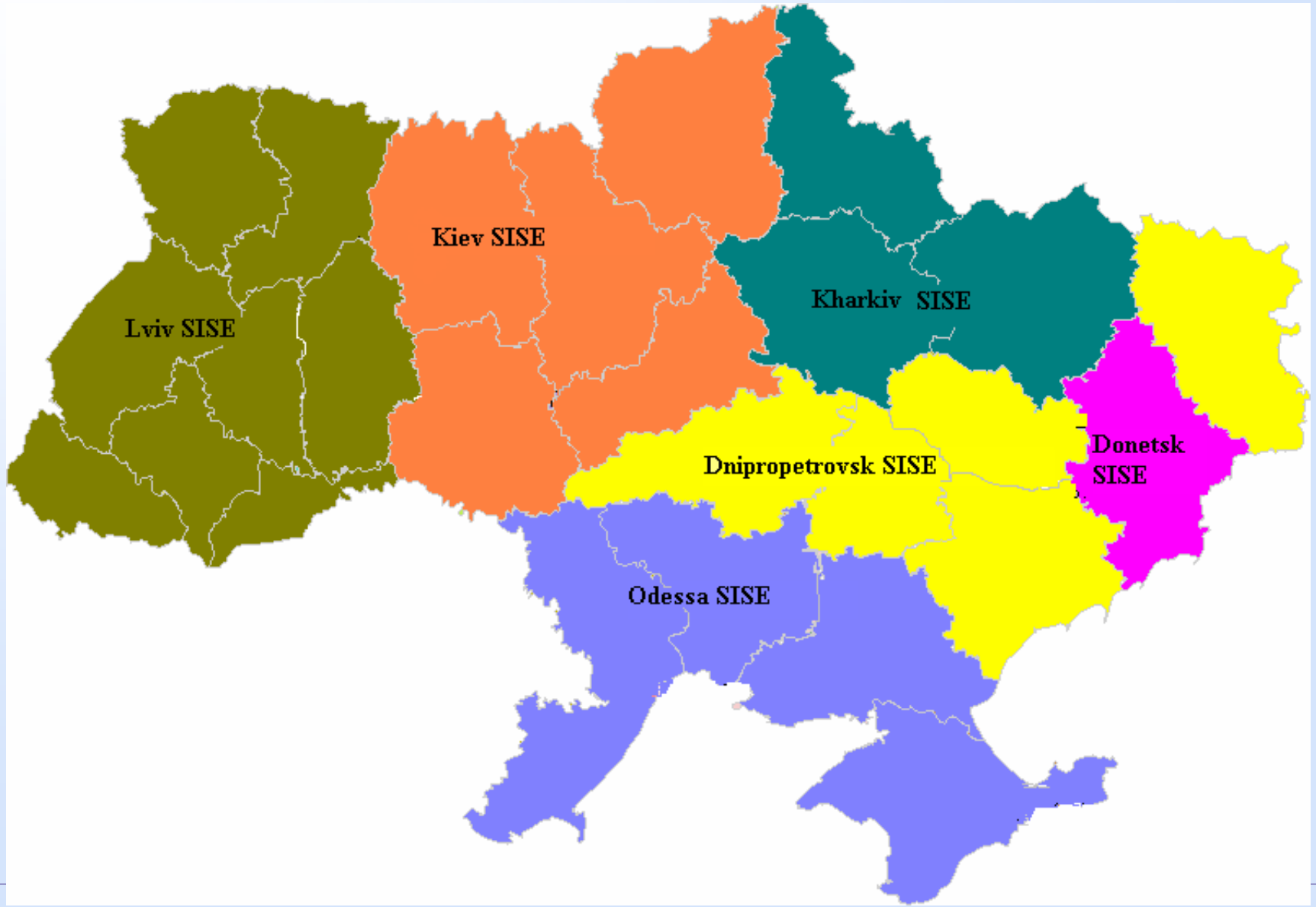
- Activity in managing RW resulting from the use of SRS in medicine, research and industry are carried out by

  6 State Interregional Specialised Enterprises (SISE) of State Corporation Radon:

  Kiev, Kharkiv, Lviv, Dnipropetrovsk,

  Odessa, Donetsk (only transportation)

Service Regions Map



Facilities design characteristics

Facility	Main purpose	Design capacity of storage facilities	Year of commission
Kyiv SISE	Transport, processing, storage of radwaste	SRW – 1800.0 m^3 Angar with containers – 219.0 m^3 LRW – 1000.0 m^3 Spent RS –120 kg equiv. Ra	1962
Dnipropetrovsk SISE	Transport, storage of radwaste	SRW – 450.0 m^3 LRW – 200.0 m^3 Spent RS – 50 kg equiv.Ra	1961
Odessa SISE	Transport, storage of radwaste	SRW – 583.0 m^3 LRW – 400.0 m^3 Spent RS – 50 kg equiv. Ra	1961
Lviv SISE	Transport, processing, storage of radwaste	SRW – 1140.0 m^3 LRW – 200.0 m^3 Spent RS – 80 kg equiv.Ra	1962
Kharkiv SISE	Transport, processing, storage of radwaste	SRW - 2384,6 m^3 LRW – 1000.0 m^3 Spent RS – 60 kg equiv.Ra	1962

Amount of DSRS at Radon sites by the end of 2009

State Specialised Enterprise	DRS			
	DSRS with bioshild		Discharged DSRS (in the well)	
	Amount	Activity, Bk	Amount	Activity, Bk
Dnipropetrovsk	88077	3,16E+14	8199	1,43E+14
Kiev	71463	3,62E+14	5800**	1,84E+14
Lviv	28712	1,35E+14	7083	1,04E+14
Odessa,	21584	2,90E+16	10916	1,70E+13
Kharkiv	91076*	3,64E+14	15219	9,60E+13
At all	300912	3,02E+16	47217	5,44E+14

* - including 22414 DSRS with activity 1,8E+14 Bk – cemented

** - including 1970 DSRS contene Ir-192 activity ~ 0 Bk

Radon facilities

б) Общий вид хранилища

- **Modernisation is needed**

- **Intoduce <u>sustainable system</u> for RW in the form of DSRS management**

Radon facilities status

- Tipical Soviet-design “Radon-type” facilities for RW at regional special RW enterprises were build in 1960-es as disposal facilities for radioactive wastes originated from out of nuclear fuel cycle
- These fasilities currently **not comply** with requirements for RW disposal
- Since 1990-th have being considered not a disposal facilities but as waste collection points for **transportation and temporaly storage** of RW until move to the centralized site

Strategy and Programs for DSRS

- **National Ecological Program of Radioactive Waste Management** approved by Low of Ukraine № 516-VI, 17Sept 2008

- **Radioactive Waste Management Strategy in Ukraine** approved by the Order of Government № 990-p, 19 August 2009

- **State Program for Safe Storage of Disused High-Level Sources** approved by the Order of Government № 1092, 3 August 2006

Strategical Tasks for Radon Sites

- Turn Radon enterprises activity to collection, transportation and temporary storage of RW until move to the Centralized site for long term storage & disposal
- Modernization of technologies, equipment, containers and transport means
- Safety reassessment of ‘legacy’ RW disposal for support of a decision of
  - retrieve and transportation to the Centralized facilities

  or may be
  - final closure on place and institutional control

State Program for Safe Storage of Disused High-Level Sources

Program objective is to develop and implement measures for:

- removal of “historical” high-level DSRS from the users’ facilities
- development of special equipment for removal DSRS from facilities and conteinerisation
- transportation from users’ sites to Radon regional enterprises
- temporaly storage at regional Radon enterprise
- **development Centrilized storage for long-term safe and secure storage of DSRS**
- perspective transportation of all DSRS to Centralized storage facility

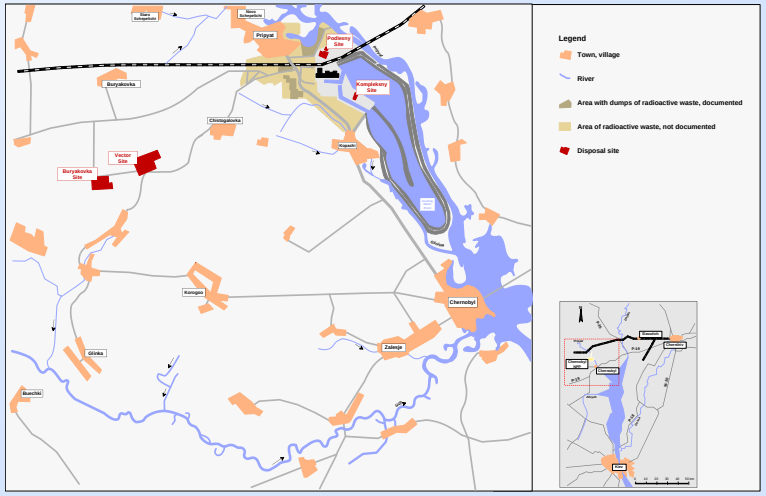
Modernization of the system for DSRS management within the **G8** non proliferation initiatives

- Design and construction of Centralize storage facility for management and long term storage of DSRS (UK, EC)
- Design of moved protection sell for discharges of DSRS and special transport container (France)
- Decommissioning of SRS using facilities, collecting DSRS from bankrupt users organizations and transport them to regional enterprises Radon (Germany, USA)
- Improvement of physical security and transportation system of DSRS (USA)
- Decommissioning of SRS storages resulting from former USSR military programs (Sweden)

G8 Projects Implementation

Construction of Centralize storage facility for management and long term storage of SRS (UK, EC) is the major stratygical project for development the modernized system of DSRS management in Ukraine

- Will include means for identification, sorting, characterization, conditioning and procesing of all tipes of DSRS
- Will be constructed in the Chernobyl Exclusion Zone at the Vector Complex Site as a part of National Centre for RW Management
- Currently the second iteration of design was implemented
- The State comprehencive regulatory reviev of design is going on



G8 Projects Implementation

Design and construction of mobile protection (hot) sell for discharge of DSRS stored at Radon sites and special transport&storage container (France)

- Conceptual design was presented
- Thechnical specifications for equipment are under development
- Technical documentation for conteiners is curently under regulatory reviev

G8 Projects Implementation

Decommissioning of SRS using facilities, collecting DSRS from bankrupt users organizations and transport them to regional special RW management enterprises Radon (Germany, USA)

- During 2009 were collected and placed for safe and secure storage at regional RW management enterprises **7 184 DSRS** from different regions of Ukraine (Germany – BMU)
- Decommissioning of SRS using facilities projects are developing for several big users enterprises (currently bancruts) from former Soviet industy and scientific programms (USA)
  - Institut of Physics NASU, Kiev
  - Institut of Phisical Chemisty NANU, Kiev
  - Instiut of Oncology and Radiobiology NASU, Kiev
  - Electron-gas enterprise, Govty vody, Dnipropetrovsk region

  ets.
- Removal equipment and special conteiners are developing

G8 Projects Implementation

Improvement of physical security and transportation system of DSRS (USA)

- Modernized physical protection systems at all Regional special Radon enterprises were instolled and put to the operation
- Overall studing for safe and secure transportation of radioactive materials were provided for all RW management interprises involving Ministers and Regulator in 2009-2010
- Development of special coordinating centre for transportation is under discussion

G8 Projects Implementation

- Investigation, safety assessment and decommissioning of DSRS storages resulting from former USSR military programs (Sweden)

  - investigations of the facilities status were provided and report prepared

  - agriment for futher cooperation etablised on the coordination meetings

RW management Fund

- Low of Ukraine “Of Radioactive Waste Management” requires of availability of special financial fund of RW management
- In 2009 the main legislative provisions regarding this Fund were establish (mechanism for collection,rules of spending)
- “Polluter pays” mechanism foresees payment for generated RW and for RW stored by waste producer longer than established in the license time frame (for SRS users 6 mounth after operational lifetime exp.)
- Government guarantees for enterprises who have paid to the Fund taking their RW for disposal & long term storage for free
- Accumulated money would intended only for State RW management program implementation
- Good tool to stimulate users for transfer DSRS to special RW management enterprises on time