



Ukraine's experience with technical assistance in implementing DSRS management

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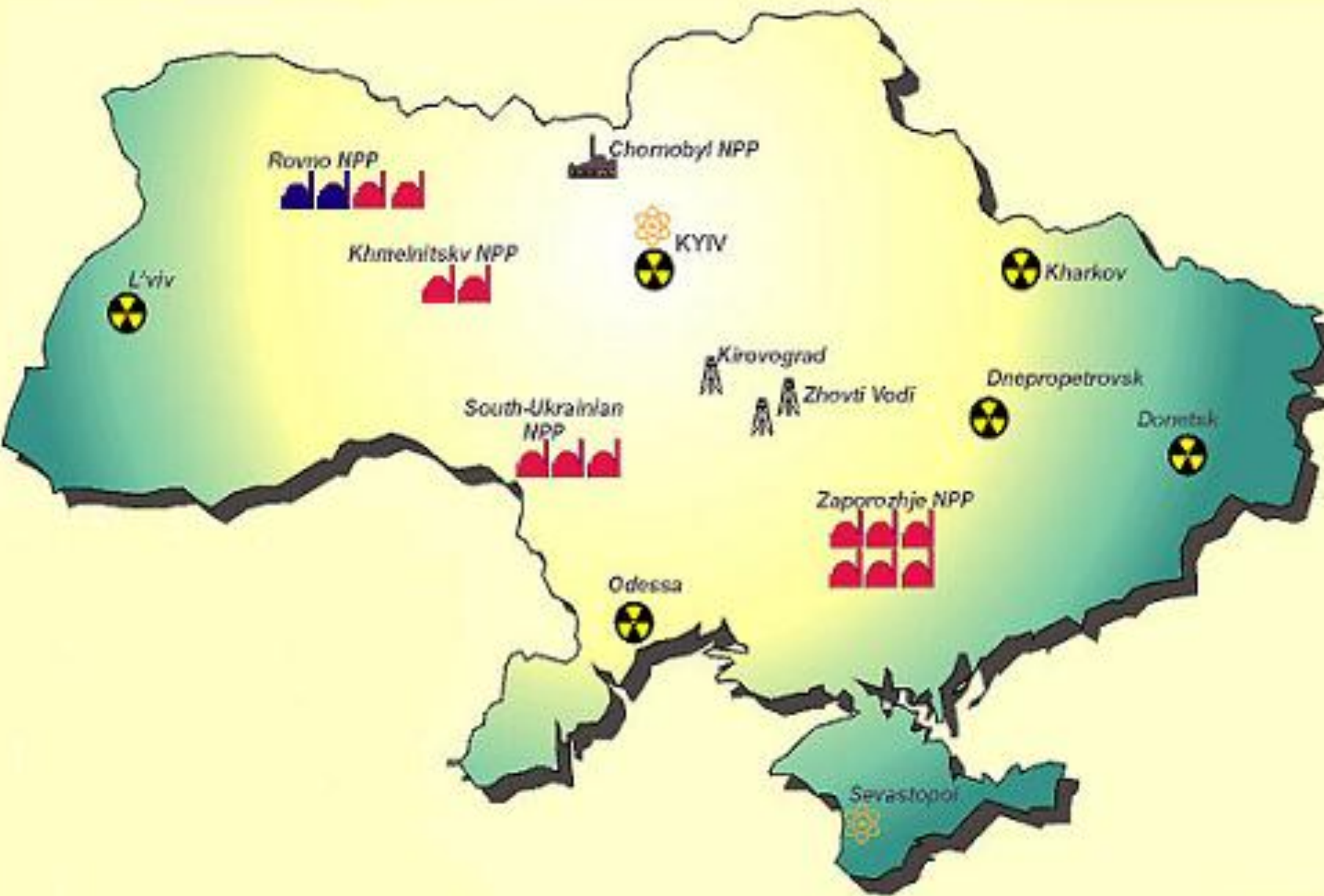
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1. Policy for DSRS Management



DSRS Policy



DSRS management in Ukraine is based on:

- ▶ **Legislation:** Laws → Governmental resolutions → Regulations
- ▶ **Policy documents:** (Green and White Books) → Strategies → State Programs
- ▶ **International instruments:** BSS - 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



DSRS Policy



- Green Book – Consultations on Ionizing Radiation Sources Safety Strengthening and White Book – Safety Strengthening of Ionizing Radiation Sources Management
- Radioactive Waste Management Strategy in Ukraine (approved by the Order of Government)
- National Program of Radioactive Waste Management (approved by Law of Ukraine)
- State Program for Ensuring Safe and Secure Storage of Disused Ionizing Radiation Sources (approved by the Order of Government)



DSRS Policy/Objectives (1)



To ensure that Radiation Sources

- are used by competent licensed users with appropriate radiation protection measures
- are adequately secured/protected
- when become disused are managed safely and securely



DSRS Policy/Objectives (2)



To establish:

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



DSRS Policy



For DSRS - only those ways of management are allowed:

- Temporary secured storage at the facility (indicated in license conditions – usually not more than 6 months)
- Return of RS to country of production according to the agreement with supplier
- Transfer of RS to special enterprises for radioactive waste management



DSRS Policy



- “New” radioactive sources – imported and used after mid of 90-ies (*when regulatory system for RS safety and security was finalized*)
- “Historical” radioactive sources - imported before 90-ies



DSRS Policy/"New" RS (1)



Policy for the "new" RS provide for safe and secure management of DSRS:

- From 2007 import of "new" 1 category RS is allowed if contract includes obligation to take back the disused RS into the country of production



DSRS Policy/"New" RS (2)



Policy for the "new" RS provide for safe and secure management of DSRS:

- In 2009 Special Fund for Radioactive Waste Management was established
- Fund is filled mainly by NPP Operator
- If new radioactive source is not returned to the supplier abroad according to the contract, certain fee shall be paid to the Fund in advance.
- This fee guaranties that the DSRS will be taken to the specialized enterprise for radioactive waste management at the first demand of the user and free of charge.



DSRS Policy/“Historical RS”



Policy for the “historical” disused RS:

- If the licensee is solvent (*responsible, not bankrupt*) DSRS storage term is indicated in the license and licensee is forced to transfer disused RS to specialized enterprises for radioactive waste management by 2 mechanisms:
 - Potential sanctions for noncompliance with license conditions
 - Payments into the Radioactive Waste Fund for extended term of storage (from 2009)



DSRS Policy/”Historical RS”



Policy for the “historical” disused RS:

- If the licensee is insolvent (*bankrupt or stopped RS use tens of years ago*):
 - State Program “For Ensuring Safe and Secure Storage of Disused Ionizing Radiation Sources” provides for removal, containerization and transportation of sources to the specialized radioactive waste management facilities



DSRS Policy/Assistance



Ukraine actively searched international technical assistance to manage “historical” DSRS:

- Special technical assistance “consolidation” programs - to gather and transfer historical disused RS to the specialized radioactive waste management facilities
- Special technical assistance programs to create DSRS safe and secure long-term storage infrastructure



2. DSRS Management Practice



DSRS Management Practice



Sealed RS tracing:

- **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
 - **15 880 SRS** registered up to 2011
- “Procedure for the State Registration of Ionizing Radiation Sources” approved by Government



DSRS Management Practice



Radioactive Waste tracing

State Register of Radioactive Waste

including DSRS is in operation from 1997

- operated by National Radwaste Operator
- 454 022 DSRS are registered up to 2011
- retrospective data from early years still under registration
- “Procedure for the State RAW Inventory” approved by Governmental



DSRS Management Practice



- Information exchange procedure between both registers is established

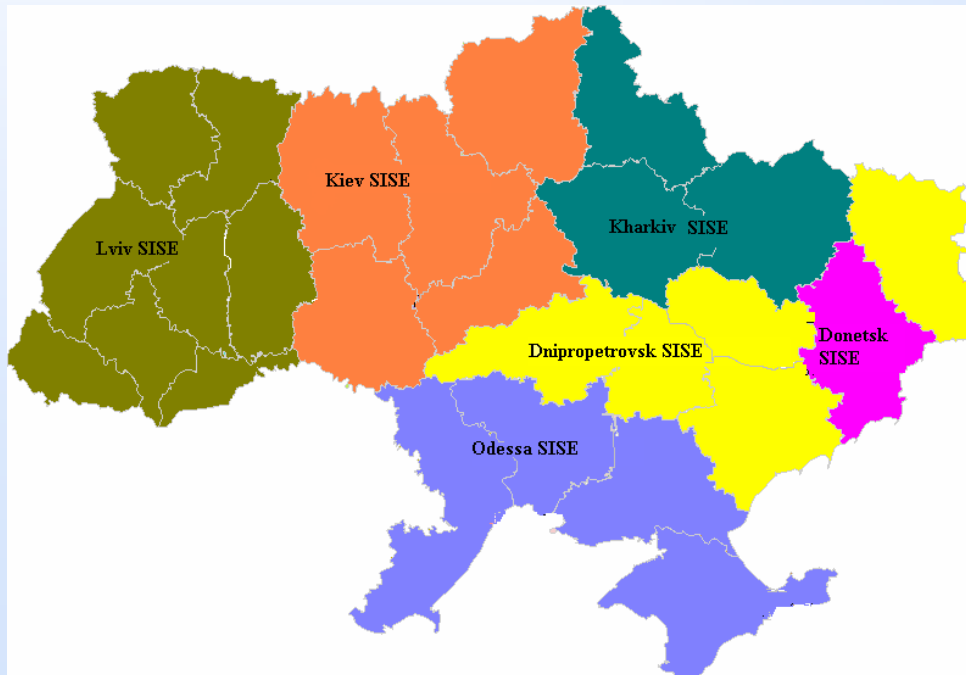
For example, in 2011 State Register of RS informed State Register of Radwaste about 1484 DSRS which were declared as radwaste by the licensees



DSRS Management Practice



- DSRS declared by licensee as radioactive waste are collected and **stored at 6 sites** that is
6 State Interregional Specialised Radwaste Management Facilities – **“Radon facilities”**





DSRS Management Practice



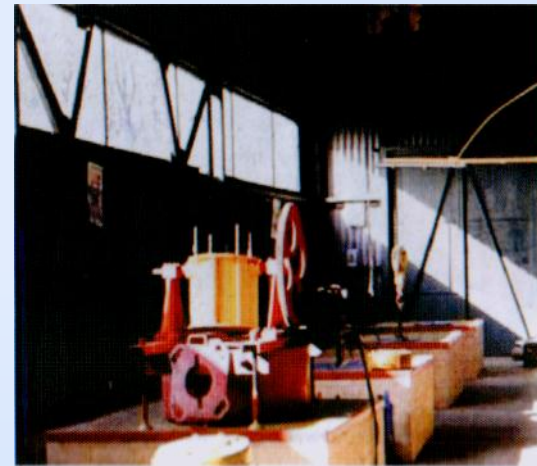
”**Radon facilities**” have two types of DSRS storage facilities:

- Boreholes

(DSRS without shielding)

- Hangar (dock) type storage

(DSRS in containers)



б) Общий вид хранилища



DSRS Management Practice



Radon facility	DSRS as Radwaste in 2011			
	DSRS with bioshild		Discharged DSRS (in the borehole)	
	Amount	Activity, Bq	Amount	Activity, Bq
Dnipropetrovsk	161612	6,41E+14	8131	1,16E+14
Kiev	88144***	5,97E+14	5805**	1,75E+14
Lviv	30523	1,26E+14	7083	6,24E+13
Odessa	32656	2,76E+16	10916	1,70E+13
Kharkiv	84405*	3,25E+14	15348	9,30E+13
At all	397310	2,93E+16	47283	4,63E+14

* - including 22414 DSRS with activity 1,54E+14 Bq – cemented

** - including 2767 DSRS contend Ir-192 activity ~ 0 Bq

*** - including 110 DSRS are activity ~ 0 Bq



DSRS Management Practice

- “Radon-type” facilities for RW at regional specialized RW enterprises were build in 1960-es **as disposal facilities** for radioactive wastes originated from out of nuclear fuel cycle
- Since 1990-th have “Radon facilities” **are not considered as disposal facilities** but as waste collection facilities for transportation and interim storage of RW



DSRS Management Practice



National Program of Radioactive Waste Management provisions are to:

- Limit “Radon facilities” activities to the collection, transportation and temporary storage of RW until it will be moved to the Centralized Storage Facility (under construction now) for long term storage & disposal
- Upgrade technologies, equipment, containers and transport



DSRS Management Practice

- “Radon facilities” license conditions require operator to provide safety reassessment of ‘legacy’ radwaste facilities which were constructed as disposal facilities
 - Based on the safety reassessment the decision should be made:
 - to retrieve and transport DSRS to the Centralized Storage Facility
- OR**
- to continue disposal with subsequent final closure and institutional control



3. DSRS Technical Assistance



DSRS Technical Assistance



From 2009 up to 2011:

- 11 289 DSRS from different regions of Ukraine with the total activity is $1,18E+15$ Bq were collected
- Placed for safe and secure storage at regional RW management enterprises - “Radon facilities”
- Provided with technical assistance of USA-DOE-Global Threat Reduction Initiative and Germany – BMU - GRS



DSRS Technical Assistance



- Decommissioning of 6 “historical” radiological facilities with 1 category DSRS (5 irradiators)
- Unique and complex projects - equipment for retrieval and special containers are developed
- Provided with technical assistance of USA-DOE-Global Threat Reduction Initiative and Germany – BMU - GRS



Irradiation facility discharging example

- RS with Co60 total activity more than 1000 Ci
- Wet RS storage
- Commissioned 30 years ago, not in use from 2002
- Located in Kiev







DSRS storage infrastructure development:

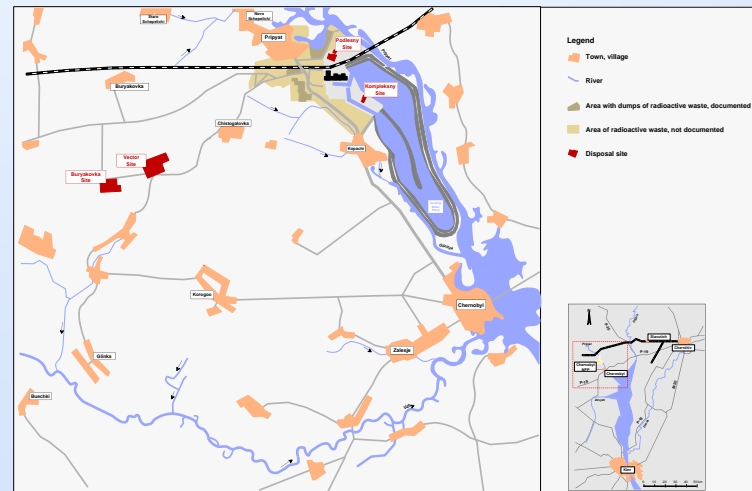
- Improvement of DSRS storage and transportation security (USA)
- Design and construction of Centralized storage facility for management and long term storage of DSRS (UK, EC)
- Decommissioning of SRS storages resulting from former USSR military programs (Sweden)



DSRS Technical Assistance



Centralized storage facility for management and long term storage of DSRS (UK, EC) will be constructed in the Chernobyl Exclusion Zone at the Vector Complex Site as a part of National Centre for RW Management





DSRS Technical Assistance



- Centralized storage facility will include means for identification, sorting, characterization, conditioning and processing of all types of DSRS
- Currently the construction stage is going on





DSRS Technical Assistance



Improvement of DSRS storage and transportation security (USA-DOE-Global Threat Reduction Initiative technical assistance):

- physical protection systems upgrading at all Regional specialized Radon enterprises (“Radon facilities)
- development of special coordinating centre for transportation is under discussion



DSRS Technical Assistance



IAEA assistance:

- Training
- Safety demonstration projects: PRISM, GEOSAF
- IAEA standards



4. DSRS Final Disposal Challenges



Question and answer



*What is the
difference between*

- *RS,*
- *DSRS*
- *and radwaste?*

*The same as
between*

- *healthy person,*
- *patient in coma*
- *and dead body*

*Nobody likes to have patients in coma ...
and if patient can not be recovered than sooner
or later the body should be buried*



DSRS Disposal Challenges



- If reuse/recycling is not possible - final disposal is the only sustainable, safe and secure solution.



DSRS Disposal Challenges



■ Boreholes (wells)

- Existing facilities under safety reassessment
- Safety reassessment is complicated by uncertain inventory and limited knowledge about disposed DSRS conditions
- Operator has no sufficient safety assessment experience
- DSRS disposal is stopped
- If long-term safety will not be demonstrated - no technologies for retrieval are in place



DSRS Disposal Challenges



- Geological repository
 - Planned to be commissioned in 2050
 - No acceptance criteria (WAC)
 - No requirements for DSRS conditioning to comply with WAC



DSRS Disposal challenges



More international cooperation is needed:

- to establish requirements for DSRS final disposal
- to provide Member States examples of good practice in the sphere of:
 - DSRS final disposal
 - DSRS conditioning if WAC for final disposal are absent

Thank you for your attention!

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