



ΕΕΑΕ ΕΛΛΗΝΙΚΗ ΕΠΙΤΡΟΠΗ ΑΤΟΜΙΚΗΣ ΕΝΕΡΓΕΙΑΣ
GREEK ATOMIC ENERGY COMMISSION

Euratom event (RTD-ENER-JRC) The safe management of spent fuel and radioactive waste in the small inventory Member States

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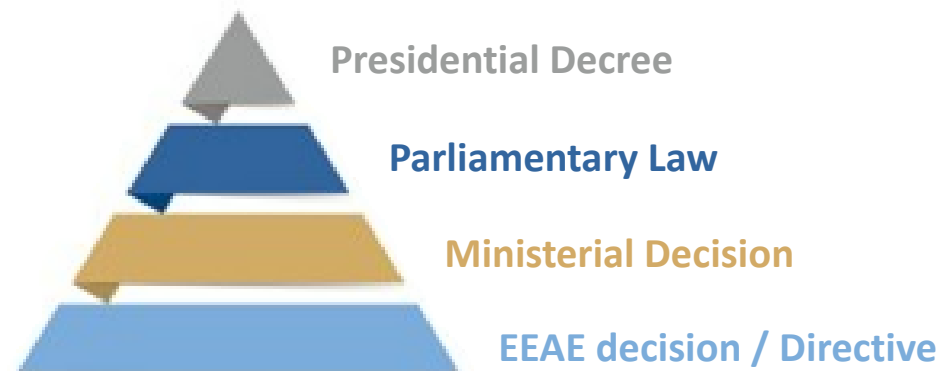
Outline

- National Framework – Main legislation for RW and SF management
- Main sources of RW
- Main RW producing/managing facilities
- SF and RW inventory
- Bodies in charge for RW management
- National Program and recent developments
- International Peer Reviewing
- Challenges

National framework

- Radioactive waste
 - MD 35225/2023
 - MD 107017/2006
- Nuclear installations
 - PD 60/2012
- Nuclear research reactors
 - MD P/112/305/2012
- Implementation of the International obligations
 - Law 2480/1997
 - Law 1636/1986
 - Law 1758/1988
 - Law 1937/1991
 - Law 1938/1991
 - Law 2824/2000
 - Law 3787/2009
 - Law 3990/2011

- Safeguards and non-proliferation
 - Law 437/1970
 - Law 2805/2000
- Radiological Protection
 - PD 101/2018
 - MD 45872/2019
 - MD 135966/2019
- Other relevant legislation
 - PD 83/2010
 - MD 11592/1999
 - MD P/112/1057/2016



Main legislation for RW and SF management



Council Directive 2011/70/Euratom
“Establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste”



Transposed in MD 35225/2023
+ NatPro (art. 25)

Council Directive 2013/59/Euratom
“Laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation”



Transposed in PD 101/2018

Ratified by the Parliament
(Law 2824/2000)

IAEA Code of Conduct for the safety and the security of radioactive sources (RS) and its Supplementary Guidance on the Import and Export of Radiation Sources.

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management



Main sources of RW

Medicine



Research Laboratories



Orphan RS and RM



Industry



NORM



Consumer products



Main RW producing/managing facilities

Research facilities

NCSR 'D' Research Reactor (GRR-1) – *Licensed under extended shutdown*

NCSR 'D' Radioactive Waste Interim Storage (DRWIS) – *Operating*

NCSR 'D' Tandem Van de Graaff accelerator – *Operating*

AUTH Subcritical Assembly – *Operating*

Industrial facilities

4 cyclotrons – *Operating*

Medical facilities

2 baby cyclotrons – *Installed, not operating*

NORM industry

Phosphoric Fertilizers

Oil drilling

Aluminium Production

Lignite power plant



NCSR 'D' – GRR1



NCSR 'D' Tandem



AUTH Subcritical Pile



SF inventory

No remaining SF!

NCSR 'D' – Research Reactor (GRR1)

SF exported in Feb 2019

FF exported in May 2023

NTUA – Subcritical Assembly

No SF (Never operated)

FF exported in Jan 2024

AUTH – Subcritical Assembly

Licensed facility

1500 kg of natU (unclassified as SF)



Export of NCSR 'D' FF



Export of NTUA FF

RW Inventory

National Center for Scientific Research "Demokritos" (NCSR "D")								
	Interim storage facility DRWIS		Research reactor (in shutdown) GRR-1		Decommissioning GRR-1		Total NCSR "D"	
	m ³	MBq	m ³	MBq	m ³	MBq	m ³	MBq
VLLW	12,8	26			14,44	*	27,24	26
VLLW (Liquid)					0,6	*	0,6	*
LLW	3	139	0,2	0,3	0,46	*	3,48	139,3
ILW	0,01	10.000			0,92	700.000	0,93	710.000
Legacy (objects in 153 drums)	25	1.106**					25	1.106
Legacy (objects in 50 drums)			10	1.000			10	1.000
Legacy (cemented sludge in 57 drums)	4,84	60					4,84	60
Graphite waste					5,6	*	5,6	*
Contaminated Soil Pu	0,3	*					0,3	*
Contaminated plates with Pu			0,01	*			0,01	*
Metallic waste			9	*			9	*
Consumer Products (lightning rods)	0,4	8.000					0,4	8.000
Consumer Products (smoke detectors)	0,2	405					0,2	405
Consumer Products (Vehicle Instr., Lamps, depU blocks)	0,5	500					0,5	500
TOTAL NCSR "D"	47,05	20.236	19,21	1.000,3	22,02		88,1	

*to be defined
 **based on external dose surveys – characterization in progress (Recovery and Resilience Fund project)



RW Inventory (continued)

Other facilities		
	m ³	MBq
Contaminated Ash	75	10.000
Objects contaminated with NORM	160	2.500
Consumer Products (lightning rods)	1,9	28.300
Consumer Products (lightning rods: future arisings)	3,3	50.500
<i>TOTAL OTHER FACILITIES</i>	<i>240,2</i>	

Disused sources (DSRS)		
	DRWIS	Other facilities
	Number of DSRS	
Category 1		2
Category 2	1	4
Category 3	3	7

Source: https://eeae.gr/files/Current_INVENTORY%20August%202024.pdf



Bodies in charge for RW management

... as provisioned in the MD 35225/2023.

- Minister responsible for EEAE (Ministry of Development)
- Greek Atomic Energy Commission (EEAE) – *Regulator*
- National Committee for Radioactive Waste Management (EEDRA) – *Advisor*
- Organization for the Interim Storage and Management of Radioactive Materials (OPADRY) – *Implementor (Not established yet)*
- National Centre for Scientific Research ‘Demokritos’ (NCSR ‘D’) – *Implementor*
- *Organization for the Radioactive Management and Disposal (ODRA) – Implementor (Not established yet)*

National Program (NatPro) and recent developments

The current version is documented in Art. 25 of the MD 35225/2023. In this context the following actions are defined:

A. Recycling of sealed radioactive sources and nuclear materials

- In February 2023, 1.5M € was allocated through Recovery and Resilience Fund (RRF) towards this action – 80% of the DSRS finally included in this project has already been sent abroad to be recycled.
- NCSR 'D' came in an agreement with McMaster Nuclear Reactor (MNR), Canada, to dispatch for reuse the 13 non-irradiated (fresh) LEU fuel. The transport was completed in May 2023.
- A cooperation program by IEAE assisted National Technical University of Athens (NTUA) to export fresh uranium from a dismantled subcritical assembly. The transport was completed in January 2024.

B. Characterization of historical RW of NCSR 'D'

- In February 2023, 1.65 M € funding through RRF was allocated towards this action. This action is starting in November and will be completed by mid-2025.

C. Upgrade of the existing RW management facility at NCSR 'D' (DRWIS) for the characterization and preparation for disposal of the NCSR 'D' RW and those that will be produced from the decommissioning of the NCSR 'D' research reactor

- Greek Government allocated 1.5M € at NCSR 'D' budget for the upgrade of the DRWIS.

National Program (NatPro) and recent developments (continued)

D. Decommissioning of the research reactor

- The decommissioning plan for the research reactor is under preparation following significant milestones that have been achieved such as the core dismantling, repatriation of FF and SF, drying reactor pool etc
- Official request has been sent for the facility to be excluded from Paris Convention (third party liability in the field of nuclear energy)

E. Disposal facility for the needs of the NCSR 'D' RW and of those that will result from the decommissioning of the research reactor of NCSR 'D'

- EEDRA requested from NTUA to carry out a radiological safety study to examine the suitability of constructing a disposal facility within the premises of NCSR 'D'. The study revealed that the location of NCSR 'D' can be suitable from a radiological safety point of view and suggested that hydrogeological and geochemical studies should be further carried out to ascertain necessary parametric values to be able to draw final conclusions.

F. Management up to disposal of RW and radioactive sources other than those of NCSR 'D'.

- EEAE has drafted a list with all the RM which is stored locally in certain scrap metal yards. Information has been collected with RW volume and activity.
- EEAE has contacted the cyclotron facilities and asked them to make a first draft estimate of the RW which will be produced in the future from such facilities. The discussions and the estimations are still in progress. It should be noted that the involved personnel of cyclotron facilities are still gaining experience in this area.



International Peer Reviewing

In 2023 Greece hosted an Integrated Review Service for Radioactive Waste and Spent Fuel, Decommissioning and Remediation (ARTEMIS) mission.

Scope of the mission included national policy, framework, and strategy (National Program) regarding the safe and responsible management of all types of Greek RW.

The mission ended up with 13 recommendations and 2 suggestions:

- 9 addressed to the Government
- 3 to NCSR 'D'
- 3 to the Regulatory Body

Challenges

- to address the ARTEMIS findings
- to improve the EEAE communication strategy so as to include all stakeholders in decision-making regarding issues related to RW

Over the next three years:

- to finalize the studies required for the siting of the disposal facility
- to establish a waste management organization, OPADRY, in the appropriate timeframe for carrying out the necessary activities foreseen in the National Program.

Detailed information

4th National Report of Greece on the Implementation of Council Directive 2011/70/EURATOM (published in August 2024)

Thank you!

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Greek Atomic Energy Commission (EEAE) staff



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