

Inventory of radioactive waste, disused and orphan sources and materials and sources in use

TABLE 1 : Resins in drums

Location: Interim storage facility of NCSR "Demokritos"

Form Resins

Origin: Past activities of GRR-1, NCSR "Demokritos"

Properties: Radiological, Physical, chemical

Status: In drums

Processing options: Characterization in progress. Disposal option has not been decided

Update: June 2018

Characterization completed

Waste classif.	Storage room	Type	# Drums	Volume, L/drum	Weight, kg/drum	Total Weight, kg	Total activity, MBq	Nuclides (main)	Maximum C _A / drum, Bq/g	Total MBq
VLLW & LLW	A & B (*)	Resins	158	200	100	15800	245	Ag-108m	4,8	15
								Cs-137	160	213
								Eu-152	2	4
								Co-60	6,2	13

(*) : LLW are stored in building A (56 drums) & VLLW in building B (102 drums). Reference date for activities 2011.

TABLE 2 : Radioactive waste produced from GRR-1

Location: NCSR "Demokritos"

Type: Sediment, liquid and activated/contaminated objects

Origin: Past activities of GRR-1, NCSR "Demokritos"

Properties: Radiological, Physical, chemical

Status:

Processing options: Characterization in progress. Disposal option has not been decided, yet

Update: July 2018

Solid Waste

Waste classif.	Storage room	Form	# Drums	Volume, L	Total activity, kBq	Nuclides (main)	Total Activity kBq
LLW	NCSR "D"	Sediment	1	2	300	Ag-108m	50
						Cs-137	
						Eu-152	30
						Co-60	220

Reference date for activities 2011

Solid Waste

Waste classif.	Storage room	Form	# Drums	Volume	Dose rate at 5 cm	Nuclides (main)	Total Activity kBq	Remarks
ILW	B	Metal parts from GRR-1	1 (cement shielding)	< 0.01 m ³	~ mSv/h	Co-60	(*)	Metal objects (e.g. screws) from GRR-1
LLW	A	Objects in drums	53	10 m ³	< 4 μSv/h	Co-60, Cs-137, Ag-108m, Eu-152	(*)	From GRR-1
Historical Waste	B	Objects in drums	100	20 m ³	< 50 μSv/h	(*)	(*)	From GRR-1 and connected facilities
Historical Waste	B	cemented sludge	50	10 m ³	~ 100 nSv/h	Cs-137	(*)	From GRR-1 and connected facilities
Historical Waste	NCSR "D"	Objects in drums	50	10 m ³	~ 100 nSv/h	(*)	(*)	From GRR-1 and connected facilities

(*) to be defined

Table 2 cont'd

TABLE 2 : continued

Liquid waste

Waste classif.	Storage room	Form	# Tanks	Volume, L	Total activity, MBq	Nuclides (main)	Total Activity kBq
VLLW	Liquid waste storage tanks	Water	15	8944	5,70E+05	H-3	5,70E+05
						Cs-137	47
						Co-60	51

Reference date for activities 2011

TABLE 3 : Expected decommissioning radioactive waste from GRR-1

Location: GRR-1 of NCSR "Demokritos"

Type: Activated /contaminated objects

Origin: Decommissioning of GRR-1. Additional RW may be produced during decommissioning activities.

Properties: Radiological, Physical, chemical

Status:

Processing options: Characterization in progress. Disposal option has not been decided, yet

Update: July 2018

Solid Waste

Waste classif.	Location	Form	# Items	Mass (tons)	Dose rate at 5 cm	Nuclides (main)	Total Activity kBq	Remarks
EW	GRR-1	Metal parts	(*)	30	(*)	Co-60, Cs-137, Ag-108m, Eu-152	(*)	Aluminium, Steel and Stainless Steel
VLLW	GRR-1	Metal parts	(*)	28	(*)	Co-60, Cs-137, Ag-108m, Eu-152	(*)	Aluminium, Steel and Stainless Steel
VLLW (mixed)	GRR-1	Lead	(*)	5	(*)	(*)	(*)	Lead (at the thermal column)
LLW	GRR-1	Metal parts	(*)	0.6	(*)	Co-60, Cs-137, Ag-108m, Eu-152	(*)	Aluminium, Stainless Steel
LLW (mixed)	GRR-1	Lead	(*)	1.8	(*)	(*)	(*)	Lead inside the experimental tubes
ILW	GRR-1	Metal parts	(*)	0.3	(*)	Fe-55, Ni-63, Co-60	(*)	Aluminum, Staintless Steel (support structure of the core and parts of the control rods)
ILW (mixed)	GRR-1	Be blocks and part of the control rods	(*)	0.2	(*)	Fe-55, Ni-63, Co-60, Ag-110m, Ag-108m, Cd-109, H-3	(*)	Be and Ag-Cd-In
(*)	GRR-1	Graphite	(*)	15	(*)	(*)	(*)	Partitioning will be done in the future
(*)	GRR-1 store room	Contaminated objects	(*)	< 1 m ³	tens μSv/h	(*)	(*)	Objects from maintenance, house-keeping, etc

(*) to be defined

TABLE 4 : Disused sources

Location: see table

Type: Disused sources stored at NCSR "D" and at user's facilities (on site)

Origin: Past -current activities of operator

Properties: Radiological

Status: Raw material

Processing options: Awaiting for recycling. Activity verification or determination is still pending

Update: July 2018

Location	Source Category	# sources	Total activity, MBq	Nuclides
Interim Storage NCSR "D, Building A	1			
	2	1	2,18E+04	Co-60
	3	56	4,78E+05	Cs-137, Am-241/Be, Sr-90, Co-60
	4	15	2,53E+04	Co-60, Kr-85, Cs-137
	5	312	2,98E+04	Co-60, Cs-137, Ir-192, Sr-90, Mn-54, Ra-226, Am-241, C-14, Pm-147
On site (facilities countrywide and in GRR-1 storage room)	1	3	5,22E+08	Co-60
	2			
	3	4	5,92E+05	Am-241, Pu-239/Be
	4	57	6,07E+05	Cs-137, Am-241, Ra-226, Th-232, Eu-152
	5	210	2,03E+05	Ra-226, Ni-63, Co-60, Cs-134, Cs-137, Sr-90, Kr-85, Pb-210, U-238, Am-241, Hg-203, Mn-54, Ba-133, Na-22, Co-57
Total		658	5,24E+08	

TABLE 5 : Radioactive material

Location: Interim Storage NCSR "D and on-site at other facilities (storage)

Type: Consumer products, Instruments, contaminated objects

Origin: Past activities of operator, illicit trafficking

Properties: Radiological

Status: Raw material

Processing options: Characterization in progress. Disposal option has not been decided, yet

Update: July 2018

Location	Type	Origin	# items / quantity	Activity	Nuclides
Interim Storage NCSR "D	Lighting rods	Collected from sites	154	~ 50 MBq/item	Am-241, Ra-226
	Smoke detectors	Collected from sites	13475	~ 0.03 MBq/item	Am-241
	Consumer products, instruments, objects	Vehicle instruments, lamps, depU blocks	2298	various (*)	Ra-226, Am-241, Th-232, Sr-90, depU
	Contaminated soil, objects	Illegal actions, illicit trafficking	3 drums	(*)	Pu-238, Pu-239, Pu-240, Pu-241
	Metal plates with evaporated Pu-238	Illegal actions, illicit trafficking	250	(*)	Pu-238, Pu-239, Pu-240, Pu-241. Evaporation on metal plates
On-site (in facilities, countrywide)	Lightning rods	Activities of user	535	50 MBq/item	Am-241, Ra-226
	Consumer products, instruments, objects	Vehicle instruments, lamps	10 drums	(*)	Ra-226
	Insineration Ash	Scrap metal industry	50-100 m ³	(*)	Cs-137
	Contaminated objects with NORM	Excavation industry	100 m ³	Max activity concentration, C _A =5E3 Bq/g	Ra-226

(*) unknown at the moment, to be defined

TABLE 6 : Orphan sources**Location:** On site**Type:** Orphan sources stored on site, where they detected (metal industries, scrap metal facilities, customs)**Origin:** Scrap Metal**Properties:** Radiological**Status:** Raw material**Processing options:** Characterization in progress. Disposal option has not been decided, yet**Update:** July 2018

Location	Source Category	# sources / devices	Form	Total activity, MBq	Nuclides
On site, at locations / facilities	1				
	2	1	Sealed source	1,85E+07	Cs-137
	3				
	4				
	5	160	objects		Ra-226, Am-241, Th-232, Sr-90, depU
Total		161		1,85E+07	

(*) unknown at the moment, to be defined