POLAND

(based on JC national report)

a) National framework for management of spent fuel and radioactive waste

Poland never had neither any nuclear power reactor nor any nuclear fuel cycle facility, except uranium mine. Mining of uranium ore ended in 1968, and processing was terminated in 1973, being not a source of any new waste at present. There is no waste from power reactor operation or spent fuel reprocessing activities in Poland. The radioactive waste originates then from research reactors, scientific and educational institutions, industry and hospitals. This waste comes from various applications of ionising radiation used in ca 3000 institutions.

According to the plans which have been valid up to 1991, spent nuclear fuel from research reactors was to be returned to the manufacturer, in that case - the former Soviet Union. In recent years the major part of SNF has been safely shipped to the Russian Federation under the GTRI – RRRFR Program with the US Government support. Next shipment in the year 2016 will ended evacuation all HEU spent fuel from Poland.

In April 2008 Council of Ministers obliged Minister of Economy to prepare National Plan of Management of Radioactive Waste and Spent Nuclear Fuel - document describing new national strategy regarding radioactive waste management and spent fuel management. The draft of the Plan was prepared by the Team in May 2014 and it was adopted in 2015.

The safe, secure, stable and protected storage of spent nuclear fuel, after its unloading from the nuclear reactor or from the fuel pool at the reactor and before its handling over for reprocessing or for disposal as radioactive waste, is the responsibility of the Government, acting by means of dedicated governmental bodies (Ministry of Economy) and public institutions (Radioactive Waste Management Plant). The development of technologies and capacities for longer-term management, including final radwaste disposal within Polish territory, is also the responsibility of the Government and constitutes a primary goal of spent fuel management strategy

Radioactive waste is classified into three categories with respect to the concentration of radioactive isotopes contained in the waste: low-, medium- and high level radioactive waste. These categories are further sub-divided into sub-categories according to the half-live of radioactive isotopes and the concentration of radioactive isotopes contained in the waste. Liquid waste is additionally classified according to its activity concentration. Spent nuclear fuel intended for disposal is classified as a high-level radioactive waste.

Disused (spent) sealed radioactive sources form an additional category of radioactive waste. Those sources are classified into the following subcategories of spent sealed radioactive sources according to the level of their activity: low-, medium- and high-level, which are further

subdivided according to the half-life of contained radionuclides into short-lived and long-lived sub-categories.

The low, intermediate and high level waste is subsequently classified into sub-categories:

- Transitional waste which will decay within the period of three years below the value defined in the legislation,
- Short-lived waste – waste containing radionuclides of half-life < 30 years with the restricted long-lived radionuclides concentration to 4000 kBq/kg in individual waste packages and to an overall average of 400 kBq/kg in the total waste volume,
- Long-lived waste: waste whose long lived radionuclides activity exceeds 400 kBq/kg.

The spent sealed sources are grouped into three subcategories:

- Low level - if the activity of the source exceed the value given in the legislation – second column, but is below 10^8 Bq,
- Intermediate level: if the activity is in the range $10^8<A<10^{12}$ Bq,
- High level: if the activity of the source $A>10^{12}$ Bq.

b) National legal and regulatory framework

The Act of Parliament on Atomic Law of 29 November 2000, which has been enforceable since 1 January 2002, introduced a consolidated system ensuring nuclear safety and radiological protection in Poland. According to the Atomic Law Act, legal authority to issue licences, binding opinions and to perform regulatory control of the activities involving radioactive waste and spent nuclear fuel in Poland is given to the President of the National Atomic Energy Agency (PAA).

The President of PAA issues the licences and accepts the notifications related also to other activities/practices that are listed above, with only the following exceptions: the licences for commissioning and use of X-ray equipment for medical purposes and for commissioning of the laboratories using such equipment are issued by the State Regional Sanitary Inspector or – for organizational units subordinated or supervised by the National Defense Ministry – the commander of the military preventive medicine center, or – for organizational units subordinated or supervised by the minister for internal affairs – the State Sanitary Inspector in the Ministry of Internal Affairs and Administration.

Activities connected with exposure of humans and environment to ionizing radiation are supervised and inspected by Nuclear Regulatory Bodies. Nuclear Regulatory Bodies consist of:

- President of PAA the supreme nuclear regulatory body;
- Nuclear Regulatory Inspectors.

c) Radioactive waste management, decommissioning and spent fuel strategy

Radioactive waste of low and medium activity, produced in Poland, is collected, processed, solidified and prepared for disposal by the State-owned public utility "Radioactive Waste Management Plant" – RWMP, which is situated in Świerk site (30 km from Warsaw). Subsequently the waste is disposed in the National Radioactive Waste Repository (NRWR) in Różan site, operated also by the RWMP. The repository - which came into operation in 1961 - is a near surface type repository, located 90 km from Warsaw on the grounds of an ex-military fort built in 1905. According to present expectations, this repository, which is the only one in Poland, is foreseen to be completely filled by 2025. Currently also alpha radioactive waste and small amounts of nuclear material (mainly depleted uranium) is temporarily stored in Różan. According to the waste acceptance criteria, the waste can be disposed in Różan repository only in solid or conditioned form. There have been studies performed to define the closure conceptions of Różan repository.

Spent fuel from research reactors may be stored either at reactor (in case of SF from MARIA RR) which is operated by the National Centre for Nuclear Research NCBJ in Świerk site, or away from reactor, in 2 separate wet storage facilities. Decommissioning activities of EWA RR attained the end of their 2nd stage. Both of these 2 separate facilities are sited at nuclear research centre in Świerk and operated by the RWMP, where also waste treatment and storage facilities for ILW and LLW are located. High activity spent sealed sources are also temporarily stored in RWMP facilities in Świerk.

In Poland there are no VLLW class, boundary of 100 Bq/g was used as proposed in IEA Working Material on Guidance to NEWMDB (2010).

Allocation of spent sealed radioactive sources (SRS) was done according to: Annex 3: Table III-1 and Fig.III-1 of Classification of Radioactive Waste No. GSG-1.

For long lived beta and/or gamma emitting radionuclides such as ^{14}C, ^{36}Cl, ^{63}Ni, assumed boundary was 50 kBq/g.

Class HLW not occur in Poland.

Because processing of sources is not normally carried out by RWMP, which has no shielding handling facility for removing sources from containers they are disposed or stored in Radioactive Waste Repository in Rozan in containers (by volume about 18%), only part of SRS delivered in return containers are disposed without containers in facility 3a.

Assumptions for classification of radioactive waste according to IAEA Safety Standards GSG-1 Classification of Radioactive Waste (2009).

Class	Meaning	Functional allocation criteria applied
VLLV	Very Low Level Waste	specific activity of waste package ≤10^2 Bq/g (≤1Bq/g for alpha)
LLW	Low Level Waste	specific activity of waste package >10^2 Bq/g
		specific alpha activity of waste package <4 kBq/g
		specific activity long lived beta/gamma isotopes <50 kBq/g
		sources with half-life <15 years and activity <15 MBq
		sources with half-life <30 years and activity <1 MBq
ILW	Intermediate Level Waste	not classified as VLLW and LLW
HLW	High Level Waste	not occur in Poland

Translation to IAEA waste classes was made as on reference date 31.12.2013.

Table 1 Radioactive Waste In Storage (NRWR Różan, Objects: 1, 2 and 3 on 31.12.2013).

Route Waste Class	Processed (type)/Un processed	Total Current Volume (m3)	Estimated Disposal Volume (m3)	Distribution (%)							Planned Disposal Route (if known)
				RO	FFE	RP	NA	DF	DC/ RE	ND	
All Classes	partially processed	1 385		0	0	0	100	0	0	0	
VLLW	partially processed	51		0	0	0	100	0	0	0	
LLW	partially processed	905		0	0	0	100	0	0	0	
ILW	partially processed	429		0	0	0	100	0	0	0	

NEWMDB waste origin type codes:
RO – reactor operations
FFE – fuel fabrication & enrichment
RP – fuel reprocessing
NA – nuclear applications
DF - defence
DC/RE - decommissioning & remediation
ND - Not Determined

Table 2 Radioactive Waste Disposed (NRWR Różan, Objects: 8 and 3a on 31.12.2013) (as disposed volume)

Waste Class	Processed (not)	Total Volume (m3)	Distribution (%)							Disposal Route Used
			RO	FFE	RP	NA	DF	DC/RE	ND	
All Classes	processed	2 402	15	0	0	85	0	0	0	Near surface disposal
VLLW	processed	793	15	0	0	85	0	0	0	
LLW	processed	1 208	15	0	0	85	0	0	0	
ILW	processed	401	15	0	0	85	0	0	0	

Table 3 Spent fuel in Storage (MTHM)

Type	Current Amount (NPP)	Current Amount (Research Reactors)
Total Spent Fuel Storage		
Wet storage (AR)		0,1
Wet storage (AFR)		
Dry storage (AR)		
Dry storage (AFR)		
Total spent fuel held in storage for other countries (amounts also included above)		

Table 4 Spent fuel sent for reprocessing (in the country or sent to another country) (MTHM)

Type	Current Amount (NPP)	Current Amount (Research Reactors)
Total amount Spent Fuel sent to Reprocessing (in your country)		
Total amount Spent Fuel sent to Reprocessing (in another country)		
Total amount of Spent Fuel received from another country for reprocessing and recycling		
Total amount of Spent Fuel (MTHM) or radioactive waste (cubic metres) returned to country of origin for storage/disposal		0,6

Table 5 Example of a translation matrix (from NEWMDB) that can be used for transition from a national classification system to IAEA classification

National Waste Classification Name	VLLW	LILW	ILW	HLW

Table 6 Waste management facilities

Type	Planned	Construct.	Commiss.	In Operation	Shutdown	Decomm.	Other	Total
Spent Fuel Storage				2				
Spent Fuel Reprocessing and Recycling								
Spent Fuel Conditioning								
Spent Fuel disposal								
Waste processing				1				
Waste storage				1				
Waste disposal				1				

Table 7 Summary of major sources of waste

Type	Planned	Construct	Commiss.	In Operation	Shutdown	Decomm.	Other	Total
Research reactors				1	1			
Nuclear Power reactors								
Spent Fuel Reprocessing and Recycling								
Other								

Table 8 Future prospects

Type	Current amount	Estimated Current amount when prepared for disposal	Current Disposal Capacity	Total forecast at 2030	Disposal Capacity 2030	Total forecast at 2050	Disposal Capacity 2050
Spent Fuel Storage							
Wet storage (AR)							
Wet storage (AFR)							
Dry storage (AR)							
Dry storage (AFR)							
Total amount Spent fuel sent to Reprocessing and Recycling							
Total amount Spent fuel disposed							
Waste in storage							
Waste disposal							