Argentina

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

The Argentine Government is solely responsible for the radioactive waste management and the National Atomic Energy Commission (CNEA) is the organization responsible for its implementation. Radioactive Waste Management Strategic Plan (PEGRR) outlines the commitments that the National Government must assume for the safety of Spent Fuel and Radioactive Waste Management, ensuring public health, the protection of the environment and the rights of future generations. It establishes the mechanisms to manage in a safe manner all waste originated from the development of practices and also those generated in decontamination activities and decommissioning of nuclear facilities and radioactive installations. The last update of the PEGRR (issued in 2012) includes the commercial start-up of the Third Nuclear Power Plant, the construction of the Fourth NPP, the life extension of Embalse Nuclear Power Plant and the start-up of CAREM Prototype Nuclear Reactor. National spent fuel management policy lays down that: the state has ownership of the special radioactive fission material contained in spent fuel originated from the operation of NPPs and from experimental, research and/or production reactors. The decision on whether or not to reuse the fissile material contained in the spent fuel has to be adopted before 2030. At such time, the installation of an underground laboratory must start, which will allow a deep geological repository to be designed and constructed. The repository must be operative by 2060.

With regard to spent fuel originated from research or radioisotope production reactors and for which no further use is envisaged, there are two alternatives: shipping back to the country where they were originally enriched, if possible, or wet interim storage and afterwards treatment and conditioning for final disposal in Argentina.

The main guidelines of radioactive waste management are:

- The radioactive waste originated from all nuclear applications performed in the country, including waste arising from the decommissioning of related facilities, will be managed safely.
- The allocation of responsibility for the development of radioactive waste management corresponds to the National State through CNEA, having the generator the obligation of providing the necessary resources for such management.
- The management of radioactive waste will be performed safely, ensuring the protection and the rights of present and future generations and the environment.
- The establishment of a proper procedure to obtain and to manage the necessary financial resources in order to comply with the obligations arising from the performance of the assigned responsibilities with reference to this matter, considering that many of them imply costs deferred in time.

In Argentina the following criteria are applied to Radioactive Waste Management:

- The radioactive materials that on account of their activity concentration and/or total activity may be considered exempt will be released from regulatory control.

- The optimized discharges of liquid and gaseous radioactive materials may be released into the environment in compliance with the authorized discharge limitations determined by the corresponding operation license.
- Those radioactive materials that on account of their activity concentration and/or total activity cannot be released into the environment will be treated and conditioned for their final disposal.

The new category produced by IAEA has recently been adopted as classification system, mainly based on long term safety considerations and on the disposal of radioactive waste:

- Exempt waste – waste that meets the criteria for clearance, exemption or exclusion from regulatory control for radiation protection purposes.
- Very short lived waste.
- Very low level waste.
- Low level waste.
- Intermediate level waste.
- High level waste.

This classification is used only with the aim of providing information about radioactive waste inventories included in this report.

b) National legal and regulatory framework

The regulation and supervision of radioactive waste management are duties of a regulatory body called the Nuclear Regulatory Authority (ARN) which is an independent public sector agency under the jurisdiction of the Office of the President. ARN is responsible, by Law, for the regulation and supervision of nuclear activities in all matters related to nuclear and radiological safety, physical protection and control of the use of nuclear materials, licensing and surveillance of nuclear facilities and international safeguards, including management of radioactive wastes. ARN regulations include licensing of nuclear facilities, radioactive facilities and their personnel, conjointly with different requirements of radiological protection, nuclear safety and transport.

The main responsibility for radioactive waste management lies in the National State through the Argentine Atomic Energy Commission (CNEA), which was created in 1950.

c) Radioactive waste management, decommissioning and spent fuel strategy

Low Level Waste

Low level waste is packed in 200 liter drums and safely stored in authorized facilities at NPPs sites and at the Ezeiza Radioactive Waste Management Area (AGE). Part of this waste is conditioned in cement matrices. Such waste includes:

1. solid and liquid waste generated from nuclear power plants, isotope applications and production facilities, research and production reactors, and facilities related to the fuel cycle.
2. non-compactable waste from the operation of nuclear power plants and other nuclear facilities.

3. liquid and solid biological waste generated from research centers, medical applications, etc.

In the past low level waste has been disposed of in enhanced surface semi-containment systems located in the AGE. However since 2001 this activity has been discontinued in order to conduct the Radiological Safety re-evaluation and to define the conditions for its closure.
For the future the construction of near surface final disposal systems have been foreseen, similar to those in operation in L'Aube (France) and El Cabril (Spain).

High and Intermediate Level Waste

In Argentina the spent fuel is not considered as waste because of its potential recycle. The decision on whether or not to reuse the fissile material contained in the spent fuel has to be adopted before 2030. At such time, the installation of the underground laboratory must start, which allows a deep geological repository to be designed and constructed. The repository must be operative by 2060.

The spent fuel from NPPs is temporarily stored until a decision on its reprocessing or final disposal is adopted. At Atucha I NPP (CNAI) spent fuel is wet stored at reactor and a dry storage facility for the oldest spent fuels is planned. At Embalse NPP (CNE) spent fuel is stored in wet pools for at least six years and then transferred to dry storage.

Spent fuel originated by the operation of research reactors is stored at the respective reactor. In the case of the research and radioisotope production reactor (RA3) the spent fuel is stored in a reactor pool until the fission products decay sufficiently, and later transferred to a temporary spent fuel storage facility. Due to the adhesion of Argentina to the RERTR Program (Reduced Enrichment for Research and Test Reactors) in December 2000, July 2006 and November 2007, all spent fuel from research and production reactors containing Highly Enriched Uranium (HUE) were exported to the Department of Energy of the USA.

Duly treated and conditioned High and Intermediate Level Radioactive Waste shall also be disposed of in the deep geological repository.

Table 1 Radioactive Waste In Storage (including spent fuel that is considered waste)

Route Waste Class	Processed (type)/Unprocessed	Total Current Volume (m3)	Estimated Disposal Volume (m3)	Distribution (%)							Planned Disposal Route (if known)
				RO	FFE	RP	NA	DF	DC/RE	ND	
All Classes	No	874	874	75	11	0	14	0	0	0	
All Classes	Yes	1880	1880	82	8	0	10	0	0	0	
ILW	No	4	4	0	25	0	75	0	0	0	
ILW	Yes	23	23	0	43	0	57	0	0	0	
LLW	No	870	870	75	11	0	14	0	0	0	
LLW	Yes	1857	1857	83	8	0	9	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 (as disposed volume)

Waste Class	Processed (not)	Total Volume (m3)	Distribution (%)							Disposal Route Used
			RO	FFE	RP	NA	DF	DC/RE	ND	
All Classes	Yes	2567	62	4	1	33	0	0	0	
ILW	Yes	170	2	46	13	39	0	0	0	
LLW	Yes	2397	66	1	0	33	0	0	0	

Table 3 Spent fuel in Storage

Type	Current Amount (NPP) Tons of Uranium	Current Amount (Research Reactors) Tons of Uranium
Total Spent Fuel Storage	3678.09	0.22
Wet storage (AR)	1717.16	
Wet storage (AFR)		0.22
Dry storage (AR)	1960.93	
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		

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-SL	LILW-LL	HLW

Table 6 Waste management and spent fuel storage facilities

Type	Planned	Construct.	Commiss.	In Operation	Shutdown	Decomm.	Other	Total
Spent Fuel Storage	1		1	5				7
Spent Fuel Reprocessing and Recycling								
Spent Fuel Conditioning								
Spent Fuel disposal								
Waste processing				14				
Waste storage				11				
Waste disposal				3				

Table 7 Summary of major sources of waste

Type	Planned	Construct	Commiss.	In Operation	Shutdown	Decomm.	Other	Total
Research reactors	1		0	5		1	0	7
Nuclear Power reactors	1	1	1	2	0	0	0	5
Spent Fuel Reprocessing and Recycling	0	0	0	0	0	0	0	
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	3678.31						
Wet storage (AR)	1717.16						
Wet storage (AFR)	0.22						
Dry storage (AR)	1960.93						
Dry storage (AFR)							
Total amount Spent fuel sent to Reprocessing and Recycling							
Total amount Spent fuel disposed							
Waste in storage	2754						
Waste disposal	2567						