ITALY

A. National Framework for Management of Spent Fuel and Radioactive Waste

Commercial utilisation of nuclear power in Italy started in 1963 and by 1981 four nuclear power plants, namely the NPPs of Garigliano (BWR), Latina (MAGNOX), Trino (PWR) and Caorso (BWR), and a LEU fuel fabrication installation (Bosco Marengo S.p.A.) had been commissioned. During that period the Nuclear Energy Research Agency (CNEN) – now the Agency for New Technologies, Energy and the Sustainable Economic Development (ENEA) - developed an extensive R&D programme on the nuclear fuel cycle with the operation of experimental fuel cycle installations (e.g. ITREC and EUREX).

The three NPPs of Latina, Trino and Caorso continued to be operated until 1987, when they were definitely shut down based on a governmental decision which interpreted the results of a national referendum, called upon after the Chernobyl accident, as the will to abandon the nuclear option. The NPP of Garigliano had been already shut down in 1978, for technical reasons.

At the same time the nuclear programme was cancelled, the Interministerial Committee for the Economical Planning (CIPE) required the National Electricity Company (ENEL S.p.A.) to start the decommissioning of the NPPs and a "Safe storage" (IAEA level 1/2) option was initially adopted.

In 1999, all ENEL S.p.A. liabilities and assets connected to nuclear power were assigned to a newly established company, named Sogin (Società Gestione Impianti Nucleari) S.p.A., whose shareholder is the Ministry of Economy and Finance, while the Ministry of Economic Development gives the strategic and operational objectives. In 2003 SOGIN took under his responsibility also the facilities of ENEA (Eurex and ITREC fuel reprocessing facilities, OPEC and Plutonium Laboratories at the Casaccia site) and Bosco Marengo LEU fuel fabrication facility (former Fabbricazioni Nucleari S.p.A.) with the main objectives to manage the activities related to their spent fuel, radioactive waste and decommissioning.

The primary mission of the Sogin S.p.A., as detailed in the Ministerial Decrees of May 7th, 2001 and of December 2nd, 2004, and as a consequence of the change of the national decommissioning policy to the DECON strategy (IAEA level 3), is to cover the complete decommissioning of all Italian nuclear installations and the safe management of the spent fuel and radioactive waste.

The spent fuel and the largest part of the radioactive waste to be managed in Italy derive from the operation of the above mentioned NPPs and fuel cycle facilities. As far as spent fuel is concerned, part of that has already been transferred abroad for reprocessing and the spent fuel still present in Italy is currently being sent in France for reprocessing. It is also envisaged that the conditioned waste resulting from the reprocessing will be returned to Italy.

Italy ratified the Joint Convention on the Safety of the spent fuel management and on the safety of the radioactive waste management" on February 2006.

In 2009 the Italian Government, with the aim to restart a new nuclear programme, promulgated a new Law (Law 99/2009) establishing the necessary legislative provisions, including the institution of the ASN (Agency for the Nuclear Safety). Other Legislative Decrees have been issued or were in preparation, but, after the Fukushima accident, a public debate brought to a another popular referendum on June 2011 that sanctioned again the abandon of the nuclear programme in Italy.

On December 2011 the Law n° 214/2011 abolished the new Nuclear Safety Agency (created with the Law 99/2009, but not yet applied) and the functions have been temporary assigned to ISPRA (that in fact continue its work as nuclear authority) waiting for a definitive asset of the regulatory organization.

In addition to the radioactive waste that have been generated by NPPs and the associated experimental nuclear fuel-cycle facilities, radioactive waste also arises from use of radioisotopes in medical, research and industrial applications and they are currently managed by authorized operator.

B. National legal and regulatory framework

The current Italian legislative and regulatory framework related to nuclear safety and radiation protection is the result of an evolution of rules and provisions that begun in the early 60s and that took into account the experience of licensing and operation of NPPs of different types and generations and of other nuclear installations.

It applies to all nuclear installations and activities, including SF and RW management.

The Italian regulatory system is made up of three types of rules of different legal force depending on their origin:

- legislation, that is Acts and Legislative Decrees, as well as governmental or ministerial decrees;
- technical Guides;
- technical standards.

The main corpus of the Italian regulatory system are itemised below, as regards Statutes and Legislative acts:

- Law n° 1860 of 31st December 1962 published in the Italian Republic's Official Journal no. 27 of 30 January 1963, as amended by the President's Decree no. 1704 of 30 December 1965 (Italian Republic's Official Journal no. 112 of 9 May 1966) and by the President's Decree no. 519 of 10 May 1975 (Italian Republic's Official Journal no. 294 of 6 November 1975).
- Legislative Decree n° 230 of 17th March 1995 published in the Supplement to Italian Republic's Official Journal no. 136 of 13 June 1995, implementing six EURATOM Directives on radiation protection (EURATOM 80/836, 84/467, 84/466, 89/618, 90/641 and 2006/117). The Decree replaced the previous DPR n°185 issued in 1964 and establishes radiation protection requirements for workers, public and environment. This Decree has been modified to take into account subsequent Directives, such as for instance the directive 96/29/Euratom laying down basic safety standards for the radiation protection of workers and the public.
- Decree of 2nd December 2004 of the Ministry of Economic Development provides directives to SOGIN for the implementation of decommissioning and radioactive waste management activities. The Decree also charges SOGIN to explore the feasibility of sending all the spent fuel currently stored in ITALY to abroad for reprocessing.
- Law n° 282 of 16th December 2005 promulgated for the ratification of Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.
- Legislative Decree n° 23/2009 related to the transposal of EU Directive 2006/117/Euratom, on the supervision and control of shipments of radioactive waste and spent fuel
- Law n° 99/2009, related to the process to start a new nuclear programme, in Article 29, establishes a new Nuclear Safety Agency with the role of Regulatory Body. As already mentioned, the Agency will be made by the resources of the Nuclear Department of ISPRA and by resources from the Agency for New technologies, Energy and sustainable development (ENEA). The full establishment of this new Safety Authority has, however, still to be completed.
- Legislative Decree n° 31/2010 related to the future nuclear development in Italy, provides criteria for the site selection procedure with the involvement of local administration, for the approval and for the compensation of the local municipality. The Decree includes also provisions for the site

selection procedure of the national site for radioactive waste disposal giving the responsibility to SOGIN.

- Legislative Decree n° 41/2011 amended the Legislative Decree 31/2010 with reference to the future nuclear development in Italy.
- Law n°75 of May 26th 2011, That modifies all the provisions given in the Law n°99/2009 and in the Legislative Decree n° 31/2010, as amended by the Legislative Decree n°41/2011, relevant to the development of new NPP in Italy, relinquishing the nuclear development in Italy. The provisions for the development of the national site for LLW disposal and ILW-HLW interim storage has been confirmed. Furthermore, by abrogating the Articles 8 and 9 of the Legislative Decree no. 230 of 1995, The Law 75/2011 slightly modifies the regulatory process by cancelling of the "Technical Commission on Nuclear safety and Radiation Protection". This Commission was entitled to formulate an independent technical advice to ISPRA during the assessment process connected to the granting of licences, authorizations and approval of detailed designs.
- Law n° 214/2011 that abrogates the Nuclear Safety Agency (created with the Act n° 99/2009, but never applied) and the functions have been temporary assigned to ISPRA (that in fact continue its work as nuclear authority) waiting for a definitive asset of the regulatory organization.
- Law n° 27/2012 on the economic development, through the Art. 24, establishes a new procedures to reduce the timing of the licensing phases for decommissioning activities with a strong involvement of local administrations.
- Legislative Decree n° 45/2014 which transposes the EU Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste. This Legislative Decree included also provisions for the establishment of a new competent Regulatory Authority (Inspectorate for Nuclear Safety and Radiation Protection, ISIN) fully dedicated to the regulation and control in the nuclear field with strengthened independence and human and financial resources and based on the current ISPRA organization. The enactment of further legislative provisions is required for the full and formal establishment of the new Regulatory Authority.

The key regulatory functions (rulemaking, licensing, assessment, inspection and enforcement) related to the nuclear safety and radiation protection matters, including also the safe management of spent fuel and radioactive waste, and decommissioning, are mainly exploited in Italy by the following bodies:

- the Minister of Economic Development is the authority which grants the licence/authorization for nuclear activities (from the design and construction to the decommissioning and waste disposal) and for major practices involving the use of ionising radiations. Authorizations are granted on the bases of the technical advice, to be considered binding, provided by Nuclear, Technological and Industrial Risk Department of ISPRA. For specified activities, in particular for decommissioning activities, also the advice of Ministries of Environment, Interior, Health, Labour and Social Policy and by the Region where the installation is located is required;
- Nuclear, Technological and Industrial Risk Department of ISPRA is entrusted with the role of competent regulatory authority responsible for the assessment and the inspection activities on nuclear installations, as well as for approving detailed designs or activities related to the construction of nuclear facilities, which are part of the general construction licence granted by the Minister of Economic Development. ISPRA as Governmental Institute operates under the aegis of the Minister for Environment and Land and Sea Protection. Any licence/authorization issued by the Minister of Economic Development is based on the technical advice and specifications formulated by Nuclear, Technological and Industrial Risk Department of ISPRA which supervises, throughout its inspection activity, the compliance with the requirements established in the authorization, issued

as Ministerial Decree with attached conditions and technical specifications. Nuclear, Technological and Industrial Risk Department of ISPRA inspectors are entitled by the law with the proper authority to request licence holders any information deemed necessary to ascertain compliance with legal requirements and licence conditions. In case of infringements, inspectors report to the Public Attorney of the jurisdiction the installation belongs to and have the authority to establish specifications in order to interrupt any violations in place. Nuclear, Technological and Industrial Risk Department of ISPRA is also the competent body for giving support to the Governmental rule-making function in the field of nuclear safety and radiation protection and it is also entitled to issue Technical Guides.

Legislative Decree n° 45/2014 establishes a new competent regulatory authority in the field of nuclear safety and radiation protection, which is the National Inspectorate for Nuclear Safety and Radiation Protection (ISIN), fully dedicated to the regulation and control in the nuclear field. The enactment of further legislative provisions is required for the full and formal establishment of the new regulatory authority.

According to the same Decree, until the entry into force of ISIN, the functions of competent regulatory authority shall continue to be carried out by Nuclear, Technological and Industrial Risk Department of ISPRA.

C. Radioactive waste management, decommissioning and spent fuel strategy

The current Italian national policy towards nuclear activities is strictly related to the outcome of the national referendum held on June 12-13, 2011, few months after the Fukushima Dai-ichi NPP accident. The result of the referendum led to the abandonment of the Government decision, taken in July 2009 by Act n° 99/2009, to reopen the nuclear option by envisaging the construction of new NPPs. As mentioned, all the nuclear installations realized in the frame of the national nuclear programme during the 60s – 70s had been definitely shutdown in 1987, and subsequently managed according to a “safe conservation and deferred dismantling” strategy until 1999, when the implementation of a decommissioning strategy finalized to achieve the unconditional release of the sites was decided.

On the above basis the national policy remains currently addressed to decommissioning of old nuclear installations and to spent fuel and waste management with provisions and activities related to the siting and construction of the National Repository of radioactive waste. A few research reactors are however still into operation.

The SF to be managed in Italy is that one resulting from the past operation of NPPs and from past research activities in the field of reprocessing. Almost all the SF coming from NPPs operation has been transferred abroad for reprocessing. A limited amount has still to be transferred to France. A few tHM of spent fuel is present in the ITREC reprocessing facility and in research facilities. For this fuel a dry storage strategy is envisaged to be adopted.

Since the beginning of its nuclear programme Italy had pursued the option of reprocessing abroad the spent fuel produced in its NPPs. After the political decision to stop all nuclear power activities, the shipments abroad of spent fuel for reprocessing were suspended with the last shipment to UK occurred in 2005 in the frame of a service agreement already in place. The opposition of local communities and authorities to the consequent choice of the on-site dry storage led the Government to reconsider the option of reprocessing abroad all the spent fuel still present (Directive of the Minister of Economic Development, March 2006).

SO.G.I.N. was charged to establish reprocessing agreements for all the remaining spent fuel still present in Italy.

Such a decision has become a part of the Inter-Governmental Agreement signed with the French Government on November 24, 2006, followed by a contract that SO.G.I.N. S.p.A. assigned to Areva NC on April 27, 2007. The Agreement included the reprocessing of the remaining spent fuel of Italian NPPs (235 tHM) and envisages the return to Italy of the radioactive waste resulting from the reprocessing activity.

Waiting for the transfer abroad for reprocessing, the spent fuel is being maintained in the storage pools. With regard to the NPPs, spent fuel has been removed from Garigliano and Latina NPPs since many years. The transfer campaign from the Caorso and Trino sites has been completed. Spent fuel for a total amount of about 13 tHM is still present in the Deposito Avogadro and its transfer abroad is expected to be completed by 2016-17.

With regards to the research reactors, the national policy on spent fuel is to return to the country of origin spent fuel. The last shipment abroad of the spent fuel was in July 1999 when 140 fuel elements from TRIGA RC-1 have been shipped to the Department of Energy in the United States of America in the frame of the USA policy of withdrawal of spent fuel of US production.

In relation to radioactive waste, most of the waste existing in Italy was produced in the past operation of the nuclear installations. At present, almost all the waste originated by the past nuclear programme is stored in the site of each individual installation where it was generated. In the future additional RW will come from activities addressed to the routine safe conservation of shutdown installations and to their decommissioning activities as well as from the re-entry in Italy of the conditioned high and intermediate level waste resulting from the reprocessing abroad of the spent fuel and from the yearly production of RW from medical, industrial and research applications.

Waiting for the availability of a National Repository, radioactive waste continues to be stored in the nuclear installations of origin. Action plans are in progress to enhance the safety level of waste by implementing specific treatment and conditioning projects, by refurbishing existing buildings or by realizing already approved new storage facilities on the sites. New facilities will also be used to ensure temporary storage capacity for waste resulting from decommissioning activities.

The decommissioning of the nuclear installations and the associated SF and RW is managed since 1999 by SO.G.I.N. (Società Gestione Impianti Nucleari) S.p.A., whose single shareholder is the Ministry of Economy. SO.G.I.N. operates under strategic and operational guidelines provided by the Italian Government. The decommissioning policy calls for the unconditional release of the nuclear sites (green field). Pending the availability of the National Repository, all the legacy waste and the one that will be generated by dismantling activities will be stored on the sites in dedicated facilities (brown field).

According to Legislative Decree n° 31/2010, SO.G.I.N. has been also entrusted of siting, construction and operation of the national radioactive waste repository in compliance with criteria defined by the Competent Regulatory Authority whose role is currently exploited by the Nuclear, Technological and Industrial Risk Department of ISPRA.

A special fund allocation for financing all above activities is ensured by means of a specific levy on the price of the electricity.

In connection with the road map associated to the above mentioned Agreement for the SF reprocessing in France, the Legislative Decree n° 31/2010 establishes the new procedure for the siting and the construction of a National Repository for the L-ILW disposal and the ILW-HLW long term storage, and assigns to SO.G.I.N. the role of the implementer responsible for the construction and operation of the National Repository.

The Legislative Decree n° 31/2010 also assigns to SO.G.I.N. the responsibility to propose suitable areas for the siting of the installation, based upon criteria established by the IAEA and by the competent regulatory authority and taking into account results of Strategic Environmental Evaluation. The siting procedure, established with the Legislative Decree n° 31/2010, has started with the issue by Nuclear,

Technological and Industrial Risk Department of ISPRA of a Technical Guide on siting criteria for low and intermediate level waste and a National Chart of Potentially Eligible Sites (CNAPI) has been proposed by the implementer and will be soon made public.

According to the National Inventory of radioactive waste, currently maintained by ISPRA, the inventory of the Italian radioactive waste, at December 2013, is: about 28.200 m^3 of VLLW and LLW, and 1.800 m^3 of ILW.

To this amount it should be added some 20 m^3 of vitrified HLW arising from reprocessing of spent fuel will be returned from Sellafield in the UK. Similar amount of vitrified HLW and about 34 m3 of ILW will have to return in Italy from the reprocessing in France.

In addition, some 30-40.000 m^3 of L-ILW will be produced from decommissioning of nuclear facilities.

The new classification system, established by a the Decree from Ministries of Economic Development and of the Environment of August 7th, 2015 provides for five different categories:

Very short lived waste.

Radioactive waste containing radionuclides with very short half-life, of less than 100 days, requiring up to 5 years to reach activity concentrations lower than values specified in art. 1, paragraph 2 of Legislative Decree n. 230 of 17 March 1995. This type of waste mainly arises from medical uses and research activities. This waste shall be stored in facilities suitable for temporary storage or waste management for disposal, such as those authorized by art. 33 of Legislative Decree n. 230 of 17 March 1995, for a period of time necessary to reach the abovementioned required activity concentration level.

Very low level waste.

Radioactive waste with activity concentration that doesn't meet the criteria set out for exempt waste, but though lower than 100 Bq/g with a maximum alpha contribute of 10 Bq/g for alpha-emitting long-lived radionuclides. This waste will be disposed of in the near surface disposal facilities at the National Repository envisaged by the Legislative Decree n. 31 of 15 February 2010.

This category includes also radioactive waste containing mainly short lived radionuclides, which over a period of up to 10 years reach an activity concentration beneath the clearance levels set out in Article. 30 and Art. 154, paragraph 3-bis of the Legislative Decree n. 230 of 17 March 1995. This waste shall be stored in facilities suitable for temporary storage or management of wastes for disposal, such as those authorized by the art. 33 of Legislative Decree n. 230 of 17 March 1995.

Low Level Waste

Radioactive waste that doesn't meet the criteria established for exempt waste and that requires containment and isolation periods of up to a few hundred years in order to be disposed of.

This category includes radioactive waste characterized by levels of activity concentration of up to 5 MBq/g for short-lived radionuclides, of up to 40 kBq/g for the long lived isotopes of Nickel and of up to 400 Bq/g for long lived radionuclides. This category includes much of the waste from nuclear installations, such as parts and components of the plant arising from the dismantling operations and from some medical, industrial and scientific research uses. This category of waste will be disposed of in near surface disposal facility at the National Repository envisaged by Legislative Decree n.31 of 15 February 2010.

Intermediate level waste

Radioactive waste with activity concentrations exceeding the values set out for low level waste, though not requiring provisions for heat dissipation during its storage and disposal.

This category includes waste containing long lived radionuclides that mostly requires a degree of isolation higher than that provided by near surface disposal facilities with engineered barriers,

therefore requiring disposal in geological formations. Pending the availability of a disposal facility in geological formation, such waste shall be stored in suitable storage facilities, such as the long term storage facility in the National Repository envisaged by art. 2, paragraph 1, letter e) of Legislative Decree n. 31 of 15 February 2010.

This category includes also waste characterized by levels of activity concentrations of up to 400 Bq/g for alpha-emitting radionuclides and mainly containing radionuclides beta/gamma emitters even long lived, with such an activity concentrations that they can be disposed of in near surface facilities with engineered barriers, provided that the level of activity concentration complies with the objectives of radiation protection established for the above-mentioned surface disposal facility, such as, for instance, the waste containing activation products arising from the decommissioning of some parts of the nuclear facilities.

High level waste.

Radioactive waste with high activity concentrations, such as to generate a significant amount of heat or with high concentrations of long-lived radionuclides, or both of these characteristics, which require a degree of isolation and containment for a time period of thousands of years and over. This waste requires disposal in geological formations.

This category includes, in particular, liquid waste with high activity concentration arising from the first extraction cycle (or equivalent liquid) of nuclear fuel reprocessing facilities, or the spent fuel itself in case of direct disposal without reprocessing. In the pre- disposal period, this waste shall be stored in suitable storage facilities, such as the long term storage facility in the National Repository envisaged by art. 2, paragraph 1, letter e) of Legislative Decree n. 31 of 15 February 2010.

The following scheme shows the new classification system established in Italy

Category	Conditions		Final destination
VSLW	T1/2 < 100 d	Cleared within 5 y	Temporary storage (art. 33 Legislative Decree n. 230/1995) and disposal in compliance with the provisions of the Legislative Decree n. 152/2006
VLLW	≤ 100 Bq/g (alfa ≤ 10 Bq/g)	Cleared within 10 y	
LLW	• Short lived ≤ 5 MBq/g • Ni59-Ni63 ≤ 40 kBq/g • Long lived ≤ 400 Bq/g		Surface, or small depth, disposal facilities with engineered barriers (National Repository Legislative Decree n. 31/2010)
ILW	• Short lived > 5 MBq/g • Ni59-Ni63 > 40 kBq/g • Long lived >400 Bq/g • No heat production	Alpha-emitting radionuclides ≤400 Bq/g beta-gamma emitters in concentrations which meet the objectives of radiation protection established for the surface disposal facility.	
HLW	Heat production or high concentrations of long-lived radionuclides, or both of such characteristics.		Interim storage facility of the National Repository (Legislative Decree n. 31/2010) waiting for the geological disposal

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

Route Waste Class	Processed (type)/ Unprocessed)	Total Current Volume (m^3)	Estimated Disposal Volume (m^3)	Distribution (%)							Planned Disposal Route (if known)
				RO	FFE	RP	NA	DF	DC / RE	ND	
All Classes	No	23779	35150	23	4	27	40	0	6	0	-
All Classes	Yes	6246	6246	29	24	11	27	0	9	0	
VLLW	No	5311	5311	0	0	0	83	0	17	0	Yes
LLW	No	17419	25028	30	5	35	25	0	5	0	Yes
LLW	Yes	5517	5517	32	27	11	20	0	10	0	Yes
ILW	No	1049	4810	8	9	49	34	0	0	0	No
ILW	Yes	730	730	0	0	3	97	0	0	0	No

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 (m^3)	Distribution (%)							
			RO	FFE	RP	NA	DF	DC / RE	ND	Disposal Route Used
LLW		23							100	Sea disposal

Table 3 Spent fuel in Storage (MTHM)(December 2013)

Type	Current Amount (NPP)	Current Amount (Research Reactors)
Total Spent Fuel Storage	**27,70**	**2,462**
Wet storage (AR)	14,51*	
Wet storage (AFR)	13,19	1,68
Dry storage (AR)		0,004
Dry storage (AFR)		0,778
Total spent fuel held in storage for other countries (amounts also included above)	16,839	

**- in 2015 has been transferred in France for reprocessing*

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)		0.11
Total amount Spent Fuel sent to Reprocessing (in another country)	1886,663	0.059
Total amount of Spent Fuel received from another country for reprocessing and recycling	1.5	0.536
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 (NOT NECESSARY)

Table 6 (sample of data based on format of table from INFCIS)

Type	Plan-ned	Construc-tion	Commis-sioning	In Opera-tion	Shut-down	Decomm.	Other	Total
Spent Fuel Storage	**1**			**10**		**4**		**15**
Spent Fuel Reprocessing and Recycling					**2**			**2**
Spent Fuel Conditioning								
Spent Fuel disposal								
Waste processing	**10**	**2**	**0**	**11**	**2**	**1**		**26**
Waste storage:	**3**	**4**	**3**	**64**		**2**		**76**
Waste disposal:								

Table 7 Summary of major sources of waste (from IAEA PRIS, INFCIS & RRDB databases

Type	Planned	Construction	Commissioning	In Operation	Shutdown	Decomm.	Other	Total
Research reactors*				**5**				
Nuclear Power reactors					**2**	**8**		
Spent Fuel Reprocessing and Recycling					**2**			
LEU Fuel Fabrication facility						**1**		
Waste processing facilities				**1**				
Research Centres					**2**			

Table 8 e. Trends and future prospects (estimation of volumes of waste and spent fuel arising, waste and spent fuel management facilities)

Type	Current amount MTHM	Estimated Current amount when prepared for disposal*	Current Disposal Capacity	Total forecast at 2030		Total forecast at 2050	
Spent Fuel Storage	30,162			2,46		2,46	
Wet storage (AR)	14,51			0		0	
Wet storage (AFR)	14,87			0		0	
Dry storage (AR)	0,004			0		0	
Dry storage (AFR)	0,778			2,46		2,46	
Total amount Spent Fuel sent to Reprocessing and Recycling	1886,752			1914,416		1914,416	
Total amount Spent fuel disposed							
Waste in storage:	**29677**	**41396**		**41765**		**16992**	
VLLW	5311	5311		7753		1557	
LLW	22728	25027		22511		1684	
ILW	1639	4810		11463		13713	
HLW	0	0		38,1		38,1	
Waste disposal:	**0**		**0**	**36533**		**75505**	
VLLW	0		0	10117		20910	
LLW	0		0	26416		54595	
ILW	0		0	N.D.		N.D.	
HLW	0		0	N.D.		N.D.	