EN

EUROPEAN COMMISSION

Brussels 16.7.2010
SEC(2008) 2416 final/2

CORRIGENDUM
Cancels and replaces document SEC(2008) 2416 final of 8.9.2008
Concerns the EN version

COMMISSION STAFF WORKING DOCUMENT

accompanying the

**REPORT FROM THE COMMISSION
TO THE EUROPEAN PARLIAMENT AND THE COUNCIL**

**SIXTH SITUATION REPORT
RADIOACTIVE WASTE AND SPENT FUEL MANAGEMENT
IN THE EUROPEAN UNION**

COM(2008)542 final

Sixth Situation Report
Radioactive Waste and Spent Fuel Management in the European Union

1. INTRODUCTION

The present report is the sixth in the series of reports on radioactive waste management in the European Union (EU). The original Situation Reports formed part of the 'Community plan of action in the field of radioactive waste'[1], which was further extended in 1992[2], in particular the requirement to 'carry out continuous analysis of the situation'. Although the Plan of Action as such is no longer in force, the need for a Situation Report remains as relevant now as when it was first conceived. It is important to consider the challenge posed by radioactive waste since its management is, and will remain, a long-term issue. Even over the timescale for which surveillance of short-lived wastes is required national borders might change. This, together with potential cross-border impacts means that an international context for radioactive waste management becomes increasingly relevant with the passage of time.

There are a variety of international contexts such as, IAEA, OECD-NEA and the ‘Joint Convention’ in which issues concerning radioactive waste management are considered. Each of these fulfils an important role in the safety of waste management and many of the EU Member States actively participate in their activities. However it is unlikely that neither the role played by any of these actors is widely known to the European citizen, nor are the processes involved particularly accessible to individuals. In some cases they are even carried out away from public scrutiny, with only the end result or summary of proceedings being made available to a wider audience.

Against this background the role of the European Union, and in particular the European Commission, in informing and protecting the European citizen becomes particularly important, as citizens look to the Commission to inform them about the situation and progress made throughout the Union, and to take the lead in ensuring uniformly high standards. The most recent Eurobarometer survey on radioactive waste[3] showed that EU citizens wished to see Member States take action on radioactive waste without further delay, in that they should fix deadlines for the setting up of management approaches for their waste. Additionally practices should be harmonised in view of potential effects of radioactive waste beyond national borders. Finally the European Union should be able to monitor national practices and programmes. The Eurobarometer also showed that if no action were taken, at least concerning high-level waste (HLW), the danger existed that this could lead to the impression that there are no solutions.

This report presents, in line with the previous report[4], in the form of tables, the status concerning waste inventories in the EU Member States[5]. Due to the considerable time

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[1] Council resolution of 18 February 1980 on the implementation of a Community Plan of Action in the field of radioactive waste

[2] Council resolution of 15 June 1992 on the renewal of the Community Plan of Action in the field of radioactive waste

[3] Special Eurobarometer 297 (2008)

[4] Fifth Situation Report – Radioactive Waste Management in the Enlarged European Union, EN 20653 EUR, European Commission, February 2003

[5] Cyprus and Malta produce only small amounts of hospital waste and are not considered further in this report

required to collect the data, the reference date is end of 2004, except where the availability of national inventories dictated otherwise. Additionally, where data are available the report considers the likely evolution of waste quantities over the coming years (to 2020).

As the report should be accessible, in terms of readability, to as broad a range of stakeholders as possible, it is restricted in this context to a presentation of the overall radioactive waste quantities, considering generation, storage and disposal at the EU level. In addition possible developments over the coming years are considered. It should be pointed out that, far more detailed information at the national level can be obtained from a variety of sources, such as national waste management organisations (WMO), reports to the Joint Convention etc.

2. SOURCES OF INFORMATION

The information in the present report has for the most been provided by the former Commission group of experts known as the Advisory Committee on Programme Management (ACPM), which was set up as part of the Community Plan of Action. Where information was not supplied or not readily available, public sources have been used such as national Joint Convention reports, IAEA, submitted in 2005[6]or reports of national waste agencies or government departments. Every effort has been made to ensure the validity of the data, though the degree of accuracy is occasionally difficult to ascertain, especially regarding precise volumes of lower level wastes for which there are a variety of possible conditioning and treatment techniques and for which the degree of treatment and conditioning is not always clear.

The figures in the following tables can be taken as a reasonably reliable guide to the amounts of waste produced, stored or already disposed of in the different countries. Also, it should be noted that because of the special status accorded to radioactive waste, the quantities are likely to be much more accurate than those reported for other hazardous or toxic wastes.

3. CATEGORIES OF RADIOACTIVE WASTE AND SPENT FUEL REPORTED

The reporting categories correspond as closely as possible to those in the Commission Recommendation on waste classification[7]. Quantities refer only to solid, solidified or solidifiable waste and not to effluents that are discharged to the environment as part of authorised practices under the supervision of the regulatory body.

The categories of waste reported are therefore:

- LILW-SL means short-lived low and intermediate level radioactive waste. This is waste that is contaminated mainly with radionuclides with half-lives of less than 30 years and for which there is negligible heat generation as a result of radioactive decay. Where disposal of this category of waste takes place it is in engineered surface or near-surface repositories.

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[6] The reports under the Joint Convention are submitted in a 3 year term and the deadline for the next ones is 11 October 2008

[7] Commission Recommendation of 15 September 1999 on a classification system for solid radioactive waste, 1999/669/EC, Euratom

- LILW-LL, or long-lived low and intermediate level radioactive waste, also produces negligible thermal power but has a concentration of long half-life radionuclides above the limit for classification as short-lived waste. Disposal would normally take place in deep geological repositories.

- HLW means high-level waste, and refers to waste for which the thermal power must be taken into consideration during storage and disposal. Most HLW results from the reprocessing of spent fuel (SF) and is in the form of vitrified residues. Spent fuel is also considered as HLW when it is to be disposed of directly.

Spent fuel (SF) is also considered in its entirety, whether it might be intended for reprocessing or not, especially in view of the fact for a number of states, there would appear to be no definitive spent fuel management policy at the present time.

In addition to the categories of radioactive waste in the Commission Recommendation, that of VLLW (very low-level waste) is considered for the first time. This reflects the gradual recognition over recent years, that there are some radioactive wastes that require a lower degree of containment and isolation than that provided by engineered surface and near-surface repositories. In fact some of these wastes may not actually be radioactive under the relevant national legislation. It may be either not cost-effective to demonstrate compliance with so-called clearance levels, at which material can be released without further restriction, or there may be issues of public concern about the release of such materials.

Not all Member States follow the Commission recommendation on classification (which is itself based on an earlier scheme from IAEA). However it is normally possible to make an approximation of the relationship between the national classification scheme and that of the Commission.

Uranium mining residues are not included as they are covered by a separate Commission study. However it is clear that these wastes should also be included at some point in the overall quantities of radioactive waste.

4. SOURCES OF RADIOACTIVE WASTE

It is clear that the greatest source of radioactive waste is from the production of electricity in nuclear power plants and other associated activities. For this reason this report focuses mainly on this aspect. However it should not be forgotten that radioactive waste is also generated as a result of non-power uses of radioactive materials, such as the manufacture of radioactive materials for use in medical and industrial applications, or research facilities such as laboratories, research reactors etc. In this context it is important to realise that activities take place in all Member States that result in the generation of radioactive wastes, even though the quantities involved are often very small, compared to countries with nuclear activities.

5. HIGHLIGHTS CONCERNING MEMBER STATES DATA

5.1. Evolution of Nuclear Power in Member States (Table A)

Nuclear power generation and its associated processes e.g. fuel manufacture, reprocessing etc are the largest generators of radioactive waste. There is a clear link between the nuclear power generation and radioactive waste generation. Therefore it is important to see the possible evolution of nuclear power in the short- to medium-term, as this will ultimately affect the amount of waste generated, from operational and ultimately, decommissioning activities. It will also affect the timeframe for their generation, although with decommissioning this depends on decisions concerning the timing and duration of decommissioning.

A number of states currently have official phase-out policies e.g. Belgium, Germany and Sweden. Others could be said to be in a de facto phase-out situation i.e. no replacement capacity planned as current NPPs are closed, such as Spain. In addition there are the NPPs, covered by early closure agreements as part of the Treaties of Accession for Bulgaria, Lithuania and Slovakia. Nevertheless with construction already taking place in four states (Bulgaria, Finland, France, Romania), even under the most restricted scenario NPP capacity will fall by just over 20% by 2020, compared to that at the start of 2006. However it is also clear that as part of the larger energy debate, construction of new capacity is being discussed in a number of states, most notably the Baltic States, the Netherlands, Poland and the UK. It is therefore feasible that in 2020, the overall capacity is little changed from the current situation.

Any decision concerning the construction of new NPPs will of course need to take into account the effect this will have on the overall radioactive waste situation, since this will lead to the generation of additional operational and (in the longer term) decommissioning wastes. Such an assessment will require the consideration of both the technical and financial resources required to deal with these wastes. There may also be political considerations where ownership of the reactors (and therefore also the waste produced) is proposed to be shared amongst several states. Such a situation already concerns one member state, Slovenia, through its joint ownership of the Krško NPP with Croatia. A similar situation may exist in the future with Estonia, Latvia, Lithuania and Poland.

5.2. Summary of Radioactive Waste Quantities – Actual and foreseen (Tables B-E)

In this section the total wastes already disposed of or in storage awaiting disposal are considered. These totals outlined for the different categories of waste are for the 27 Member States considered in the report and are reported in tables B, C and D. All quantities are approximate and have been rounded. Since there is no surface disposal – either practised or under consideration – in Germany and the Netherlands, these countries do not distinguish between LILW-SL and LILW-LL wastes and both categories are consequently reported together. For the purposes of comparison with other Member States it is likely that up to 10% of these wastes could be considered as LILW-LL.

(a) Radioactive waste disposed of by the end of 2004:

The total quantity of waste that has been disposed of to the end of 2004 equals **1,890,000 m^3**. This consists almost entirely of LILW-SL, most of which has been disposed of in United Kingdom and France. Additionally for the other 14 countries that operate or have operated NPPs, only five (Czech Republic, Finland, Slovakia, Spain and Sweden) currently have operational waste repositories for the wastes generated from NPP operation, although it is expected that this will change in the coming years. A number of countries (both with or without NPPs) have small disposal sites for institutional waste, but these are very limited in the wastes they can accept, and some of these sites have required considerable refurbishment in recent years to ensure they meet acceptable standards of safety.

(b) Annual production of radioactive waste and spent fuel (2004 figures):

VLLW**18 000 m^3** – most of which arises and is disposed of in France. (It should be noted however that UK does not record generation and disposal of this category of waste in its national inventory)

LILW-SL: **62** 000 **m^3** – of which over 80% is routinely disposed of at sites in France and UK.

LILW-LL: **5** 100 **m^3** – which is conditioned for long-term storage with only minor amounts disposed of.

HLW: 280 **m^3** – all of which goes into long-term storage; no repository exists yet.

SF: **3 600 te Heavy Metal (HM)** – of which at least 1 500 te (HM) can be currently considered as being placed in long-term storage for possible direct disposal.

Therefore, in total, some **85 000 m^3 of radioactive waste are produced in the EU each year**, the vast majority of which is VLLW and LILW-SL. However in order to compare this figure with that for 2000 quoted in the 5th Situation Report, the quantity of VLLW (18 000 m^3) should be discounted as it was not included in the overall figures and its rate of generation was probably already comparable with the current rate.

Hence the comparison should be between 39 000 m^3 (2000) and 67 000 m^3 (2004) these being the totals of LILW-SL, LILW-LL and HLW. The 5th Situation Report had already stated that it was unlikely that the reduction in waste generation seen in relation to a figure of some 50 000 m^3 (EU 15) predicted in the 4th Situation Report and a reported annual production of roughly 80 000 m^3 (EU 12) at the beginning of the 1990s[8] would be continued. It therefore seems clear that the downward trend in overall waste generation has ceased, although this observation can be accounted for almost entirely by the increases in LILW in just two Member States, namely France and the UK. Thus, while there are clear indications that further efforts have been made to reduce the volume of operational waste, the observed trend is possibly due to the treatment of some historic wastes taking place and, possibly most significantly, decommissioning activities which start to play an increasing role in the amount of waste generated. Although there has been a reduction in the total installed nuclear capacity since 2000 this is unlikely to have had a major effect on volumes of waste generation, since major decommissioning works will not have commenced yet. The increase is more likely to have arisen as a result of decommissioning activities at installations that have been closed for a number of years already; NPPs, fuel cycle facilities and research facilities.

(c) Total of radioactive waste and spent fuel in storage at the end of 2004:

VLLW: **170 000 m^3** – of which almost 75% is disposed of in the VLLW facility at Morvilliers in France (again the comment in the previous section concerning UK VLLW remains relevant)

LILW-SL: **250 000 m^3** – of which 120 000 m^3 currently has no disposal route

8 COM (93)88 final of 1/4/93 “Third report from the Commission on the present situation and prospects for radioactive waste management in the European Communities”

LILW-LL: **220 000 m^3** – for all of which there is currently no disposal route

HLW: **7 000 m^3** – the majority being vitrified waste from the reprocessing of spent fuel, for which there is currently no disposal route

SF: **38 000 te (HM)** – of which at least 24 000 te (HM) is or will be placed in long-term storage for eventual direct disposal

At this stage, there is still no disposal route available in the EU, or for that matter anywhere in the world, for the most hazardous radioactive waste i.e. that represented by the categories HLW and spent fuel to be disposed of directly. As a result the amounts indicated in the 5th Situation Report, have increased still further. These materials remain stored in temporary surface and near surface storage facilities in those EU Member States with active or past nuclear power programmes. The above figures also show that there are significant accumulations of stockpiled waste in other less hazardous categories, including LILW-SL for which many countries still do not have access to disposal sites, even though disposal of this category has taken place routinely, in engineered facilities, for several decades now.

(d) Additional radioactive waste and spent fuel arisings from 2004 to 2020:

VLLW: **440 000 m^3** – of which almost 85% will arise in France

LILW-SL: **900 000 m^3** – of which almost 400 000 m^3 will arise in countries with no current disposal route

LILW-LL: **430 000 m^3** – for all of which there is currently no disposal route and of which almost 80% will arise in UK

HLW: **2 300 m^3** – the majority being vitrified waste from the reprocessing of spent fuel.

SF: **48 000 te** – of which at least 23 000 te will be placed in long-term storage for direct disposal

These figures represent quantities of wastes and spent fuel generated additional to those already existing at the end of 2004. As can be seen from the above figures the rate of waste generation in the VLLW and LILW will continue to increase in the short- to medium-term, with most of the increase coming from decommissioning activities, dominated by the programme in the UK, especially in terms of LILW-LL.

The figures are somewhat speculative since they rely on the assumption that certain decisions will be taken e.g. timing of decommissioning activities (immediate vs. delayed). However whatever decisions are taken these wastes will arise, only the timing can be changed. It is feasible that further volume reduction is achieved through changes in waste conditioning techniques; however this will not affect the overall radioactivity (and hazard) of the waste, only the repository space that might be required.

There will be little change in spent fuel generated, since the reactor closures, especially in Germany and UK, will take place gradually over the period. Additionally the effect of defuelling of closed reactors (removal of all spent fuel from the reactor core) is an additional consideration. What will change over the period is balance between reprocessing (HLW) and direct disposal (SF). The last German SF for reprocessing was transported in 2005, in line with the agreement on the phase-out of nuclear energy. Belgium is currently continuing with its moratorium on reprocessing, already in place since 1993. No further reprocessing contracts have been signed for UK domestic fuel, with reprocessing operations in Sellafield possibly to continue until at least 2015 for Thorp and 2016 for Magnox. This means that, assuming present policies continue, only three Member States, Bulgaria, France and the Netherlands will reprocess their spent fuel, likely to be less than 1000 te annually. Italy has stated its intention to reprocess its remaining spent fuel.

6. DEVELOPMENTS IN WASTE POLICIES AND PRACTICES (TABLES E-L)

In this section a general overview is given of Member States' policies and practices, together with financing aspects and the responsibilities concerning implementation

6.1. Policies and Practices:

Since the previous Situation Report, a good example of new legislation for radioactive waste management has been adopted in France. It covers all types of waste streams up to the final disposal.

6.1.1. Spent Fuel / HLW

The first choice facing Member States is their choice of spent fuel management policy i.e. reprocessing or direct disposal. The first option will recover plutonium and uranium for possible re-use, but also generate HLW, LILW-LL and LILW-SL, all of which will require disposal. In the case of the first two categories, this should take place in a deep geological repository. Currently five states make use of the reprocessing option; Bulgaria, France, Germany (in the case of the remaining spent fuel at reprocessing facilities), the Netherlands and UK. Italy also intends to reprocess the remaining fuel from its closed reactors. If current plans are pursued, Germany will no longer reprocess fuel once the current contracts expire. The UK is still keeping open the option of new business for Thorp, but any new contracts would need Government approval. Belgium has a moratorium on new reprocessing contracts since 1993. In the past Spain exported a small amount of fuel for reprocessing, but has since stored all fuel at its NPPs (Spain is planning a centralised storage facility for HLW and spent fuel to be operational before 2011).

Where spent fuel is not to be reprocessed, the normal management option is an extended period of storage, at least 30 years, followed by deep geological disposal. For these other states direct disposal of spent fuel forms the reference management scenario. Currently two states, Finland and Sweden are actively pursuing this option. However in the majority of states a definitive spent fuel policy does not exist, other than arrangements to ensure a safe extended period of storage (50 – 100 years).Whatever the management route chosen, the only disposal option for HLW / spent fuel is deep geological disposal. Although most states are committed in principle to this option, it is likely that by 2025 only three states will have operational deep repositories for HLW / spent fuel; Finland, France and Sweden. Although Germany has a target date of 2030, this looks increasingly difficult, in view of the continuing moratorium on exploration work at the Gorleben site and the limited follow-up to the 2002 AkEnd study the issue of repository siting for all wastes.

Beyond this group of states only Belgium has an underground laboratory, with notional dates for construction (2025) and operation (2040) of a repository. In the UK, the NDA's current planning assumption is that a repository will be ready to accept HLW by 2040. For the remaining states target dates for operational repositories are from around 2050 onwards, if one has even been set at all. Generally the work carried out in this latter group of countries has been rather limited, even as regards setting out a procedure for the various steps towards a repository.

Most of these countries (those with smaller nuclear programmes) participated in the SAPIERR project under the Euratom 6th Framework Programme (FP6), exploring the conditions to be met for a possible shared repository. A follow-up project: SAPIERR II commenced at the end of 2006 and can be seen as the second step of a long-term, adaptively staged decision-making process. The main objective of SAPIERR II is to propose an European development strategy and organisational structure to manage the process.

Finally, some countries have only very small quantities of spent fuel originating from research reactors only. Generally the management solution is covered by 'take-back' agreements, where the spent fuel is returned to the country of origin.

6.1.2. LILW-LL

Like HLW / spent fuel it is generally acknowledged that LILW-LL requires disposal in a geological repository. This category of waste arises largely through reprocessing operations and decommissioning. As the disposal route is the same as for HLW, it also follows that in general terms the progress in terms of disposal routes is similar (Germany might be an exception here as for non-heat developing long-lived waste a deep repository might be operational before 2014). It should be noted that some states which give dates for HLW disposal actually make no mention of this type of waste in terms of disposal dates or even how it should be disposed of. Open questions include whether or not HLW and LILW-LL should be co-disposed i.e. placed in the same repository. It should be mentioned however that the short-term hazard presented by conditioned LILW-LL is significantly less than that of HLW. However the overall disposal volumes will be considerably greater. In terms of implementation it is likely that by 2020 Denmark, Germany (assuming use of Konrad) and Hungary will have operational repositories capable of taking this type of waste, although mainly due to these countries policy of disposing all radioactive wastes in deeper facilities.

6.1.3. LILW-SL

This category represents the largest volume of waste in all Member States. It is here that polices and practices are most developed. Disposal normally takes place in engineered surface or near-surface facilities. In the sixteen 'NPP states' seven currently practice disposal in surface or near surface facilities. In addition a number of countries are at various stages of implementation from conception through to final construction. By 2020 it is likely that all the 'NPP states' with the exception of the Netherlands, will have an operational repository for these wastes. In addition, Denmark and Latvia should also have operational repositories.

6.1.4. VLLW

As already stated the concept of VLLW arose to deal with those wastes where the degree of isolation and confinement required is considerably reduced compared to LILW-SL. Currently France, Sweden and UK carry out large-scale VLLW disposals. Lithuania and Spain are currently constructing disposal facilities and it is likely that others will do so as the need to manage large volumes of decommissioning wastes arises in the future. Those countries that intend to use only deep disposal for their wastes e.g. Germany and the Netherlands, are unlikely to categorise any waste as VLLW, but instead will probably make use of the possibility of clearance to enable wastes to be disposed of as conventional waste or recycled. France has decided against large-scale clearance of such wastes, on both cost and public perception grounds.

6.1.5. Other Wastes

Although not generally considered in this report there are radioactive wastes generated as a result of non-nuclear activities: These include sealed-sources and medical isotopes. Most countries now have arrangements in place whereby ‘take-back’ provisions must be incorporated into the supply contract. Nevertheless there are large numbers of historical sealed-sources not covered by such provisions. When disposal facilities become available for the full range of fuel-cycle generated wastes, they should also be able to take radioactive wastes from other activities. However for the smaller countries, that do not have sufficient waste to justify construction of a repository, solutions will still need to be found.

6.2. Financing

It is not the intention to cover this aspect in detail, since the Commission already publishes detailed reports on the financing of decommissioning and waste management activities[9]. Additionally in 2006 the Commission published a recommendation concerning decommissioning and waste management funds[10]. It can be seen however from Table F that for all states where information is available, funding mechanisms are in place or are under preparation.

6.3. Organisational Responsibilities

An area that has seen further developments since the 5th Situation Report is that of responsibilities in the field of waste management and in particular the role played by Waste Management Organisations (WMO). Since 2000 eight Member States have established or reorganised their WMO. The role of such organisations varies widely between Member States from those concentrating mainly on repository development and operation e.g. ANDRA in France, to those which have responsibility for all historic liabilities including site operation, such as in Slovakia (JAVYS) and UK (NDA). Additionally the status varies from that of a public utility to subsidiary of commercial NPP operators, as in Sweden (SKB) and Finland (Posiva).

Although in some smaller countries there is a dedicated WMO, there are several where the quantity of waste concerned would not justify such an organisation. In these cases a department of the radiation protection regulator usually takes responsibility for such matters. In Greece and Portugal, the responsibility is taken by the national research centres which in any case are also the main generators of radioactive waste.

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9 COM(2007) 794 of 12.12.2007 - Communication from the Commission to the European Parliament and the Council – Second Report on the use of financial resources earmarked for the decommissioning of nuclear installations, spent fuel and radioactive waste

10 Commission Recommendation of 24 October 2006 on the management of financial resources for the decommissioning of nuclear installations, spent fuel and radioactive waste

It would seem that there is no single model for a successful WMO. The main requirement would seem to be that responsibilities are clearly laid down and that there are adequate financial arrangements.

7. INTERNATIONAL DEVELOPMENTS - JOINT CONVENTION (TABLE M)

The Joint Convention is considered here separately as it has become a significant contributor setting the principles for the management of radioactive waste and spent fuel in the EU. Of the current 27 Member States 24 have acceded to the Convention, as has the Euratom Community itself. This latter is significant since as a result the Convention becomes part of Community legislation. Along with the individual national reports from Member States, a Euratom report was presented to the 2nd Review Meeting of the Convention during 2006. The Community was represented during the Review meeting by the Commission, allowing it to observe at first hand and contribute to the review process.

Details of the review process and summary reports from the meeting can be found on the IAEA website[11]. It is generally agreed that the convention has the potential to be an incentive for participants to make progress in the safety of waste management through feedback from other participant states. This is especially true when the contracting parties are using the review process to drive a continual improvement in safety of radioactive waste management rather than just demonstrating compliance with the articles of the convention..

8. CONCLUSIONS

8.1. Waste Quantities

An increase has been observed in the rate of generation of the volume of radioactive waste since the 5th Situation Report. This concerns mainly the categories LILW-SL and LILW-LL. Annual generation of HLW / SF, which generally depends on the size of the nuclear power programme, remains broadly constant.

Quantities of waste in storage have increased, especially HLW and LILW-LL as there are as yet no disposal routes available.

8.2. Developments in Waste Policies and Practices

It is generally possible to identify the policies and practices of Member States concerning waste and spent fuel management. In the case of VLLW and LILW-SL it is likely that almost all Member States with nuclear power programmes (and some 'non-nuclear power' states) will implement disposal solutions in the medium term i.e. by 2020.

However for HLW and spent fuel (for direct disposal) only a handful of states i.e. those actively pursuing repository development can be said to have definitive policies in place. The same situation exists for LILW-LL, since for these wastes also the preferred solution is geological disposal, whether in the same repository as HLW /spent fuel or separately.

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11 http://www-ns.iaea.org/conventions/waste-jointconvention.htm

8.3. Organisational Responsibilities

In all Member States the responsibilities concerning waste management seem to be clearly identified and assigned, with significant roles given to national waste management organisations.

8.4. International Developments

The Joint Convention to date appears to have been a driver in promoting and assuring improvements in the safety of waste management. This is likely to continue, although there is some concern about how some states attempt to use the review process.

9. DATA TABLES

Table A: Nuclear installed capacity

country	installed capacity at June 2008 (GWe) [12]	comments	Predicted capacity at end 2020 (GWe)	comments
Belgium	5.82		4.04	In principle NPPs close after 40 years operation
Bulgaria	1.91	1.91 under construction	3.81	
Czech Rep.	3.62		1.93	In principle NPPs type VVER 213 close after 30 years operation
Finland	2.70	1.60 under construction	4.28	
France	63.26	1.60 under construction	64.70	
Germany	20.47		1.70	Assuming continuation of phase-out policy
Hungary	1.83		1.76	
Lithuania	1.19	covered by an early closure agreement	3.20	Assuming construction of 2 EPR type units
Netherlands	0.48		0.45	Lifetime extension agreed for single BWR NPP
Romania	1.30	0.66 under construction	2.62	Possible further 2 CANDU units
Slovakia	2.03	0.82 covered by an early closure agreement; a further 0.82 construction suspended	1.62	Assuming completion of Mochovce units 3 and 4
Slovenia	0.67		0.68	
Spain	7.45		7.38	For the purposes of planning and calculation the General Radioactive Waste Plan considers 40 years service lifetime for the existing NPPs
Sweden	9.01		8.91	
UK	10.22		2.44	
Total EU-27	131.96		109.13	

[12] Figures were calculated based on extract from IAEA Priss Data base – June 25, 2008

Table B: Waste quantities disposed of by end of 2004

country	quantity (m³)	period	origin / type of waste[13]	type of disposal[14]	site(s)	still in use?
Belgium	15,000	till 1982	LILW	ocean	North Atlantic	no
Bulgaria	260	1964-1994	institutional	surface	Novi han	yes, but for storage only
Czech Rep.	4 700	1994-present	NPP operational	surface	Dukovany	yes
	330	1958-1965	institutional	mine (limestone)	Hostím	no
	6 300	1964-present	institutional	mine (limestone)	Richard	yes
	880	1972-present	institutional, only natural radionuclides	mine (uranium)	Bratrství	yes
Estonia	110	1963-1995	institutional	RADON	Tammiku (Saku)	no
Finland	4 140	1992-present	NPP operational	rock cavern	VLJ-repository, Olkiluoto	yes
	1 230	1998-present	NPP operational	rock cavern	Loviisa	yes
France	9 900	1967-1969	LILW	ocean	North Atlantic	no
	527 000	1969-1994	LILW-SL	surface	Centre de la Manche	no
	137 000	1992-present	LILW-SL	surface	Centre de l'Aube	yes
	18 200	2003-present	VLLW	surface	Morvilliers	yes
Germany	96	1967	LILW	ocean	North Atlantic	no
	16,150	1967-1978	LILW	deep	Asse salt mine	no

13 Institutional = waste from non-fuel cycle sources but including waste from operation of research reactors (generally LILW-SL); NPP operational = low-level waste from day to day activities and operations at NPP (generally LILW-SL); NORM = waste containing Naturally Occurring Radioactive Material.

14 Surface = surface vaults / trenches + subsequent capping. RADON is a specific vaulted design developed by the Russian company of the same name. Mine and rock caverns generally some tens of metres depth. Deep = >~100 m depth. International moratorium on ocean / sea disposal since 1983.

country	quantity (m^3)	period	origin / type of waste[13]	type of disposal[14]	site(s)	still in use?
Germany (cont.)	36,753 (includes 6,617 SRS)	1971-1998	LILW	deep	Morsleben Repository	no
Hungary	5000	1976-present	institutional + formerly NPP operational	surface	Püspökszilágy	yes, but space very limited
Italy	23	1967	LILW	ocean	North Atlantic	no
Latvia	800	1963-present	institutional	RADON	Baldone	yes, but very small scale disposal only
Lithuania	120	1963-1988	institutional	RADON	Maišiagala	no
The Netherlands	8 700	till 1982	LILW	ocean	North Atlantic	no
Poland	2 800	1961-present	institutional	surface	Różan	yes
Romania	1 370	1985-2000	institutional	mine (uranium)	Baita-Bihor	yes, operation under review
Slovakia	2 380	1999-present	LILW-SL	surface	Mochovce	yes
Spain	51 170	1992-present	LILW-SL	surface	El Cabril	yes
Sweden	30 446 3929 7346 3471 999	1989-present 1986-present 1986-present 1993-present 1988-present	LILW-SL VLLW VLLW VLLW VLLW	rock cavern surface surface surface surface	SFR-1 Forsmark(FKA) Oskarshamn (OKG) Ringhals (RAB) Studsvik	yes yes yes yes yes
United Kingdom	33 000	1949-1982	LILW	ocean	North Atlantic and UK coastal waters	no
	960 000	1959-present	LLW	surface	Near village of Drigg	yes
	33 000	1959-2002	LILW-SL	surface	Dounreay	no

Table C: Waste and spent fuel production in the year 2004

Quantities of spent fuel discharged and waste produced per category during 2004						
Country	**VLLW (m^3)**	**LILW – SL (m^3)**	**LILW – LL (m^3)**	**HLW[15] (m^3)**	**SF (te HM)**	**comments**
Austria	-	108	12	-	-	90% decommissioning waste 10% institutional waste
Belgium	-	437	-	4.2	116	LILW is waste conditioned during 2004; HLW is waste from one transport from La Hague
Bulgaria	-	335		-	50	NPP wastes estimate - does not include 300 m^3 NPP liquid waste
Czech Rep.	-	272	16	-	58,4	
Denmark	-	15	1	-	-	
Estonia	-	-	5	-	-	
Finland	-	260	1	-	69	
France	16 600	23 600	612	133	1150	LILW-LL consists of all material conditioned at La Hague and Marcoule in 2004, and includes some pre-2004 wastes.
Germany	-	4068		65	385	Does not include approx 1200 m^3 intermediate products
Greece	-	2	-	-	-	Estimate after decay storage and conditioning of solid waste
Hungary	-	190	5	-	43	Does not include 260 m^3 NPP liquid waste
Italy	300	300	-	-	-	
Latvia	15	-	3	-	-	

15 It should be noted that HLW arises from the reprocessing of SF. Production of HLW therefore results in a reduction in SF stocks.

Quantities of spent fuel discharged and waste produced per category during 2004						
Country	**VLLW (m^3)**	**LILW – SL (m^3)**	**LILW – LL (m^3)**	**HLW[15] (m^3)**	**SF (te HM)**	**comments**
Lithuania	1140	934	41	-	75	
Poland	-	46	7			
The Netherlands	-	353	39	1.5	0.5	
Portugal	-	5	-	-	-	
Romania	-	54	-	-	100	LILW-SL may contain some LILW-LL
Slovakia	-	300	-	-		
Slovenia	-	37	-	-	22.9	LILW-SL may contain some LILW-LL
Spain	-	745	-	-	107	LILW-SL may contain some LILW-LL
Sweden	45	1426	363	-	380	
United Kingdom	-	5 400	30 000	76	1000	Prior to 2004 data reported as LILW-SL was for LLW only. Some LILW-LL may be suitable for shallow disposal if it meets the conditions for acceptance. VLLW which can be disposed of by controlled burial at landfill sites is not formally reported in the UK Radioactive Waste Inventory.

Table D: Waste and spent fuel in storage

Quantities of spent fuel and waste in storage at end of 2004						
Country	**VLLW (m^3)**	**LILW – SL (m^3)**	**LILW – LL (m^3)**	**HLW (m^3)**	**SF (te HM)**	**comments**
Austria	-	1800	200	-	-	Any remaining SF will be shipped to USA under 'take back agreement'
Belgium	-	13 000	4 000	444	2 675	Does not include 200 m^3 radium-contaminated wastes
Bulgaria	-	7 636	-	-	943	Does not include liquid wastes (7 400 m^3)
Czech Rep.	-	4510	4	-	891	
Denmark	-	1 100	125	-	-	The small amount of SF is considered as LILW-LL
Estonia	-	400	1	-	-	Mainly from decommissioning of former submarine training centre at Tammiku
Finland	-	1 940	40	-	1 416	
France	128 000	98 700	92 600	1 851	8 279	In addition probably around 3 000 te at NPP
Germany	-	128 761		2 000 840	3 109	HLW includes 448 m^3 untreated heat-generating wastes. LILW includes 47 500 m^3 untreated wastes and intermediate products. Total vitrified waste to be returned
Greece	-	70	-	-	-	
Hungary	-	1 214	-	-	740	Liquid waste awaiting processing (4 700 m^3) not included
Italy	8 000	17 000	8 000	-	247	
Latvia	-	-	-	-	-	Small quantities of sealed sources only
Lithuania	26 000	57 900	760	-	1 820	Does not include liquid wastes
The Netherlands	-	8550		5	2	

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Quantities of spent fuel and waste in storage at end of 2004						
Country	**VLLW (m^3)**	**LILW – SL (m^3)**	**LILW – LL (m^3)**	**HLW (m^3)**	**SF (te HM)**	**comments**
Poland	-	30	4	-	0.6	Does not include liquid wastes (300 m^3)
Portugal	-	1000	-	-	-	
Romania	-	472	11	-	767	
Slovakia	4 000	15 000	50	-	770	
Slovenia	-	2362	-	-	313	LILW-SL includes some LILW-LL
Spain	5760	30230	1146	13	3 195	HLW currently stored in France; LILW-LL 666 m^3 stored in France and the rest stored on site at Vandellos 1 NPP from its decommissioning. VLLW also stored on site at Vandellos 1 from its decommissioning
Sweden	3 940	7 881	4 900	-	4 930	
United Kingdom	-	2 000	105 000	1 200	8 000	ILW and HLW include waste arising from the reprocessing of fuel for foreign customers

Table E: Additional waste and spent fuel arising to 2020

Waste and spent fuel arising to 2020						
Country	**VLLW (m^3)**	**LILW – SL (m^3)**	**LILW – LL (m^3)**	**HLW (m^3)**	**SF (te HM)**	**comments**
Austria	-	1440	160	-	-	Decommissioning waste from ASTRA research reactor and other facilities on Seibersdorf site
Belgium	-	6 600	1 600	29	1 400	HLW consists of returns from La Hague
Bulgaria	-	6 000	1500	-	950	SF in principle sent for reprocessing
Czech Rep.	-	5000	75	-	2150	
Denmark	-	900	-	-	-	Includes decommissioning of DR 1
Estonia	-	-	5	-	-	
Finland	-	4 800	7	-	1 500	SF includes Olkiluoto-3
France	370 000	400 000	49 300	1 770	19 600	SF in principle sent for reprocessing
Germany	-	93 500		900	5 420	HLW consists of returns from Sellafield and La Hague
Greece	-	30	-	-	-	Estimate after decay storage and conditioning of solid waste
Hungary	-	5 400	-	-	600	
Italy	-	30 000	9 000	60	-	HLW consists of returns from La Hague. LILW consists of decommissioning wastes.
Latvia	50	40	1000	-	-	Wastes mainly from decommissioning of Salaspils research reactor
Lithuania	48 000	114 000	6 600	-	620	
The Netherlands	-	5 100		20	200	Spent fuel estimated, as all is sent for reprocessing. Estimated split for LILW is 600 m^3 LILW-LL and 4500 m^3 LILW-SL.

Waste and spent fuel arising to 2020						
Country	**VLLW (m^3)**	**LILW – SL (m^3)**	**LILW – LL (m^3)**	**HLW (m^3)**	**SF (te HM)**	**comments**
Poland	-	540	75	-	-	
Portugal	-	70	-	-	-	Based on current rate of generation
Romania	-	1 800	-	-	3 400	LILW-SL includes some LILW-LL
Slovakia		12 000	-	-	750	LILW-SL mainly from decommissioning of Bohunice-V1, will include some LILW-SL
Slovenia	-	855	-	-	220	LILW-SL includes some LILW-LL
Spain	10 000	10 100	750	-	2425	See table D for returns from France
Sweden	12 000	12 000	1 800	-	2 700	
United Kingdom	-	100 000	390 000	530	10 000	ILW and HLW include waste arising from the reprocessing of fuel for foreign customers

Table F: Financing schemes for radioactive waste

country	basis for allocation of charges to waste producers	mechanisms for financing longer term liabilities[16]
Austria	A price list updated annually, and approved by the regulatory authority, includes the actual cost of waste management (transport, treatment, conditioning, interim storage) payable to Nuclear Engineering Seibersdorf GmbH	Since the beginning of 2003, all holders of radioactive waste and orphan sources for disposal are obliged to make contributions to a fund for final disposal. Users have to pay this fee to WMO. WMO regularly transfers the collected fees to the Federal Ministry of Agriculture, Forestry, Environment and Water Management, where this fund has been separately set up for the exclusive purpose of the later final disposal of the conditioned radioactive waste.
Belgium	'Polluter pays' principle: Costs are waste category specific and proportional to the volume within each category.	WMO is responsible for the management of all radioactive waste in Belgium and, all radioactive waste has to be transferred from the producer or owner to WMO. Upon transfer, the producer or owner pays to WMO the amount which covers the future management costs. These provisions are managed by WMO.
Bulgaria	SF management cost included in NPP operation. Waste management activities carried out by SERAW; budget is covered by national fund.	Segregated external funds were created in 1999 to cover decommissioning and waste liabilities. Under the 2003 Regulation funds are collected from radioactive waste producers and managed by the Ministry of Economy and Energy in a dedicated fund. Funds allocated to cover the annual activity programme. Some activities are financed by EU under PHARE and also through the Kozloduy International Decommissioning Support fund (KIDSF).
Czech Rep.	Payments are made into the Nuclear Account and cover all of activities connecting with SF and waste disposal and repository operation. Small producers pay on acceptance of their waste for disposal.	State-controlled segregated fund – the Nuclear Account – receives contributions from waste producers including the nuclear operator who pays levies according to the average production of electricity. Each producer pays according to his share of the total waste and the estimated costs of the WMO's activities, which are updated according to economic or waste management policy changes. The WMO is responsible for collecting these charges, monitors the adequacy of the reserve and approves any withdrawal. A segregate decommissioning reserve is created.
Denmark	Fees charged for items received from outside Danish Decommissioning	State support as the major costs will arise as a result of the decommissioning of the research facilities at Risø.

16 WMO = Waste Management Organisation (refer to Table G)

country	basis for allocation of charges to waste producers	mechanisms for financing longer term liabilities[16]
Estonia	Payment is made by waste producers at the time of transfer of their waste into interim storage. At present, no distinction in charges is made between different types of waste.	State pays for "historical waste" liabilities such as the former soviet nuclear naval training facility at Paldiski and its implementation was entrusted to the Estonian Radioactive Waste Management Agency (A.L.A.R.A.).
Finland	The nuclear power companies and the operator of the research reactor present annual cost estimates for the future management of nuclear wastes and ensure that funds are deposited with the State Nuclear Waste Management Fund.	According to the Nuclear Energy Act the licence holder has an obligation to take responsibility for all nuclear waste management measures and their appropriate preparation (including decommissioning costs), and shall cover all the related expenses. This is done by gathering adequate funds for future investments in an independent Finnish State Nuclear Waste Management Fund. To guarantee against the insolvency of the nuclear utilities, they shall provide securities to MTI for the part of financial liability which is not covered by the Fund.
France	Unit volume (or commercial tariff for specified packages) on delivery for disposal.	For VLLW and LILW-SL disposal is financed through commercial contracts between the producer and ANDRA. For LILW-LL and HLW waste producers build up provisions on the basis of an evaluation by ANDRA. The regulatory situation and organisation of nuclear decommissioning and waste management in France underwent profound change in 2006 with the adoption new legislation on nuclear waste research and management. ANDRA has to set up an internal restricted fund in order to finance the storage of long lived high and medium level wastes. The fund will be fed by contributions from the nuclear operators under bilateral conventions. The nuclear operators will set up internal restricted funds covered by dedicated assets managed under separate accountability.
Germany	State bears the cost for the initial development of repositories. These costs are recovered through contributions (cost per unit volume) or advanced payments.	For privately owned nuclear facilities i.e. NPPS provisions are allocated to the foreseen costs. Provisions for management of radioactive waste from operation are made according to the waste generated. For publicly owned facilities costs are finance d through the annual public budget.

country	basis for allocation of charges to waste producers	mechanisms for financing longer term liabilities[16]
Hungary	Official tariff list set by ministerial decree for small producers.	The Central Nuclear Financial Fund, a separate Treasury account made up of the contributions of the nuclear power plant operator, will cover all future waste management and decommissioning costs. Annual payments into the fund by Paks Nuclear Power Plant are proposed by the Minister supervising the Hungarian Atomic Energy Authority (HAEA). Payments are based upon submittals prepared by the PURAM and approved by the HAEA and by the Hungarian Energy Office.
Italy	Official current estimate € 7 000 / m^3 forms basis of estimate for waste management liabilities.	ENEL transferred its long-term liabilities fund for decommissioning and waste management (about €750 million) to SOGIN on its creation. As these were judged insufficient an additional levy per kWh, adjusted every 3 years has been implemented. The levy is fixed by the National Authority for the Electricity and Gas on the basis of Sogin's annual program of activities.
Latvia	Fees collected by BAPA for management services as well directly from state budget.	Natural resource tax payable on radioactive substances imported, which generate waste requiring disposal in Latvia. Additional disposal vault and storage facility at Baldone funded under PHARE.
Lithuania	NPP operator contributes to the national fund for the decommissioning of Ignalina NPP. Other waste producers contribute through charges to the finances of RATA.	NPP operator and other waste producers contribute through charges to the finances of RATA, which is responsible for managing all waste according to the national strategy. There are also national and international funds for the decommissioning of Ignalina and management of the wastes. The NPP decommissioning fund is financed through a levy of 6% on the price of electricity sold. It co-finances waste management activities with the Ignalina International Decommissioning Support Funds.
The Netherlands	For LILW: treatment, volume and radiation level of conditioned waste. For HLW: reserved capacity (volume).	For waste management and final disposal funding the operators pay volumetric fees to Central Organisation for Radioactive Waste (COVRA). COVRA then takes over full title of the waste (i.e. ownership and liability).
Poland	Funds available through state budget or from services carried out by RWMP.	No arrangements currently for some long-term activities These will be provided from the state budget as required.
Portugal	Part of estimated cost per item of waste.	None. Portugal has no relevant activities or installations in the nuclear field.
Romania	Annual allocation of charges to waste producers (to cover operational costs of the new WMO called ANDRAD).	The Government Ordinance 31/2006 defines two segregated funds; one for spent fuel and radioactive waste management and the second one for decommissioning of nuclear facilities. The funding mechanism is scheduled by the end of 2007 (plan: pay a fee based on a certain amount per MWh of electricity delivered).

country	basis for allocation of charges to waste producers	mechanisms for financing longer term liabilities[16]
Slovakia	NPP operational wastes management funded from operating budget.	A national fund has steadily built up since the mid-nineties. The State Fund for Decommissioning of Nuclear Installations and Management of Spent Fuel and Radioactive Wastes restructured in 2004. The fund is managed by the Ministry of Economy. Annual contributions by NPP operators are as a levy on the electricity price to the end user. The contributions are reviewed at five year intervals. There is co-funding of activities with the Bohunice International Decommissioning Support Fund.
Slovenia	Small waste producers (medicine, industry and research) pay ARAO for services provided on the basis of a price list established by government decree.	The Fund for the Decommissioning of the Krško NPP is financed through a levy on the kWh electricity production. The purpose of the Fund is to collect money as a levy on the produced electricity for future decommissioning and for the disposal of radioactive waste and spent fuel. The Fund operates as an independent legal entity and its work is overseen by a Supervisory Committee.
Spain	The National up-front Fund for the activities contemplated in the General Plan for RWM and Decommissioning is being done through incomes collected during the facilities lifetime based on cost estimations. Costs estimations are subjected to annual revision by the Government.	According to the Royal Decree 5/2005 an updated financing system has been set up. The revenues transferred to the Fund arise from: The amounts collected via the supply and access tariffs for the entire electricity sales. Billing to NPPs licensees for the amount resulting from multiplying the gross KWh monthly generated by each plant by a specific unit value, applicable to waste and SF originated beyond 31st March 2005. Idem to 2 referring to the Juzbado Fuel Assemblies Manufacturing Plant by annual contributions. Billing to the licenses of radioactive installations outside the nuclear cycle via tariffs approved by the MITyC. This case invoicing is done when the waste is collected by ENRESA.
Sweden	Costs for operational LILW disposal are paid for directly by producers. Costs for management of spent fuel and long-lived LILW are levied on power generators (i.e. waste producers) by means of fees on generated electricity.	The Nuclear Waste Fund administrated by a special Board and invested with the Swedish National Debt Office, though SSM (regulator) advises Government, on the basis of an estimate made by SKB, regarding the size of the fees and must approve the main disbursements. The fees are reviewed annually. Additional guarantees are requires to cover early closure of NPPs (< 25 years operation) and unforeseen and unforeseen waste management costs. The funds are set up as external segregated funds with considerable oversight especially with respect to fund investment.

country	basis for allocation of charges to waste producers	mechanisms for financing longer term liabilities[16]
United Kingdom	Charges are levied by waste managers on waste producers for disposal of Low Level Radioactive Waste (LLW). For higher level wastes, no charges are levied at present, there being no disposal facilities available	Historic liabilities (previously owned by BNFL and the UKAEA) assumed by NDA will be funded through a combination of continued commercial operation of some facilities and the state budget. The NDA's strategy for dealing with radioactive waste is dependent on the outcome of reviews initiated by the UK Government. British Energy has its own segregated fund to cover its own liabilities.

Table G: Radioactive waste management organisations (WMO)

Country	WMO	Comments
Austria	NES	Public /Private. An affiliate of Austrian Research Centers GmbH (ARC)
Belgium	ONDRAF/NIRAS	Public, established in 1980
Bulgaria	SERAW	Public, established in 2004
Czech Rep.	SÚRAO (RAWRA)	Public, established in 1997
Denmark	DD	Public, established in 2003
Estonia	A.L.A.R.A. AS	Public, established in 1995
Finland	POSIVA	Private, established in 1995 by NPP operators
France	ANDRA	Public, established in 1991
Germany	DBE	Public under authority of BfS (Federal Office for Radiation Protection)
Hungary	PURAM	Public, established in 1998
Italy	SOGIN	Public, established in 1999
Latvia	BAPA	Public, established in 2005
Lithuania	RATA	Public, established in 2001
The Netherlands	COVRA	Public, established in 1982
Poland	RWMP	Public, established in 2002
Romania	ANDRAD	Public, established in 2003
Slovakia	JAVYS	Public, established in 2005
Slovenia	ARAO	Public, established in 1991
Spain	ENRESA	Public, established in 1984
Sweden	SKB AB	Private, owned by NPP operators, established in 1972
United Kingdom	NDA	Public, established in 2005 (Its predecessor WMO, Nirex, was established in 1982)

Table H: Principal underground research laboratories (URL) and exploratory mines for HLW / SF

country	URL	Operator	details
Belgium	HADES	EURIDICE (cooperation of ONDRAF / NIRAS & SCK·CEN	Boom clay (plastic) at ~ 230m depth on SCK·CEN site at Mol; has been extended as part of ongoing PRACLAY project
Finland	Onkalo	Posiva	Under construction, characterisation planned 2009 onwards at 520m depth, planned to be incorporated into disposal facility with first disposal ~ 2020
France	Bure	ANDRA	Callovo-Oxfordian clay (hard) at ~ 450 to 500 m depth. Meuse Department. Construction completed in 2006
	Tournemire	IRSN	sediments (hard clay), 250 m depth; started 1990; former railway tunnel & adjacent galleries; methodological laboratory only
Germany	Asse mine	DBE	Former potash / rock salt mine; R&D facility until 1997. Closure currently in preparation and scheduled for 2013.
	Gorleben	DBE	Salt dome at 800m depth. Exploration works since 1986. Moratorium since 2000
Sweden	Äspö HRL	SKB	granite, 200 - 500 m depth
	Stripa mine	SKB	Granite, former iron ore mine 360 – 410 m research from 1977- 1991. Now closed
Switzerland	Grimsel Test Site	NAGRA	granite, reached through main access tunnel of hydro power company KWO~ 450 m depth; operational since 1983
Switzerland	Mt. Terri Project	Swiss Federal Office of Topography	opalinus clay (hard), ~ 400 m depth; gallery off a road tunnel; started 1995

Table I: National management strategies for radioactive waste and spent fuel

country	VLLW (if applicable) & LILW	HLW / SF
Austria	Interim storage of conditioned waste (LILW) at the Research Center Seibersdorf. Study in 2001 concluded that surface disposal was not an option in view of the presence of long-lived waste. However, in view of the small quantities a regional solution is the preferred option	-
Belgium	Interim storage of conditioned waste at the Belgoprocess site in Dessel pending the availability of a disposal site. Surface disposal repository planned for Dessel, with construction commencing around 2011.	Storage at the Belgoprocess site of returned vitrified waste from reprocessing at La Hague. SF is now being stored in AFR facilities on NPP sites – current policy is a moratorium on further reprocessing contracts. However both open and closed fuel cycle scenarios are considered. Underground research continuing at the HADES facility at Mol concerning the concept of deep geological disposal in clay. Construction of a deep geological repository would not start before 2025, with possible operation around 2040. The WMO is a member of ARIUS and participated in the SAPPIERR project.
Bulgaria	Processing of all waste. Construction of a national near-surface repository for LILW-SL (both institutional and from NPP) by 2015. The repository should assure storage of waste not suitable for near surface disposal.	Transfer of SF for storage and reprocessing in Russia with HLW return, under terms of 1995 agreement. SF can be declared waste if a disposal route is available. Storage of SF in reactor ponds and wet store at Kozloduy. Dry store to be commissioned around 2009, which can store both SF and HLW (after return from Russia). Decision on HLW disposal concept around 2012. Bulgaria participated in the SAPIERR project.
Czech Rep.	Treatment and conditioning of all waste, disposal in one of the operation disposal sites or safe storage of waste that can not be deposited in the existing repositories.	Long term interim storage of all SF pending the availability of a disposal route. The national management strategy does not foresee a deep geological disposal site in operation before 2065. Six possible locations have been identified. It is anticipated a deep repository will accommodate all the waste that can not be deposited in near-surface repositories, SF once it is declared as waste and HLW from decommissioning.
Denmark	Interim storage of conditioned waste at Risø National Laboratory. Repository concept under development. "Basis for Decision" outlining development expected to be approved.	International solution being sought for small amount of SF remaining in line with earlier solutions regarding SF from research reactors.
Estonia	All waste from the decommissioning of Paldiski and from institutional sources is conditioned for long-term storage at Paldiski pending the availability of a disposal route.	None (all SF from the Paldiski training reactors was returned to Russia)

country	VLLW (if applicable) & LILW	HLW / SF
Finland	Routine disposal of operational NPP waste in underground (intermediate depth) repositories at the two NPP sites.	SF stored in AFR facilities on NPP sites. The Decision in Principle by the Finnish Parliament in 2001 endorsed the selection of Olkiluoto as the site for the development of a deep disposal facility, subject to approval by the regulatory authorities. The repository is planed for operation around 2020. Posiva is now constructing the underground research facility Onkalo, which is planned to be part of the planned repository.
France	Routine disposal of short-lived LILW at the Centre de l'Aube facility. Centre de Morvilliers opened in 2003 for disposal of VLLW. Long-term storage of conditioned LILW-LL pending development of disposal solution	Routine reprocessing of most, but not all, SF. Unreprocessed SF is stored at La Hague. Deep geological disposal of HLW, based on investigations in Bure underground laboratory. Decision on a site expected by 2015, with operation of a repository by 2025.
Germany	In line with its objective to dispose of this waste in deep geological formations, the Federal Government is not pursuing any plans for near-surface repositories. After the dismissal of court cases against the licence issued for the Konrad repository in 2002, covering non-heat developing waste, work has started to transform the former iron ore mine into a repository. Disposal operations are planned to start at the end of 2013.	Returned vitrified waste following reprocessing of SF at La Hague or Sellafield is stored at Gorleben. Final transport of SF for reprocessing took place in 2005. No further contracts are allowed All new generated SF is placed in dry stores adjacent to NPPs, until availability of deep geological repository. The Federal Government is aiming to establish a repository in deep geological formations for the disposal of all kinds of waste, including spent fuel assemblies, by the year 2030. All activities at the Gorleben site remain actually suspended. Since November 2005 the present government aims to find solutions and progress by 2009.
Greece	Wastes are stored at the NCSR Demokritos and in users' premises under GAEC inspection.	SF return to supplier state
Hungary	Institutional LILW-SL waste still to be disposed of at Püspökszilágy, though spare capacity is limited. An underground repository (200m) for NPP operational and decommissioning LILW waste is under construction at Bátaapáti, to be operational by 2008.	Long term interim storage of all SF in AFR facility pending the availability of a disposal route. The reference scenario is domestic direct disposal in deep geologic repository, although other scenarios are kept open. The current target is to finalize URL by 2012, with possible SF/HLW repository operation by the end of the 2040's (candidate site at Boda). PURAM is a member of ARIUS and participated in the SAPIERR project.
Ireland	The small quantities of waste are stored on site by users.	-

country	VLLW (if applicable) & LILW	HLW / SF
Italy	Wastes to be conditioned and stored at point of origin. A national disposal facility is foreseen for VLLW and LILW-SL. As yet no timetable for implementation, although the stated aim of decommissioning all facilities by 2020 will require the availability of a disposal option.	All remaining SF stored in NPP ponds and will be exported for reprocessing. A centralised store for the HLW returned is envisaged. In principle HLW and any remaining SF will be disposed of in a deep geological disposal. Italy participated in the SAPIERR project and participates in SAPIERR II.
Latvia	Wastes from decommissioning of Salaspils will be disposed of at Baldone, which is currently being expanded. LLLW-LL stored pending availability of deep repository (national or regional); Latvia participated in the SAPIERR project.	SF from the research reactor at Salaspils is planned to be moved out of Latvia in the framework of USA–IAEA–Russia co-operation project and proposed Latvia–Russia governmental Agreement on co-operation in the spent fuel management.
Lithuania	VLLW disposal facility currently under construction. Confirmed site for disposal of LILW-SL at Stabatiškė, in the vicinity of the Ignalina NPP. The design work is to start in 2008, the construction in 2012, and the near-surface repository is to be commissioned in 2015. Initial investigations for an intermediate-depth repository for waste not acceptable for near-surface disposal.	SF categorized as radioactive waste. Storage in dry store for at least 50 years prior to disposal in deep geological repository. Some initial investigations have taken place. Lithuania participated in the SAPIERR project and participates in SAPIERR II.
The Netherlands	Long-term interim storage of conditioned waste at the COVRA facility in Borssele. (Near) surface disposal option not considered.	All SF to be reprocessed and vitrified wastes returned and stored in the HABOG facility at Borssele. Current policy is long-term interim storage (100 years) prior to a definitive decision. Participated in the SAPIERR project and participates in SAPIERR II.
Portugal	Interim storage at the DPRSN facility at Sacavém.	Small quantities of HLW stored at Sacavém. All research reactor spent fuel returned to USA.
Poland	Disposal of Institutional LILW at the Różan facility, together with interim storage of long-lived waste. Some siting activities have taken place for a replacement repository, but have stalled due to lack of local support at the concerned sites.	SF is in temporary pond storage at Swierk from research reactors. Placement of this material into dry storage is underway, financed by state budget and under PHARE.

country	VLLW (if applicable) & LILW	HLW / SF
Romania	Disposal of institutional short-lived waste at Baita Bihor site. NPP operational wastes to be disposed of in near surface repository, planned to be built till 2014. Conditioning of LL-LILW and storage minimum 50 years prior to deep geological disposal together with SF.	Open fuel cycle, SF considered as radioactive waste. Six years wet storage at NPP, followed by minimum 50 years in Spent Fuel Dry Store. Deep geological disposal in a national repository that should be available around 2050. Regarding the SF from research reactors – return to the country of origin and/or deep geological disposal in the national repository.
Slovakia	All suitable wastes are sent to the Mochovce facility for disposal (both institutional and NPP operational waste). VLLW disposal facility under consideration. Wastes not suitable for Mochovce stored pending availability of deep geological repository.	Storage of SF for 50 years followed by deep geological disposal. Other alternatives are also considered. A proposal for back-end fuel-cycle policy is expected in 2007. As yet there is no timetable for repository development. Slovakia was represented in the SAPIERR study and is represented in SAPIERR II as well.
Slovenia	All waste currently being stored – mainly at Krško NPP – pending the availability of a national repository. The site should be determined around 2008, with operation around 2013.	All SF is currently stored in the AR pond at Krško NPP – there is sufficient space for the projected reactor lifetime. Current plans include operation of a dry store from 2023, with an operational deep geological repository around 2065, although export is also considered.
Spain	Routine disposal of VLLW and short-lived LILW at the El Cabril facility. VLLW repository at El Cabril available since July 2008. LILW-LL stored pending availability of a deep geological repository.	The GRWP in force considers as a basic element of the reference scenario an open cycle strategy. Since 1982 all SF is currently stored in AR fuel ponds; except at Trillo NPP, where a dry cask AFR storage has operated since 2002. Some vitrified waste is due to be returned from France around 2010 by the reprocessing of the SNF from Vandellos 1 (Gas Cooled Reactor). GRWM plan assumes the availability of a central SF store around the same time and a HLW / SF repository around 2050.
Sweden	Routine disposal either in surface facilities at nuclear sites (VLLW) or in SFR-1 underground facility close to Forsmark NPP (LILW-SL). Planned disposal of decommissioning waste in an extension to SFR-1 with operation in 2020. A repository for LILW-LL will be sited in about 2035.	All SF is stored centrally in the CLAB facility at Oskarshamn. The WMO is proceeding with detailed site investigations at two possible deep disposal sites, with the approval of the local municipalities and the government. Site selection is expected around 2008, with repository operation around 2018.

country	VLLW (if applicable) & LILW	HLW / SF
United Kingdom	Routine disposal of LLW at the Low Level Waste Repository near to the village of Drigg in Cumbria. Plans exist for surface repository at Dounreay for LLW wastes from that site. LILW-LL is stored at the sites of production and is being progressively conditioned into a form suitable for long-term management. LILW-LL will be disposed of in a deep geological repository.	All remaining Magnox fuel will not be reprocessed until 2016 or later. AGR reprocessing contracts will be fulfilled by 2011, leaving 3500 te AGR and 1200 te PWR fuel in storage. Since 2006, official policy for HLW is deep geological disposal, together with the appropriate long-term storage.

Table J: Bodies with responsibilities in the management of radioactive waste and spent fuel

(I) Member States with active or past nuclear power programmes[17]

country	category of waste	regulatory authority	waste treatment and/or conditioning	waste transport	development and/or operation of interim storage facilities	development and/or operation of disposal facilities
Belgium	LILW	FANC	WMO & waste producers	WMO	WMO	WMO
	HLW / SF				WMO (& industry for SF)	
Bulgaria	LILW	NRA	WMO	Waste Producer /WMO	WMO	WMO
	HLW / SF			Industry	Industry	
Czech Rep.	LILW	SÚJB	Waste Producer	Waste Producer	Waste Producer and WMO	WMO
	SF				NPP Operator	
Finland	LILW	STUK	Waste Producers	Industry	Industry	Waste Producer
	SF					WMO
France	LILW & HLW / SF	ASN	Industry and WMO	Industry	- Industry for short-term interim storage: industry - R&D for long-term storage: CEA	WMO
Germany	LILW	BfS	waste producers	waste producers	waste producers and/or collecting depots (Landessammelstellen)	DBE acting on behalf of BfS
	HLW / SF				industry	

17 WMO = Waste Management Organisation (refer to Table G)

Hungary	LILW	HAEA[18]	Waste producers	WMO	Industry and WMO	WMO
	SF		WMO			
Italy	LILW HLW / SF	APAT	NUCLECO for non-fuel cycle wastes SOGIN for NPP wastes	commercial operators	NUCLECO for non-fuel cycle wastes SOGIN for NPP wastes	ENEA
Lithuania	LILW SF	VATESI (RSC for institutional waste)	waste producers	waste producers (WMO for institutional waste)	Waste producer	WMO (NPP for VLLW)
The Netherlands	LILW & HLW / SF	VROM (KFD)	WMO & waste producers	WMO	WMO	WMO
Romania	LILW	CNCAN	IFIN for institutional waste; industry for NPP waste	IFIN for institutional waste; industry for NPP waste	IFIN for institutional waste; industry for NPP waste	WMO
	SF			industry	industry	
Slovakia	LILW SF	ÚJD SR	WMO + waste producers	WMO	WMO	WMO
Slovenia	LILW / SF	URSJV	WMO + waste producers	WMO	WMO / waste producers	WMO
Spain	LILW & HLW / SF	MITYC & CSN	WMO & waste producers	WMO	WMO & waste producers	WMO

18 The Office of the National Chief Medical Officer, as the licensing authority for radiation protection regulation, also participates in the nuclear safety licensing procedure.

Sweden	LILW	SSM	Waste producer	Waste producer & WMO	WMO	WMO
	SF		WMO			
United Kingdom	LILW HLW / SF	- HSE (NII) for safety of nuclear installations - EA (England & Wales) and SEPA (Scotland) for discharges to the environment and disposal	waste producers	waste producers	Waste producers	WMO

(II) Member States without nuclear power programmes

country	Responsible bodies
Austria	Nuclear Engineering Seibersdorf GmbH (NES) is responsible for radioactive waste management. The Federal Ministry of Agriculture, Forestry, Environment and Water Management has the main responsibilities for regulation, licensing and supervision in the field of radioactive waste management
Cyprus	The Radiation Inspections and Control Service of the Ministry of Labour and Social Insurance is responsible for licensing concerning sealed sources
Denmark	Danish Decommissioning (DD) is responsible for radioactive waste management. The Nuclear Regulatory Authorities are the Nuclear Office under the Danish Emergency Management Agency and the National Institute of Radiation Hygiene under the National Board Of Health.
Estonia	A.L.A.R.A. AS is responsible for radioactive waste management. The regulatory authority is the Ministry of the Environment through the Environmaental Inspectorate and the Estonian Radiation Protection Centre ERPC)
Greece	The management of radioactive waste is carried out by the NCSR Demokritos. The regulator is the Greek Atomic Energy Commission.
Ireland	The Radiological Protection Institute of Ireland is responsible for the regulation of the storage, transport and disposal of radioactive waste arising from the use of radioisotopes.
Latvia	The State Hazardous Waste Management Agency (BAPA) is responsible for radioactive waste management. The regulator is the Radiation Safety Centre (RDC).
Luxembourg	The Radiation Protection Department of the Ministry of Health is responsible for interim storage of disused sealed sources. The regulator is the Ministry of Health.
Malta	The Radiation Protection Board is responsible for all licensing issues concerning use of radiation sources.
Poland	The Radioactive Waste Management Plant (RWMP) is responsible for radioactive waste management. The regulatory authority is the National Atomic Energy Agency (PAA)
Portugal	The Department of Radiological Protection and Nuclear Safety (DPRSN), of the Nuclear and Technical Institute (ITN) under the Science, Technology and Higher Education Ministry, is responsible for radioactive waste management. The national responsible authorities are the ITN, the General Directorate for Health of the Ministry of Health and the Ministry of Environment. Since 2005 there is an Independent Commission for Radiological Protection and Nuclear Safety.

Table K: Interim storage facilities for vitrified high-level waste

country	facility / site	period of operation	comments
Belgium	Dessel, Belgoprocess, Building 129 Dessel, Belgoprocess, Building 136C	1982 - 2000 -	
Bulgaria	Kozloduy	2009 -	under construction
France	La Hague Marcoule	up to ~2050 up to ~2050	
Germany	BLG (Brennelementlager Gorleben)	1995-2035	
The Netherlands	HABOG (COVRA site, Borssele)	2003 -	Storage for at least 100 years
United Kingdom	Vitrified Product Store, Sellafield	1990 -	

Table L: Interim storage facilities for spent fuel

country	facility/site	facility type[19]	period of operation	comments
Belgium	Doel NPP	AFR dry cask	1995 -	
	Tihange NPP	AFR pool	1997 -	
	Dessel	AFR Dry cask	2001 -	
Bulgaria	Kozloduy NPP	AFR pool	1989 -	
	Kozloduy NPP	Dry cask	2009 -	Under construction
Czech Rep.	Dukovany NPP	AFR dry cask	1997 -	
	Dukovany NPP	AFR dry cask	2006 -	
	Temelin NPP	AFR dry cask	2010 -	Planned
Finland	Loviisa NPP	AFR pool	1978 -	extension from 1985
	Olkiluoto NPP	AFR pool	1979 -	extension from 1987
France	La Hague	pool		Storage for reprocessing
Germany	Ahaus-BZA	dry cask	1992 -	
	Gorleben-BLG	dry cask	1995 -	
	Greifswald-ZAB	AFR pool	1986 -	
	Greifswald-ZLN	AFR dry cask	1997 -	
	5 reactor sites	AFR dry cask	2001 -	Temporary facilities; 4 in operation at end 2006
	13 reactor sites	AFR dry cask	2002 -	10 in operation at end 2006
Hungary	Paks NPP	AFR dry vault	1997 -	modular design
Italy	Trino NPP	AR pool	1965 -	
	Caorso NPP	AR pool	1981 -	
	Avogadro	AFR pool	1971 -	
Lithuania	Ignalina NPP	AFR dry cask	1999 -	CASTOR- and CONSTOR-RBMK casks
Romania	Cernavoda NPP	AFR dry vault	2003 -	MACSTOR
Slovakia	Bohunice NPP	AFR pool	1986-	
Spain	Trillo NPP	AFR dry cask	2002 -	Fuel from other reactors stored in reactor ponds pending construction of central store
Sweden	CLAB	pool	1989 -	

[19] Only centralised stores, AFR stores at NPP sites and AR stores at shutdown reactors are listed. All operating NPPs also have some capacity for AR wet or dry storage. Some countries also have small stores for SNF from research reactors or combine the storage of research reactor SNF with the storage of reprocessing waste (e.g. HABOG in the Netherlands).

country	facility/site	facility type[19]	period of operation	comments
United Kingdom	Sellafield and NPPs	pool	–Since 1950	

Table M: The Joint Convention – ratification status

country	date of signature	date of ratification, acceptance or approval	date of entry into force
Austria	17/09/98	13/06/01	11/09/01
Belgium	08/12/97	05/09/02	04/12/02
Bulgaria	22/09/98	21/06/00	18/06/01
Cyprus	-	-	-
Czech Rep.	30/09/97	25/03/99	18/06/01
Denmark	09/02/98	03/09/99	18/06/01
Estonia	05/01/01	03/02/06	04/05/06
Finland	02/10/97	10/02/00	18/06/01
France	29/09/97	27/04/00	18/06/01
Germany	01/10/97	13/10/98	18/06/01
Greece	09/02/98	18/07/00	18/06/01
Hungary	29/09/97	02/06/98	18/06/01
Ireland	01/10/97	20/03/01	18/06/01
Italy	26/01/98	08/02/06	09/05/06
Latvia	27/03/00	27/03/00	18/06/01
Lithuania	30/09/97	16/03/04	14/06/04
Luxembourg	01/10/97	21/08/01	19/11/01
Malta	-	-	-
The Netherlands	10/03/99	26/04/00	18/06/01
Poland	03/10/97	05/05/00	18/06/01
Portugal	-	-	-
Romania	30/09/97	06/09/99	18/06/01
Slovakia	30/09/97	06/10/98	18/06/01
Slovenia	29/09/97	25/02/99	18/06/01
Spain	30/06/98	11/05/99	18/06/01
Sweden	29/09/97	29/07/99	18/06/01
United Kingdom	29/09/97	12/03/01	18/06/01
Euratom	-	04/10/05	02/01/06

Abbreviations and Acronyms

AECL	Atomic Energy of Canada Ltd. http://www.aecl.ca/
AFR	"away from reactor" (storage)
AGR	advanced gas-cooled reactor
AkEnd	Arbeitskreis Auswahlverfahren Endlagerstandorte (Germany) http://www.akend.de/
A.L.A.R.A.	"As Low As Reasonably Achievable" – also the name of the Estonian Radioactive Waste Management Agency http://www.alara.ee/
ANDRA	Agence Nationale pour la Gestion des Déchets Radioactifs (France) http://www.andra.fr/
ANDRAD	Agentia Nationala pentru Deseuri Radioactive (Romanian National Agency for Radioactive Waste) http://www.andrad.ro/
APAT	L'Agenzia per la protezione dell'ambiente e per i servizi tecnici (Italian Regulator) http://www.apat.gov.it/
AR	"at reactor" (storage)
ARAO	Agencija za radioaktivne odpadke (Slovenian Agency for Radwaste Management) http://www.gov.si/arao/
ARIUS	Association for Regional and International Underground Storage http://www.arius-world.org
AVR	Arbeitsgemeinschaft Versuchs Reaktor GmbH (German test reactor at Jülich)
BAPA	Bīstamo atkritumu pārvaldības valsts aģentūra (Latvian State Hazardous Waste Management Agency) http://www.bapa.gov.lv/
BfS	Bundesamt für Strahlenschutz (Germany) http://www.bfs.de/
BLG	Brennelementlager (Gorleben)
BMU	Das Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (Germany) http://www.bmu.de/
BNFL	British Nuclear Fuels Limited (now BNF plc) http://www.bnfl.com/
BWR	boiling water reactor
BZA	Brennelement-Zwischenlager (Ahaus)
CANDU	Canadian Deuterium Uranium (Canadian heavy water reactor design)
CEA	Commissariat à l'énergie atomique (France) http://www.cea.fr/
CILVA	Centrale infrastructuur voor de verwerking van laagactief vast afval (Belgium)
CLAB	Centralt Lager för Använt Kärnbränsle (Swedish interim storage facility for spent fuel)
CNCAN	Comisia Nationalã pentru Controlul Activitãtilor Nucleare (National Commission for Nuclear Activities Control - Romanian nuclear safety authority)
COGEMA	Compagnie Générale des Matières Nucléaires http://www.cogema.com/
COVRA	Centrale Organisatie voor Radioactief Afval (Dutch Central Organization for Radioactive waste) http://www.covra.nl/
CSN	Consejo de Seguridad Nuclear (Spain) http://www.csn.es/

DBE	Deutsche Gesellschaft zum Bau und Betrieb von Endlagern für Abfallstoffe mbH (Germany) http://www.dbe.de/
DD	Danish Decommissioning http://www.ddcom.dk/
DEFRA	Department for Environment Food and Rural Affairs (UK) http://www.defra.gov.uk
DFR	demonstration fast reactor
DG	Directorate-General (of the European Commission)
DG-RTD	Directorate-General for Research and Technological Development (European Commission) http://europa.eu.int/comm/research/energy/index_en.html
DGSNR	Direction générale de la sûreté nucléaire et de la radioprotection (France) http://asn.gouv.fr/
DPRSN	Department of Radiological Protection and Nuclear Safety (Portugal) http://www.itn.pt/sec/prsn/uk_dprsn_pse.htm
EA	Environment Agency (UK) http://www.environment-agency.gov.uk/
ENEA	Ente per le Nuove Tecnologie, l'Energia e l'Ambiente (Italy) http://www.enea.it/
ENEL	Ente Nazionale per l'Energia Elettrica (Italy) http://www.enel.it/
ENRESA	Empresa Nacional de Residuos Radiactivos SA (Spanish WMO) http://www.enresa.es/
ERPC	Estonian Radiation Protection Centre http://www.envir.ee/kiirgus/index.php
EURIDICE	European Underground Research infrastructure for disposal of radioactive waste in a Clay Environment http://www.euridice.be/
FANC / AFCN	Federaal Agentschap voor Nucleaire Controle / L'Agence fédérale de Contrôle nucléaire (Belgium) http://www.fanc.fgov.be/newfanc/default.htm
GAEC	Greek Atomic Energy Commission
GWe	Gigawatt electrical (unit of electrical power)
HABOG	Hoogradioactief Afval Behandelings- en Opslag Gebouw (Netherlands)
HADES	High Activity Disposal Experimental Site (situated on SCK-CEN site at Mol, Belgium)
HAEA	Hungarian Atomic Energy Authority http://www.haea.gov.hu/
HEU	High Enriched Uranium
HLW	high-level waste
HRL	Hard Rock Laboratory (Äspö, Sweden)
HSE	Health and Safety Executive (UK) http://www.hse.gov.uk/
IAEA	International Atomic Energy Agency http://www.iaea.org/worldatom/ and in particular http://www.iaea.org/databases/dbdir/db97.htm
IFIN-HH	Institutul National de Fizica si Inginerie Nucleara- "Horia Hulubei" (Romania) http://venus.nipne.ro/maggi/ifin-hh.php
INRNE	Institute of Nuclear Research and Nuclear Engineering of the Bulgarian Academy of Sciences http://www.inrne.bas.bg/
JAVYS	Jadrová a vyraďovacia společnost (Slovakian Nuclear Decommissioning Company) http://www.javys.sk

KFD	Kernfysische Dienst (Dutch regulator within Ministry of Environment)
LILW	low- and intermediate-level waste (-SL short-lived, -LL long-lived)
LWR	light-water reactor (i.e. PWR and / or BWR)
m^3	cubic metre
Magnox	graphite moderated gas-cooled reactor (from magnesium oxide cladding)
MACSTOR	Modular Air Cooled Storage
MITYC	Ministerio de Industria Turismo y Comercio (Spain) http://www.mineco.es/
MOX	mixed oxide (fuel)
MS	Member States (of the European Union)
NAEA	National Atomic Energy Agency (see PAA)
NDA	Nuclear Decommissioning Authority (UK) http://www.nda.gov.uk/
NEA	Nuclear Energy Agency (of OECD – Organisation for Economic Co-operation and Development) http://www.nea.fr/ and in particular http://www.nea.fr/html/rwm/rf/welcome.html
NES	Nuclear Engineering Seibersdorf GmbH (Austria) http://www.nuclear-engineering.at/
NII	Nuclear Installations Inspectorate (part of HSE) http://www.hse.gov.uk/nsd/index.htm
NORM	Naturally Occurring Radioactive Material
NPP	nuclear power plant
NRA	Nuclear Regulatory Agency (Bulgaria) http://www.bnra.bg/
NCSR Demokritos	National Centre of Scientific Research "Demokritos" (Greece)
OKG	Oskarshamnskraftgrupp AB (Swedish NPP Company) http://www.okg.se/
ONDRAF / NIRAS	Organisme National des Déchets Radioactifs et des Matières Fissiles / Nationale Instelling voor het Beheer van Radioactief Afval en Splijtstoffen (Belgium WMO) http://www.nirond.be/
P & T	partitioning and transmutation
PAA	Państwowa Agencja Atomistyki (Poland) http://www.paa.gov.pl/
PFR	prototype fast reactor
POSIVA	(Finnish WMO) http://www.posiva.fi/
PRACLAY	Preliminary demonstration test for Clay disposal of highly radioactive waste
PURAM	Public Agency for Radioactive Waste Management (Hungaria) http://www.rhk.hu/index.htm
PWR	pressurised water reactor
R&D	research and development
RATA	Radioaktyviųjų atliekų tvarkymo agentūra (Lithuanian State Enterprise Radioactive Waste Management Agency) http://www.rata.lt/
RAWRA	Radioactive Waste Repository Authority (see SÚRAO)
RBMK	(Russian designed graphite moderated pressure tube reactor)

RDC /RSC	Radiācijas drošības centrs (Latvian Radiation Safety Centre) http://www.rdc.gov.lv/
RSC	Radiacinės saugos centras / Radiation Protection Centre (Lithuania) http://www.rsc.lt/
RWMP	Radioactive Waste Management Plant (Poland)
SCK-CEN	Studiecentrum voor Kernenergie / Centre d'Etudes de l'Energie Nucléaire (Belgium nuclear research centre) http://www.sckcen.be/
SEPA	Scottish Environment Protection Agency http://www.sepa.org.uk/
SERAW	State Enterprise "Radioactive Waste" (Bulgaria) http://www.dprao.bg
SE-VYZ o.z.	Slovenské elektrárne, a.s. - Vyraďovanie jadrovoenergetických zariadení, zaobchádzanie s RAO a vyhoreným palivom, o.z. (Slovak WMO) http://www.seas.sk/index.php?id=201
SFR	Slutförvaret för radioaktivt driftavfall (Swedish final repository for radioactive waste, Forsmark)
SFuDD	spent fuel destined for direct disposal
SKB	Svensk Kärnbränslehantering AB (Swedish Nuclear Fuel and Waste Management Co) http://www.skb.se/
SF	spent fuel
SOGIN	Società Gestione Impianti Nucleari (Italian Decommissioning and Waste Management Company) http://www.sogin.it/
SSM	Strålsäkerhetsmyndigheten (Swedish Radiation Safety Authority) http://www.stralsakerhetsmyndigheten.se
SSRS	spent sealed radioactive source
STUK	Säteilyturvakeskus (Finnish radiation and nuclear safety authority) http://www.stuk.fi/
SÚJB	Státní úřad pro jadernou bezpečnost (Czech nuclear safety authority) http://www.sujb.cz/
SÚRAO	Správa úložišť radioaktivních odpadů (Czech Radioactive Waste Repository Authority) http://www.surao.cz/
Te HM	tonnes heavy metal (equivalent to tonnes of uranium + plutonium)
THTR	Thorium Hochtemperatur-Reaktor (at Hamm-Uentrop in Germany)
ÚJD SR	Úrad jadrového dozoru Slovenskej republiky (Nuclear Regulatory Authority of the Slovak Republic) http://www.ujd.gov.sk/
URL	underground research laboratory
URSJV	Uprava Republike Slovenije za jedrsko varnost (Slovenian Nuclear Safety Administration) http://www.sigov.si/ursjv/
VATESI	Valstybinė Atominės Energetikos Saugos Inspekcija (Lithuanian nuclear safety authority) http://www.vatesi.lt/
VLJ	Voimalaitosjäte (Finnish – nuclear power plant operational waste)
VLLW	very low-level waste
VROM	De Raad voor de Volkshuisvesting, de Ruimtelijke Ordening en het Milieubeheer (Netherlands) http://www.vrom.nl/

VVER	Russian designed pressurised water reactor
WMO	(radioactive) waste management organisation
ZAB	Zwischenlager für abgebrannte Brennstäbe (Greifswald)
ZLN	Zentrallager Nord (Greifswald)