



# National Policies

## Radioactive Waste Management - Appendix 3

updated April 2013

### Australia

There are no nuclear power reactors in Australia. The HIFAR research reactor at Lucas Heights, near Sydney, operated for 50 years and was replaced in 2007 by the OPAL reactor on the same site. The Lucas Heights research centre is operated by the Australian Nuclear Science and Technology Organisation (ANSTO).

Australia's policy is to reprocess spent fuel from its research reactors, with the exception of US origin fuel, which has all been returned to the USA. The waste arising from the reprocessing of the non-US spent fuel overseas will be returned to Australia for storage and, ultimately, disposal as intermediate-level waste.

#### Disposal status

Since the late 1970s there has been an evolving process of site selection for a national radioactive waste repository for low-level waste (LLW) and short-lived intermediate-level waste (ILW). This will be a shallow, engineered pit with multi-layered cover. There has also been consideration of the need to co-locate a secure above-ground storage facility for long-lived ILW including those which will be returned to Australia following the reprocessing of ANSTO's research reactor used fuel. After plans to use a suitable site in South Australia were abandoned due to political pressure the federal government is looking at sites in the Northern Territory. Once a preferred site is selected, a two-year environmental assessment process will begin, in conjunction with the site licensing process.

#### Waste management facilities

ANSTO's Lucas Heights facility has storage facilities on site for its operational waste and for spent fuel. The Queensland State Government has a purpose-built, above-ground store at Esk, near Brisbane, for low-level and short- and long-lived ILW. The facility holds waste generated in Queensland.

The Western Australian (WA) Government operates a near-surface disposal facility for intractable waste generated in WA, including LLW and short-lived ILW, at Mount Walton East, which is located about 480 km northeast of Perth.

#### Responsible agencies

Implementer: Australian Nuclear Science and Technology Organisation (ANSTO) - [www.ansto.gov.au](http://www.ansto.gov.au)

Regulator for Federal facilities: Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) - [www.arpansa.gov.au](http://www.arpansa.gov.au)

Agency with responsibility for radioactive waste management: Federal Department of Resources Energy and Tourism - [www.ret.gov.au/resources/radioactive\\_waste](http://www.ret.gov.au/resources/radioactive_waste)

### Belgium

Seven PWR units with a total capacity of 5.9 GWe supply more than half of Belgium's electricity production. The country also has two research reactors operated by the Belgian Nuclear Research Centre SCK-CEN.

Following the cessation of new reprocessing contracts by the Government in 1994, the country has adopted a strategy of direct disposal.

### Disposal status

Near-surface and deep geological repository concepts considered for LLW; sites considered at existing nuclear facilities (Doel, Mol-Dessel and Tihange); partnerships with local authorities at Mol and Dessel to study the societal acceptability.

Deep geological disposal studies are underway for ILW and HLW/used fuel; clay and shale layers at Mol demonstration repository are under investigation at the Hades (High-activity disposal experimental site) underground research laboratory 225 m deep in the Boom clay. No disposal site for HLW has been identified.

### Waste management facilities

LLW/ILW storage at Belgoprocess, Dessel.

Spent fuel stored on site at the nuclear power plants.

High-level vitrified waste stored at Belgoprocess, Dessel.

### Responsible agencies

Implementer: Belgian Nuclear Research Centre (SCK.CEN) - [www.sckcen.be](http://www.sckcen.be); Belgoprocess - [www.belgoprocess.be](http://www.belgoprocess.be)

Regulator: Federal Agency for Nuclear Control (FANC) - [www.fanc.fgov.be](http://www.fanc.fgov.be)

Agency with responsibility for radioactive waste management: Belgian Agency for Management of Radioactive Waste and Enriched Fissile Materials (ONDRAF/NIRAS) - [www.ondraf.be](http://www.ondraf.be)

## Canada

Over 15% of Canada's electricity production comes from its 19 operating nuclear power reactors (about 13.5 GWe capacity).

The Nuclear Waste Management Organization (NWMO) was set up under the 2002 Nuclear Fuel Waste Act by the nuclear utilities Ontario Power Generation, Hydro-Québec and New Brunswick Power Corporation operating in conjunction with AECL. Its mandate is to explore options for storage and disposal, to then make proposals to the government and to implement what is decided. Less than 3000 tonnes of used fuel per year from Candu reactors is involved.

### Disposal status and facilities

The nuclear utilities and AECL remain responsible for low- and intermediate-level wastes, which are currently stored above ground.

Following a strong positive response to polling of local residents, Ontario Power Generation (OPG) in 2005 proceeded with plans to construct a Deep Geologic Repository (DGR) for its low- and intermediate-level wastes near the Bruce nuclear power plant. The DGR will be 660 metres beneath its Western Waste Management Facility, which it has operated since 1974. Environmental assessment and licensing is expected to take 6-8 years, culminating in a construction licence in about 2013. Operation is expected around 2018.

OPG is the owner and licensee of the DGR; however, NWMO was contracted to manage development of the DGR.

In June 2007, the government selected the retrievable deep geological disposal option - referred to as adaptive phased management (APM) - recommended by NWMO for the long-term management of high-level wastes. NWMO has said that a final repository would probably be in Ontario, Quebec, New Brunswick

or Saskatchewan, and 21 localities have volunteered for the role. The search for a site began in 2012. Operation is expected by around 2035.

### Waste management facilities

The Western Waste Management Facility stores all the low- and intermediate-level nuclear waste from the operation of OPG's 20 nuclear reactors, including those leased to Bruce Power. In addition, the facility provides dry fuel storage for the Bruce reactors.

The Pickering Waste Management Facility provides dry fuel storage for the Pickering reactors. OPG is adding a second phase to the facility.

The Darlington Waste Management Facility provides dry fuel storage for the Darlington reactors.

### Responsible agencies

Implementer: Nuclear Waste Management Organization (NWMO) - [www.nwmo.ca](http://www.nwmo.ca)

Regulator for Federal facilities: Canadian Nuclear Safety Commission (CNSC) - [www.cnsccsn.gc.ca](http://www.cnsccsn.gc.ca)

Agency with responsibility for radioactive waste management: Natural Resources Canada - [www.nrcan-mcan.gc.ca](http://www.nrcan-mcan.gc.ca)

## Finland

Four nuclear power reactors (totalling 2.7 GWe) supply about 30% of total electricity produced. A fifth unit (1600 MWe capacity) is under construction. The country has a policy of direct disposal of used fuel.

### Disposal status and facilities

Near-surface disposal (shallow repositories) for low- and intermediate-level operational waste in operation at Olkiluoto since 1992 and Loviisa since 1998.

Six sites for deep geological disposal of high-level waste/used fuel were considered between 1987 and 1999. Application for 'Decision in Principle' and environmental impact assessment (EIA) submitted by Posiva to government in May 1999. Government policy decision in December 2000 for deep geological disposal in Olkiluoto bedrock at Eurajoki.

Construction of the underground rock characterisation facility (ONKALO) began in 2004. ONKALO will be extended to the final disposal depth of about -400 m. Research has been conducted there since the beginning of its construction.

Posiva applied for a construction licence for the final repository for 9000 tonnes of used fuel from Olkiluoto and Loviisa and the encapsulation plant in December 2012. The operating licence application is expected in 2020, with a view to operation from 2022. Posiva claims that it will have no space in the planned repository for fuel from Fennovoima's planned Hanhikivi reactor in the north.

### Responsible agencies

Implementer: Fortum Power and Heat Oy and Teollisuuden Voima Oyj (TVO) are responsible for interim storage of used fuel and for the conditioning and disposal of operating low- and intermediate-level waste at the Loviisa (Fortum) and Olkiluoto (TVO) nuclear power plants. Posiva Oy - [www.posiva.fi](http://www.posiva.fi) - which is owned by TVO (60%) and Fortum (40%), is responsible for the final disposal of spent nuclear fuel of the owners.

Regulator: Radiation and Nuclear Safety Authority (STUK) - [www.stuk.fi](http://www.stuk.fi)

Agency with responsibility for radioactive waste management: Ministry of Employment and the Economy - [www.tem.fi](http://www.tem.fi)

## France

France has 58 power reactors providing three quarters of its electricity. The country has a policy of reprocessing used fuel.

The management of radioactive waste in France is governed by the 2006 Nuclear Materials and Waste Management Program Act which established deep geological disposal as the reference solution for high-level and long-lived radioactive wastes (with retrievability for at least 100 years). It requires the updating every three years of a National Plan for the Management of Radioactive Materials and Waste.

### Disposal status and facilities

Most short-lived intermediate- and low-level wastes are sent for final disposal to the National Radioactive Waste Management Agency's (ANDRA's) surface waste repository:

- The Centre de l'Aube low- and intermediate level short-lived waste repository in Soulaines-Dhuys (Aube department) was licensed in September 1989 and took over from the Manche repository In 1992.

The Manche waste repository next to La Hague received 527,000 m<sup>3</sup> of these wastes from 1969 to 1994, and is now capped with a multi-layer grassed cover. It entered the surveillance phase in January 2003.

In addition, the Centre de Morvilliers (near the Centre de l'Aube), a dedicated facility for very low-level waste (average activity should be under 10 Bq/g), has been in service since August 2003.

For wastes contaminated with radium and of graphite wastes (*i.e.* low-level wastes that are long lived) a store is being built at the Morvilliers VLLW site pending progress with a disposal centre.

In 1999 ANDRA was authorised to build an underground research laboratory in clay at Bure to prepare for disposal of vitrified high-level wastes and long-lived intermediate-level wastes. In 2012 plans for the Industrial Centre for Geological Disposal (CIGEO) deep repository at Bure were approved. ANDRA expects to apply for a construction and operating licence for CIGEO at the end of 2014, preceded by public debate. It is expected to operate from 2025. Two further repositories are envisaged.

### Responsible agencies

Implementer: National Radioactive Waste Management Agency (*Agence Nationale pour la gestion des Dechets Radioactifs*, ANDRA) - [www.andra.fr](http://www.andra.fr)

Regulator for Federal facilities: French nuclear safety authority (*Autorité de Sûreté Nucléaire*, ASN) - [www.asn.fr](http://www.asn.fr)

Agency with responsibility for radioactive waste management: Ministry for Ecology, Energy, Sustainable development and Town and country planning (Le ministère de l'Écologie, de l'Énergie, du Développement durable et de l'Aménagement du territoire) - [www.developpement-durable.gouv.fr](http://www.developpement-durable.gouv.fr)

Commission Nationale d'Evaluation (CNE) - [www.cne2.fr](http://www.cne2.fr)

## Germany

Germany has nine power reactors operating, with another 8 having been shut down by political edict in 2011. The country has a nuclear phaseout policy in place. If it is not reversed, all nuclear power stations would be closed by around 2022.

The utilities are responsible for interim storage of spent fuel, and have formed joint companies to build and operate off-site surface facilities at Ahaus and Gorleben. However, current policy is for interim storage at reactor sites. Final disposal is the responsibility of the federal government.

Separated high-level wastes from past reprocessing in France and UK are expected to be returned to Germany by 2022 and stored. A total of 166 large casks of glass canisters will be involved, and following the last shipment from La Hague in November 2011, 50 of these are now in storage at Gorleben.

### Disposal status and facilities

The Morsleben repository for radioactive waste was used for the disposal of low-level and medium-level radioactive waste in the former German Democratic Republic from 1971 to 1991 and later on from 1994 to 1998. The installation is now being decommissioned.

The former iron ore mine Konrad in Salzgitter has been investigated since 1975 as a possible repository repository for radioactive waste with negligible heat generation. The conversion of the Konrad mine into a repository started in May 2007 following a decision Federal Administrative Court ruling. It is expected to be operational about 2014.

The Asse salt mine repository received wastes from 1967 to 1978, and is now closed. It is in poor condition and is seen to represent a failure of proper licensing process. The BfS decided in 2010 that the wastes should be moved from it. The 126,000 drums of wastes are likely to be moved to Konrad.

The salt dome at Gorleben was to be the location for a national centre for disposal of radioactive wastes. It is now considered a possible site for geological disposal of high-level wastes. A pilot conditioning plant is there. The site could be available as a final repository from 2025, with a decision to be made about 2019. Research over 1979 to 2000 established the suitability of the site and the investment in it from the power utilities now stands at about EUR 1.6 billion.

### Responsible agencies

Implementer: Federal Office for Radiation Protection (*Bundesamt für Strahlenschutz*, BfS) - [www.bfs.de](http://www.bfs.de), a division of the regulator, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (*Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit*, BMU) - [www.bmu.de](http://www.bmu.de)

Gesellschaft für Nuklear-Service (GNS) is responsible for all operations regarding the transport and disposal of waste in Germany, at nine sites.

## Japan

Up to 2011, Japan's nuclear power reactors accounted for some 30% of electricity produced in the country. There are currently 50 operable power reactors with a total capacity of 44 GWe. The country has a policy of reprocessing and a large reprocessing complex at Rokkasho-Mura, Aomori Prefecture is being commissioned.

### Disposal status and facilities

A large low-level radioactive waste (LLW) disposal centre at the Japan Nuclear Fuel Ltd (JNFL) site in Rokkasho-Mura, Aomori Prefecture, has been operational since 1992. JNFL is a private venture led by ten domestic electric power companies.

In 2000, the Japanese Diet passed the Law on Final Disposal of Specified Radioactive Waste (the “Final Disposal Law”) which mandates deep geological disposal of high-level waste (defined as only vitrified waste from reprocessing spent reactor fuel). In line with this, the Nuclear Waste Management Organisation (NUMO) was set up by the private sector to progress plans for disposal. An open solicitation for candidate sites is in progress, with site selection envisaged between 2023 and 2027.

Used fuel storage occurs onsite at all nuclear power plants. An offsite interim storage facility for used fuel from Tepco and Japco plants is due to commence operations in 2013 at Mutsu, Aomori Prefecture.

JNFL operates a storage facility at Rokkasho-Mura for vitrified high-level wastes which have been returned from Europe after Japanese used fuel has been reprocessed there.

### Responsible agencies

Implementer: Nuclear Waste Management Organization of Japan - [www.numo.or.jp](http://www.numo.or.jp)

Regulator: Nuclear Regulatory Authority - [www.nsr.go.jp](http://www.nsr.go.jp) under the Environment Ministry;

Japan Atomic Energy Commission - [www.aec.go.jp](http://www.aec.go.jp);

Agency with responsibility for radioactive waste management: Ministry of Economy, Trade and Industry - [www.meti.go.jp](http://www.meti.go.jp)

## Netherlands

The 485 MWe Borssele power reactor supplies almost 4% of Dutch electricity. The country has a policy of reprocessing used fuel and long-term storage (100 years) of all radioactive wastes.

### Disposal status

In 1984, a decision was made by the Dutch Government to store all waste at a central interim storage facility for a period of 50-100 years. It established the Central Organization for Radioactive Waste (COVRA), based at Borssele. Long-term storage allows for the deferral of a decision on the final solution to the waste, now expected about 2016.

Used nuclear fuel from Borssele and the shutdown Dodewaard nuclear plant is reprocessed in France (and formerly in UK). The waste arising from reprocessing is sent to COVRA for long-term storage.

### Waste management facilities

Storage facilities for all radioactive waste originating in the Netherlands are located at COVRA in Zeeland, near the Borssele power plant. A low- and intermediate-level radioactive waste (LILW) management centre was commissioned in 1992. The HABOG interim dry high-level waste storage facility at COVRA opened in 2003 with two sections: for ILW, and for vitrified HLW.

### Responsible agencies

Implementer and agency with responsibility for radioactive waste management: Central Organisation for Radioactive Waste (COVRA) - [www.covra.nl](http://www.covra.nl)

Regulator: The Dutch supervisory authority, the Department of Nuclear Safety, Security and Safeguards (*Kernfysische Dienst*, KFD) - [www.vrom.nl](http://www.vrom.nl)

## Spain

Seven nuclear power reactors produce almost one fifth of Spain's electricity.

In 1984 the state-owned ENRESA was established to take responsibility for radioactive waste management in the country and is now the only state-owned part of the nuclear industry.

### Disposal status

Some used fuel has been reprocessed abroad, but further reprocessing was cancelled in 1983 and since then used fuel has been stored at the nuclear plants where it arises.

In mid 2006 Parliament approved ENRESA's plans to develop a temporary central nuclear waste storage facility, and the safety authority approved its design, which was similar to the Habog facility in the Netherlands. In 2009 the government called for municipalities to volunteer to host this EUR 700 million Almacén Temporal Centralizado (ATC) facility for high-level wastes and used fuel. In December 2011 the Ministry announced that Villar de Canas in Cuenca had been selected as the site, and a 60-year storage

period was mentioned. Research continues on deep geological disposal, and also transmutation of long-lived radionuclides.

### Waste management facilities

The El Cabril low- and intermediate-level radioactive waste near-surface disposal facility has been in operation in Córdoba since 1992. Its capacity is sufficient to last up to around 2020.

### Responsible agencies

Implementer: National Agency for Radioactive Waste (*Empresa Nacional de Residuos Radioactivos, S.A., Enresa*) - [www.enresa.es](http://www.enresa.es)

Regulator for Federal facilities: Nuclear Safety Council (*Consejo de Seguridad Nuclear, CSN*) - [www.csn.es](http://www.csn.es)

Agency with responsibility for radioactive waste management: Ministry of the Treasury (*Ministerio de Economía y Hacienda*) ;Ministry of Agriculture, Food and Environment (*Ministerio de Agricultura, Alimentación y Medio Ambiente*)- <http://www.magrama.gob.es/es/>

## Sweden

Ten nuclear power reactors (totalling almost 9 GWe capacity) account for about 40% of Sweden's total electricity production. The country's radioactive waste policy is for direct disposal of used fuel in crystalline bedrock.

### Disposal status and facilities

Nuclear generators are responsible for the costs of managing and disposing of spent fuel. The Swedish Nuclear Fuel and Waste Management Company (*Svensk Kärnbränslehantering AB, SKB*) was set up by them to manage and dispose of radioactive wastes.

Low-level and short-lived intermediate-level operational waste is disposed of in the final repository (known as SFR), located 50 metres beneath the Baltic Sea adjacent to the Forsmark nuclear plant. Brought into operation in 1988, SFR contains four underground caverns and one silo.

Used fuel is transferred from reactor storage to a central interim storage facility (CLAB) near the Oskarshamn nuclear plant after about a year. CLAB has operated since 1985, and the used fuel is stored under water in an underground rock cavern for some 40-50 years. It will then be encapsulated in copper canisters with cast iron internal structure for final emplacement packed with bentonite clay in a 500 metre deep repository in granite.

Research at the Äspö Hard Rock Laboratory 500 metres deep in wet granite nearby identified geological characteristics for this final deep repository. Site selection procedures from 2002 resulted in selection of Östhammar near Forsmark as the site for the final repository. SKB applied for a licence to construct the repository in March 2011. It plans to begin site works in 2013, with full construction starting in 2015, and operation after 2020.

The repository will have 12,000 tonnes capacity at 500 metres depth in 1.9 billion year-old granite. A 5 km ramp will connect to an eventual 60 km of tunnels over 4 sq km, housing 6000 copper-cast iron canisters containing the used fuel. Each 25-tonne canister will hold 2 tonnes of used fuel. Bentonite clay would surround each canister to adsorb any leakage. The repository concept is known as KBS-3.

### Responsible agencies

Implementer: Swedish Nuclear Fuel and Waste Management Company (SKB) - [www.skb.se](http://www.skb.se)

Regulator: In 2008 the National Swedish Nuclear Power Inspectorate (SKI) and the Swedish Radiation Protection Institute (SSI) were merged to form a joint authority, the Swedish Radiation Safety Authority -

[www.stralsakerhetsmyndigheten.se](http://www.stralsakerhetsmyndigheten.se)

Agency with responsibility for radioactive waste management: Ministry of the Environment. An independent committee attached to the Ministry, the Swedish National Council for Nuclear Waste - [www.karnavfallsradet.se](http://www.karnavfallsradet.se), was established in 1985. The Swedish National Council for Nuclear Waste was previously known as KASAM.

## Switzerland

Five reactors (3.2 GWe total capacity) provide about 40% of electricity. The Swiss Federal Nuclear Energy Act stipulates that radioactive waste must be disposed of in Switzerland in a deep geological repository. In 1972 a national co-operative for disposal of radioactive wastes (NAGRA) was set up, involving power plant operators and the federal government. There is no national policy regarding reprocessing or direct disposal of used fuel, but in 2006 a ten-year suspension of reprocessing was ordered.

### Disposal status

Zwilag is a waste company owned by four Swiss nuclear utilities. Used fuel is now retained at the reactors or sent to Zwilag ZZL for interim above-ground storage, being managed as high-level waste.

The Federal Council adopted the conceptual part of the Deep Geological Repository sectoral plan in April 2008, initiating a three-step procedure that will result in the designation of suitable sites for deep geological repositories within ten years. The first step involves a list of proposals for suitable geological regions, which Nagra submitted in autumn 2008.

Six geological siting regions are proposed for a repository for low- and intermediate-level waste. The proposed siting regions – Südanden, Zürcher Weinland, North of Lägeren, Bözberg, Jura-Südfuss and Wellenberg – all have clay-rich sediments as a potential host rock.

Three of these siting regions – Zürcher Weinland, North of Lägeren and Bözberg - have also been identified for a repository for high-level waste.

### Waste management facilities

Zwilag's ZZL (zentrales Zwischenlager) commenced operation as a central interim dry cask storage facility for high-level wastes in 2001 at Würenlingen. It also accepts other radioactive wastes. Two smaller interim storage sites for low and intermediate level wastes have been operating since 1993: the federal government's BZL associated with the Paul Scherrer Institute at Würenlingen, and Zwibez at Beznau, which also has a storage hall for dry cask storage of spent fuel and high-level wastes. Wastes from medicine, industry and research go to BZL for sorting, conditioning and storage.

All four Swiss nuclear power plants have onsite waste treatment and conditioning facilities as well as stores for low- and intermediate-level operational waste.

After removal from the reactor, the used fuel elements are stored for five to ten years at the sites, and may then be sent to ZZL for interim storage.

There are two rock laboratories in Switzerland. Nagra has its own rock laboratory - the Grimsel Test Site - on the Grimsel pass in the Canton of Bern and is involved in the programme at the Mont Terri Rock Laboratory in the Jura Canton; the latter is managed by the Federal Government (Federal Office of Topography).

### Responsible agencies

Implementer: National Cooperative for the Disposal of Radioactive Waste (*Nationale Genossenschaft für die Lagerung radioaktiver Abfälle*, Nagra) - [www.nagra.ch](http://www.nagra.ch)

Regulator: Swiss Federal Nuclear Safety Inspectorate (*Eidgenössisches Nuklearsicherheitsinspektorat*, ENSI)- [www.ensi.ch](http://www.ensi.ch) ENSI was created under legislation adopted in 2007.



Agency with responsibility for radioactive waste management: Swiss Federal Office for Energy (SFOE) - [www.bfe.admin.ch](http://www.bfe.admin.ch)

## United Kingdom

Nuclear power provides about one sixth of total electricity generation in UK. There are 16 reactors in operation with a combined capacity of 10.1 GWe. All but one (the 1188 MWe Sizewell B PWR) of the existing reactors are due to be shut down by 2023, although several new reactors are planned.

The country has had a policy of reprocessing, but is unlikely to reprocess all the used fuel from its AGR reactors and the PWR at Sizewell B.

In April 2005 the Nuclear Decommissioning Authority (NDA) formally took ownership of UK nuclear liabilities. The role of Nirex (originally known as the Nuclear Industry Radioactive Waste Executive) was transferred to the Radioactive Waste Management Directorate of the NDA in 2007.

### Disposal status and facilities

The NDA has set up a Radioactive Waste Management Directorate (RWMD) to develop plans for a deep geological repository for high- and intermediate-level wastes and evolve into the entity that builds and operates it. The government has invited communities to volunteer to host this Geological Disposal Facility (GDF), which will accommodate waste from new build as well as legacy wastes. The next steps are to undertake a 4-year geological study; surface research lasting ten years; and finally a 15-year period of underground research, construction and commissioning. In these steps the NDA will seek to find an 11-year saving to enable operation from 2029.

Near-surface disposal of low-level waste in engineered vaults at Drigg in Cumbria has been operational since 1959.

Intermediate-level waste is stored at Sellafield and other licensed source sites, pending disposal.

High-level waste (HLW) arising from reprocessing is vitrified and stored at Sellafield, in stainless steel canisters in silos. A dry cask storage for used fuel is being built at Sizewell B for operation from 2015. All HLW is to be stored for 50 years before disposal, to allow cooling.

### Responsible agencies

Implementer: Nuclear Decommissioning Authority (NDA) - [www.nda.gov.uk](http://www.nda.gov.uk)

Regulators: The Health and Safety Executive's Nuclear Directorate (formerly known as the Nuclear Installations Inspectorate) - [www.hse.gov.uk/nuclear](http://www.hse.gov.uk/nuclear); Environment Agency (EA) - [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk); Scottish Environmental Protection Agency (SEPA) - [www.sepa.org.uk](http://www.sepa.org.uk)

Agency with responsibility for radioactive waste management: Department for Energy and Climate Change (DECC) - [www.decc.gov.uk](http://www.decc.gov.uk)

## United States of America

There are 103 operating nuclear units in the USA, with a combined capacity of just over 100 GWe. Nuclear generated electricity accounts for about 20% of total electricity production.

US policy since 1977 has been to forbid reprocessing of used fuel and to treat it all as high-level waste, which the government is responsible for finally disposing of in a deep geological repository.

### Disposal status and facilities

The Nuclear Waste Policy Act of 1982 stipulated that the US Department of Energy (DoE) is responsible for disposing of high-level waste/used fuel, with disposal from 1998. In December 1987, the Act was amended

to designate the Yucca Mountain site in Nevada a permanent repository. In 2002, the US Senate approved the development of the proposed repository at Yucca Mountain. However, following the 2009 presidential elections, the Obama administration attempted to abort the Yucca Mountain project, and a high-level "Blue Ribbon" commission was appointed to come up with alternative proposals.

Delays in implementing a repository meant that utilities could not be relieved of their used fuel as legislated, so damages have been awarded to meet some of the costs of supplementary dry cask storage at reactor sites. About \$1.2 billion had been paid to utilities by the end of 2012.

Under new standard contracts with DOE, proponents of new reactor construction must undertake to store used fuel on site indefinitely, so that the DOE does not become liable for delays. The contracts specify that the DOE will begin removing used fuel within 20 years of the first refueling. As of January 2009, 19 such contracts had been signed under the Nuclear Regulatory Commission's (NRC's) Waste Confidence Rule. They are a prerequisite for new reactor licensing and for licence renewals, and reflect the degree to which the NRC is confident that used fuel from US power reactors can be safely managed.

The so-called Blue Ribbon Commission's report to Congress in January 2012 recommended the development of centralized interim storage, establishing a new organization outside DOE to manage the US used fuel program. In January 2013 the DOE announced a new approach based on the report, including setting up a new organisation to manage the siting, development and operation of the future waste stores. It envisaged a 'pilot interim store' being operation in 2021, with a priority on taking used nuclear fuel from current shut down power plant sites. By 2025 a larger 'full-scale interim store' would open, and by 2048 an underground disposal facility should be in place to permanently store and dispose of the material. However, the mandate for the new organisation would exclude reprocessing of used fuel.

The Waste Isolation Pilot Plant (WIPP) repository for defence-related transuranic wastes, located underground in a salt formation in Carlsbad, New Mexico began disposal operations in 1999.

For low-level wastes, disposal facilities operate at: Barnwell, South Carolina - operated by EnergySolutions; Richland, Washington - operated by American Ecology Corporation (formerly U.S. Ecology); Clive, Utah - operated by EnergySolutions; Oak Ridge, Tennessee – operated by EnergySolutions; and the Texas Compact Facility.

### Responsible agencies

Implementer: DoE's Office of Civilian Radioactive Waste Management - [www.ocrwm.doe.gov](http://www.ocrwm.doe.gov)

Regulators: Nuclear Regulatory Commission - [www.nrc.gov](http://www.nrc.gov); U.S. Environmental Protection Agency - [www.epa.gov](http://www.epa.gov)

Agency with responsibility for radioactive waste management: U.S. Department of Energy - [www.doe.gov](http://www.doe.gov)

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