Nuclear Waste Services

2025 UK Radioactive Materials Inventory

Part of the NDA group

NDA

Department for Energy Security & Net Zero

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Uranium hexafluoride cylinders at Capenhurst

1. Introduction

1.1. The Inventory

An inventory of radioactive waste and materials in the UK is compiled every three years under the strategic oversight of the Nuclear Decommissioning Authority (NDA) and the Department for Energy Security and Net Zero (DESNZ). Nuclear Waste Services (NWS) prepares and publishes the Inventory on behalf of the NDA, working with radioactive waste producers and custodians across the UK.

The inventory provides up-to-date information about radioactive waste to:

- Inform policy and strategy development
- Enable the UK to meet international reporting obligations
- Aid radioactive waste and material management planning
- Support stakeholder engagement.

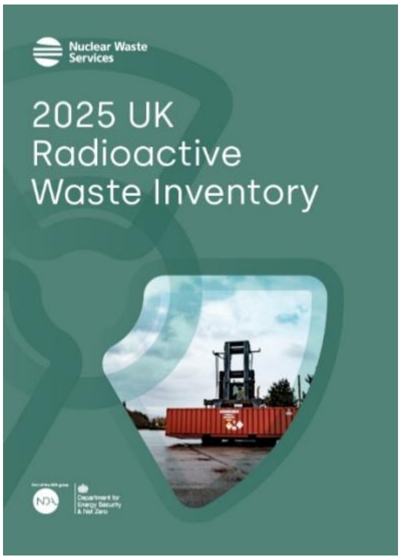
The inventory is used by a wide range of stakeholders:

Government departments and agencies	Develop policies and strategies for managing UK radioactive waste and regulating nuclear operations
Supply chain organisations	Process waste and use data to support the planning, operation and performance of their facilities
Waste planners	Ensure that radioactive waste management facilities meet local and national needs
Researchers and academics	Develop innovative technologies and processes for managing the range of radioactive waste in the UK
Members of the public	Increase understanding about the types and quantities of radioactive waste produced in the UK

The 2025 UK Radioactive Waste and Materials Inventory (the 2025 Inventory) is the latest public record on the sources, quantities and properties of radioactive waste and materials in the UK at 1st April 2025 and predicted to arise after that date.

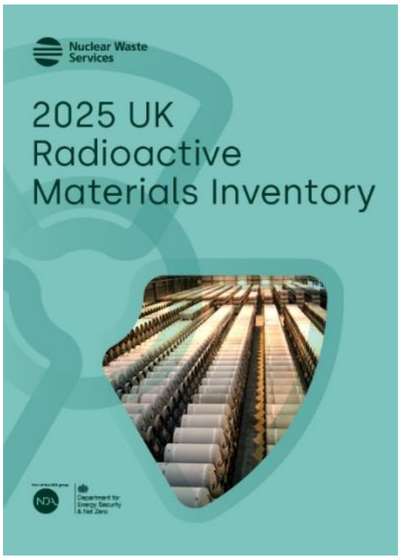
1.2. Inventory documents

The 2025 Inventory comprises four reports:



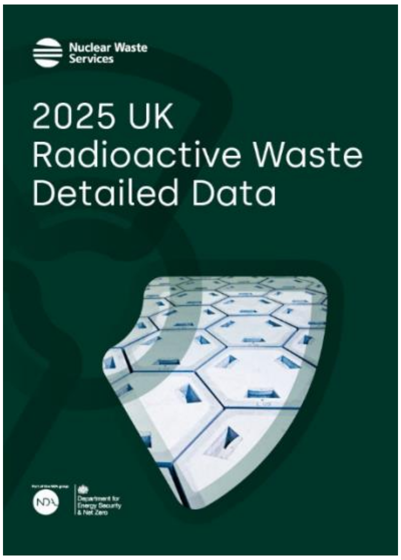
Radioactive Waste Inventory

Describes the sources, volume, composition and activity of radioactive waste in the UK, and a comparison with the previous inventory



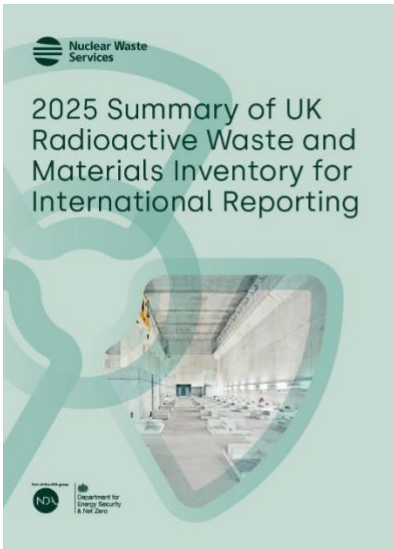
Radioactive Materials Inventory

Summarises the quantities of UK civil nuclear materials that might have to be managed as waste in the future



Radioactive Waste Detailed Data

Provides further information on the radioactive waste inventory including a list of waste streams



Summary for International Reporting

Gives information to meet the UK's international reporting obligations in the field of radioactive waste and materials

As part of the commitment to openness, reports can be found on a website maintained by NWS, https://inventory.nuclearwasteservices.uk. All of the 2025 Inventory reports can be found together with other information about radioactive waste at this location.

1.3. This report

This report brings together information about civil nuclear materials in the UK and other radioactive substances that are not currently classed as waste but might have to be managed as waste in the future.

The inventory includes radioactive materials that existed on 1st April 2025 and those forecast to arise in the future. Information is collected about the type and quantity of radioactive materials that exist in operational reactors and stores.

This report also includes land contamination (e.g. radioactively contaminated soil) that might arise as waste and radioactively contaminated subsurface structures (e.g. building foundations), where significant uncertainty over the management route and/or the waste quantities currently prevents inclusion in the UK Radioactive Waste Inventory.

UK defence activities produce irradiated fuel, plutonium and uranium, but these are not included in this report.

AGR fuel flask in Fuel Handling Plant, Sellafield

2. Radioactive Materials

UK legislation[1,2,3] defines radioactive material as a substance containing either one or more naturally occurring or man-made radionuclides at concentrations exceeding those specified in the legislation.

Through past and current nuclear programmes, the UK has accumulated radioactive materials such as spent (i.e. used) nuclear fuel, uranium and plutonium. These materials could potentially be classified as waste in the future. If it were decided at some point in the future that these materials had no further use, they would need to be managed as wastes.

There are two categories of radioactive material included in this report:

- **Civil nuclear materials and spent fuel** that are not currently designated to be waste. This category comprises uranium, plutonium, and unirradiated and irradiated fuels.
- **Land that is potentially contaminated with radioactivity** but is yet to be fully characterised and therefore has considerable uncertainty in the quantities that may arise. As a consequence, these provisional volume estimates are not reported as waste streams in the 2025 Inventory.

Excluded are nuclear materials outside safeguards. The UK Safeguards Office defines non-safeguarded nuclear material as “nuclear material that is excluded from the accountancy and safeguards requirements for reasons of national security and/or defence purposes”. Nuclear licensed sites used solely for defence purposes are not subject to safeguards requirements. Nevertheless, it is Ministry of Defence (MOD) policy to have nuclear materials accountancy standards and management arrangements that are, so far as reasonably practicable, at least as good as those required by safeguards legislation. Civil nuclear licensed sites that handle nuclear materials excluded from safeguards for reasons of national security/defence requirements are expected to comply with the MOD requirements. Also excluded are small quantities of nuclear materials with very low concentrations of activity, typically from research establishments, universities and the non-nuclear industry.

Information on the use of nuclear materials and nuclear fuels in the UK is given on the following pages.

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[1] Radioactive Substances Act 1993 (as amended), 27 May 1993.
[2] Statutory Instruments 2016 No. 1154. Environmental Permitting (England and Wales) Regulations 2016 (as amended), 11 December 2016.
[3] Environmental Authorisations (Scotland) Regulations 2018 (as amended), 28 June 2018.

2.1. Uranium

Uranium is a naturally occurring radioactive element that is the raw material used for making fuel for nuclear reactors. Uranium ore is processed to concentrate the uranium content, which is exported from mines as triuranium octoxide (U_3O_8) – commonly referred to as yellowcake. This product is then further processed to produce uranium in a physical and chemical form suitable for fabricating into nuclear fuels.

There are different types (or grades) of uranium:

Natural Uranium (NU) Uranium in nature has a uranium-235 content of about 0.711% by mass. Natural uranium was used in its metallic form in Magnox reactor fuel.[4]	**Highly Enriched Uranium (HEU)** Uranium enriched in uranium-235 to 20% or more by mass. HEU is used in the manufacture of specialist nuclear fuels. In the past it has also been recovered by reprocessing these fuels.
Low Enriched Uranium (LEU) Uranium enriched in uranium-235 to less than 20% by mass. LEU as uranium dioxide (UO_2) is used in the manufacture of Advanced Gas-cooled Reactor (AGR) and Pressurised Water Reactor (PWR) fuels. Power reactor fuels have a typical initial uranium-235 content of between 3% and 5% by mass. LEU (with reduced uranium-235 content) is also a product of reprocessing these fuels. This reprocessed uranium is stored as uranium trioxide (UO_3).	**Depleted Uranium (DU)** Uranium with uranium-235 content less than in natural uranium. DU is a by-product of the uranium enrichment process used in the manufacture of nuclear fuels for AGR and PWR power stations. This is currently stored as uranium hexafluoride (UF_6). DU is also a product of reprocessed spent Magnox reactor fuel. This is stored as UO_3.

To manufacture fuel for current UK civil nuclear reactors, yellowcake is first converted through chemical processing into uranium hexafluoride UF_6, which is enriched to LEU. The enriched UF_6 is then converted to UO_2 and formed into ceramic pellets which are fabricated into fuel pins and assemblies. In the UK, enrichment is carried out at Capenhurst in Cheshire and enriched oxide fuel is fabricated at Springfields in Lancashire.

Uranium recovered from the reprocessing of spent fuel can be re-enriched and re-utilised in new nuclear fuel. In the past, some reprocessed uranium from the Magnox programme was used to manufacture new AGR fuel. Depleted UF_6 can be enriched to provide feed stock for new fuel.

2.2. Thorium

Thorium is a naturally occurring radioactive element that can be mined, extracted and processed to make fuel for nuclear reactors. In the UK only experimental reactors have used thorium-based fuels. The Dragon high temperature helium-cooled reactor at Winfrith, which operated from 1964 to 1975, used a mix of uranium and thorium fuels. Dragon reactor fuel and

[4] Some Magnox fuel was slightly enriched (<1% uranium-235) to offset the effects of reactor ageing.

unused reactor grade thorium metal bars have been designated as waste, and are reported in the 2025 UK Radioactive Waste Inventory.

2.3. Unirradiated fuel

Unirradiated fuel is nuclear fuel that has not yet been used to power nuclear reactors. It includes fuel at fabrication plants awaiting shipment and fuel at nuclear power stations awaiting loading into reactors. There are also small quantities of surplus unirradiated research fuels.

2.4. Spent fuel

Irradiated fuel is nuclear fuel that is being or has been used to power nuclear reactors. When it has reached the end of its life and is no longer capable of efficient fission, it is known as 'spent fuel'. Typically, the spent fuel is made up of 96% unreacted uranium, 1% plutonium and 3% waste products. However, the precise composition depends on the type of reactor and the amount of power produced by the fuel.

There are three main types of nuclear power reactor that have operated in the UK (Magnox, AGR and PWR), and spent fuel from each is handled differently.

Magnox	Spent fuel from shutdown Magnox reactors was reprocessed until 2022. The remaining spent fuel is stored at Sellafield pending decisions about its future disposal.
AGR	Reprocessing of spent fuel from AGRs was completed in 2018. The remaining and future spent fuel from AGR stations will be stored at Sellafield pending a decision whether to classify it as waste for future disposal.
PWR	Spent fuel from the Sizewell B PWR is stored at the station pending a decision whether to classify it as waste for future disposal.

Irradiated fuel has also arisen from the various test and prototype reactors, both large and small, that have operated in the UK. These include the Prototype Fast Reactor (PFR) and Dounreay Fast Reactor (DFR) at Dounreay, DIDO and PLUTO at Harwell, Windscale Advanced Gas-cooled Reactor (WAGR) at Windscale and Steam Generating Heavy Water Reactor (SGHWR) at Winfrith. All of these research reactors, and their associated facilities, are shut down and being decommissioned or have already been decommissioned. Much of the spent fuel from these research reactors has been reprocessed, and the remaining fuel will be stored pending decisions about its future disposal.

New nuclear power stations built in the UK will also produce spent fuel; however, it is not yet clear how many reactors in total will be constructed. The uncertainty in the volume and type of spent fuel that may be generated means it would not be appropriate to include in this report. An assumed new build programme is accounted for in Nuclear Waste Services' (NWS) Environmental Safety Case for the Low Level Waste Repository (LLWR) and the generic Disposal System Safety Case for a Geological Disposal Facility (GDF).

Small quantities of relatively low irradiation spent fuel have already been classified as waste and are reported in the 2025 UK Radioactive Waste Inventory. These comprise spent fuels from the Graphite Low Energy Experimental Pile (GLEEP), the Dragon reactor, and the Zero Energy Nitrogen Heated Thermal (ZENITH) reactor. It also includes small quantities of Windscale Pile fuel and prototype commercial fuels.

2.5. Plutonium

Plutonium is a radioactive element that does not occur in nature. It is created in nuclear reactors as a result of irradiating the uranium in nuclear fuel. It is contained within spent nuclear fuel when it is removed from the reactor but can be extracted by reprocessing the fuel. Separated plutonium is stored as plutonium oxide powder within high integrity containers in purpose-built facilities.

In 2025, the UK government announced that the new policy regarding plutonium was to immobilise the UK's inventory of plutonium, not to reuse it (see Section 3.1).

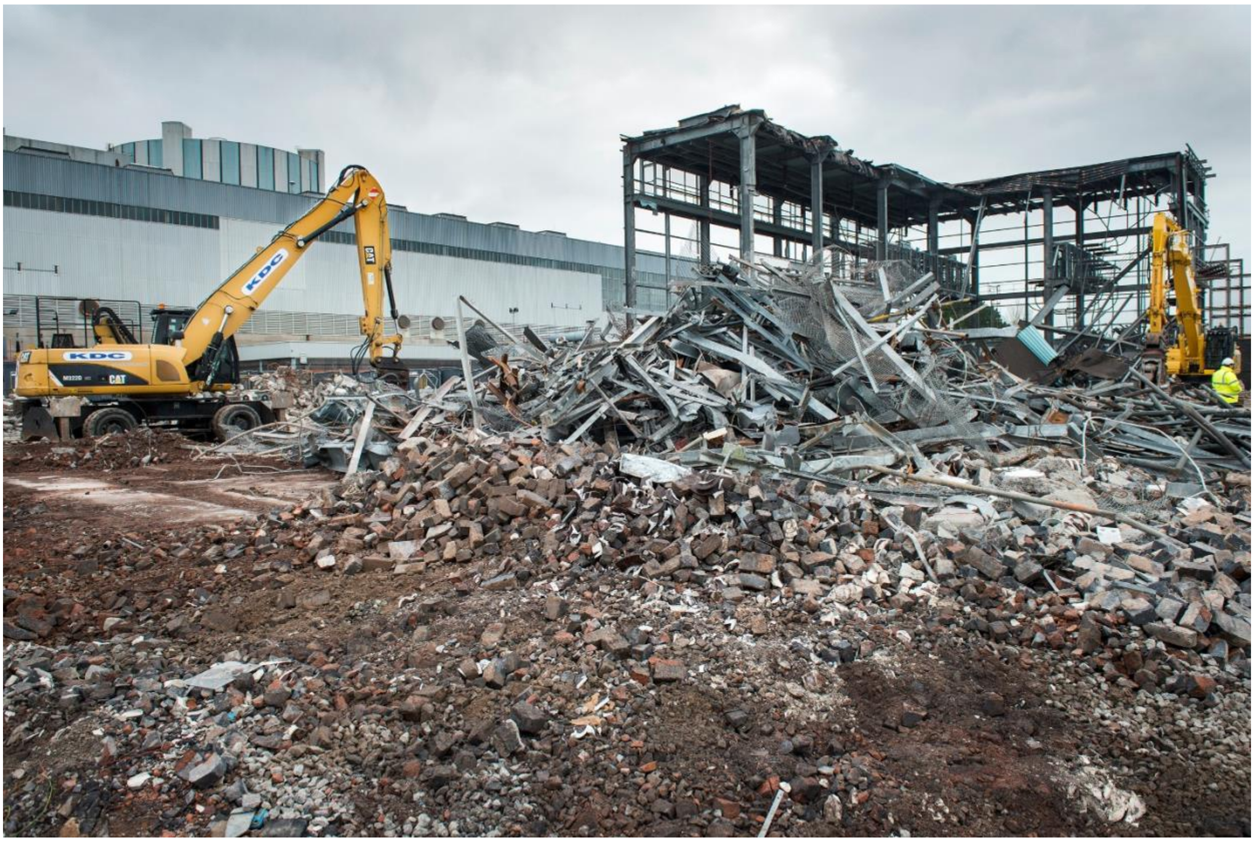
2.6. Radioactive land contamination

Land (e.g. soil) and building structures that are beneath the surface may become contaminated as a result of lifetime site operations. Land contamination that is in situ is not considered to be waste. It only becomes waste if it is excavated (e.g. for treatment or to access another subsurface structure). Much of the land contamination at nuclear sites is being managed in situ at present and may never require excavation.

Radioactively contaminated subsurface structures become waste when they no longer have a purpose. It is also dependent on whether they are disposed of in situ or excavated and disposed of ex situ. Examples are reactor basements, below ground ponds and radioactive effluent pipelines.

There can be significant uncertainty in the quantities of waste from the clean-up of land contamination and radioactively contaminated structures. This is particularly the case for radioactive wastes at the lower end of the activity range referred to as Very Low Level Waste (VLLW). Because of these uncertainties it is likely that the estimated waste volumes from land contamination will change.

Where clean-up plans have been confirmed, the waste resulting from radioactive land contamination and radioactively contaminated subsurface structures is reported in the 2025 UK Radioactive Waste Inventory. Some waste producers have elected to include inventory information in this 2025 Radioactive Materials Inventory prior to completing site characterisation and selecting the optimal management route.



Clearing land at Oldbury

3. Materials Management

3.1. Management policy

Government recognises that its policy for managing radioactive materials in the long term is required to be as comprehensive and forward looking as possible. The NDA waste management strategy includes a clear idea of those radioactive materials that might later be declared as waste. Radioactive materials not currently classified as waste are also considered in planning for a GDF.[5]

Spent fuel

Historically the UK's approach has been to reprocess spent nuclear fuel in order to recover the uranium and plutonium content. However, the UK ceased reprocessing in 2022. All remaining and future spent fuel arising from nuclear power stations in the UK is and will be stored pending a future decision on whether to declare them as waste for disposal in a GDF.

Nuclear materials

The NDA strategy for nuclear materials management in the UK is safe and secure storage, pending development of cost-effective lifecycle solutions for their management.[6]

For plutonium the priority is to provide a solution that puts the UK's civil plutonium "beyond reach". This is because continued, indefinite, long-term storage leaves a burden of security risks and proliferation sensitivities for future generations to manage.

Following a public consultation in 2011 the government at the time formed a preliminary policy view to pursue reuse of plutonium as mixed oxide fuel (MOX) but to remain open to any alternative proposals for plutonium management. NDA have since carried out substantial technical, deliverability and economic analysis to identify a preferred option for a long-term disposition solution, including options for immobilisation and reuse. The outcome of this work recommended immobilisation as the preferred way forward to put the material "beyond reach" as soon as possible and with greatest delivery confidence. In 2025, the UK government announced that the policy for separated plutonium is now disposal rather than reuse.[7] Following further development work the NDA will select a preferred technology for immobilisation of the plutonium in a form suitable for long-term storage and subsequently disposal in a GDF.

Uranium has the potential to be reused in nuclear fuel for generating electricity, subject to the availability of the appropriate power stations and supporting infrastructure. Uranium stocks are held in safe and secure storage on fuel manufacture, enrichment and historic reprocessing sites pending the development of disposition options. If it were decided that some of these materials have no future value they may need to be managed as waste.

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[5] Department for Energy and Net Zero, UK policy framework for managing radioactive substances and nuclear decommissioning, May 2024.
[6] Nuclear Decommissioning Authority, "The NDA Strategy Effective from March 2026", March 2026.
[7] Department for Energy Security and Net Zero, Plutonium Disposition Strategy, UK Parliament Statement HCWS388, 2025.

Radioactive land contamination

'Guidance on Requirements for Release of Nuclear Sites from Radioactive Substances Regulation (GRR)', July 2018, from the environmental regulators directs nuclear operators to review their approach to site-wide waste management, to ensure the delivery of an optimised site end state. This may involve options for the in-situ disposal of existing subsurface structures and the on-site disposal of associated above-ground parts. GRR is further supported by updated policy.[8]

3.2. Nuclear safeguards

Nuclear safeguards are measures to verify that countries abide by their commitments to use nuclear material for declared peaceful purposes.

Civil nuclear facilities are subject to the UK's safeguards agreements with the International Atomic Energy Agency (IAEA). They are also subject to the safeguards provisions of the UK-Euratom Nuclear Cooperation Agreement (NCA). These are designed to detect diversion of nuclear material into clandestine weapons programmes, and involve accounting for nuclear material and submitting to international inspection.

3.3. Government reporting

The UK Government has reporting obligations under the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. The UK's 8th national report for the Convention was provided in August 2024.[9] The national report contains an inventory of spent nuclear fuel in storage, as well as volumes of radioactive waste in storage and projected in future arisings. National reports are subject to a process of peer review by the Contracting Parties and are updated every three years.

The UK Government also publishes annual figures for the UK's stocks of civil plutonium and uranium. In accordance with its commitment under the "Guidelines for the Management of Plutonium", the UK also provides these figures to the IAEA. The latest figures are for 31st December 2024.[10]

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[8] Department for Energy and Net Zero, UK policy framework for managing radioactive substances and nuclear decommissioning, May 2024.

[9] Department for Energy and Net Zero, The United Kingdom's Eighth National Report on Compliance with the Obligations of the Joint Convention on the Safety of Spent Fuel and on the Safety of Radioactive Waste Management, August 2024.

[10] Office for Nuclear Regulation, 2024 annual figures for holdings of civil unirradiated plutonium, 19th December 2025, https://www.onr.org.uk/publications/regulatory-reports/safeguards/annual-civil-plutonium-figures/2024-annual-figures-for-holdings-of-civil-unirradiated-plutonium.

4. Material Quantities

Key facts:

- UK-owned uranium stock is ~ 114,000 tHM.
- UK-owned plutonium stock is ~113 tHM.
- UK-owned spent fuel in reactor and in storage is ~6,370 tHM.

This chapter presents summary information on the quantities of radioactive materials in the UK.[11] The information has been provided by the NDA and those organisations that operate sites in the UK where radioactive materials are stored and forecast to arise.

Quantities of nuclear materials (uranium, thorium, plutonium, and spent and unirradiated nuclear fuels) are given as masses expressed as tonnes of heavy metal (tHM). Quantities of radioactive land contamination and radioactively contaminated subsurface structures are given as volumes expressed as cubic metres (m^3).

The Appendix sets out the assumptions used in reporting radioactive materials in the 2025 Inventory.

4.1. Uranium

Table 1 gives the total masses of UK-owned DNLEU (Depleted, Natural and Low Enriched Uranium) and HEU (Highly Enriched Uranium) at 1st April 2025.

Table 1 UK-owned uranium (Mass in stocks)

Location	Description	Stock at 1st April 2025 (tHM)
All UK sites	DNLEU	~114,000 (1)
All UK sites	HEU	<1

(1) The latest figure published by the Office for Nuclear Regulation (ONR) is 135,400 tHM at 31st December 2024. This is greater than the figure reported here because it includes DNLEU present in spent fuels as well as foreign-owned uranium, both of which are reported separately in the 2025 Inventory (see Table 5 and text below). The radioactive materials inventory does not include nuclear materials owned by the MOD.

There are about 114,000 tHM of DNLEU in stock. The major components are depleted uranium from enrichment in the form of UF_6, and from reprocessing of Magnox fuel in the form of UO_3. DNLEU stocks are held at Capenhurst, Springfields, Sellafield and Dounreay. Table 1 excludes about 7,000 tHM of overseas-owned material.

[11] Within the tables the totals are presented as the sum of the unrounded values which are then rounded.

Future arisings of UK-owned DNLEU are estimated at about 123,000 tHM. This figure assumes enrichment operations continuing over the next thirty years, and the spent fuel management scenario as described in the Appendix.

In addition approximately 184,000 tHM of foreign-owned UF_6 are forecast for enrichment at Capenhurst. Future enrichment may utilise either existing uranium stocks or new uranium depending on the economics. Hence, there is uncertainty in the total quantities of DNLEU that will be produced.

There is currently less than 1 tHM of HEU in stock. This material comprises residues from reprocessing and fuel fabrication. No further arisings are expected.

4.2. Thorium

Table 2 gives the total mass of UK-owned thorium at 1st April 2025. There are no reported future arisings.

Table 2 UK-owned thorium (Mass in stocks)

Location	Description	Stock at 1st April 2025 (tHM)
Springfields	ThO_2	~0.2

4.3. Plutonium

Table 3 gives the total mass of UK-owned separated plutonium at 1st April 2025. Separated plutonium is held mainly as plutonium dioxide (PuO_2) from the reprocessing of Magnox and oxide fuel at Sellafield, with a small amount in other forms and fuel residues. Reprocessing finished in 2022.

Table 3 UK-owned separated plutonium (Mass in stocks)

Location	Description	Stock at 1st April 2025 (tHM)
All UK sites	PuO_2	~113

There are currently about 113 tHM of UK-owned separated plutonium in stock.

Existing stocks of plutonium from reprocessing overseas spent Light Water Reactor (LWR) fuel are about 24 tHM.[12]

4.4. Unirradiated fuel

Table 4 gives the masses of UK-owned unirradiated fuel in the UK. The total mass of unirradiated fuel at 1st April 2025 is estimated to be about 110 tHM. There will be future arisings of UK power reactor fuels, AGR and PWR, to meet the fuelling requirements for projected

[12] The UK Government has stated that overseas owners of plutonium stored in the UK could have that plutonium managed in line with UK plutonium, subject to commercial terms that are acceptable to the UK Government. In addition, subject to compliance with inter-governmental agreements and acceptable commercial arrangements, the UK is prepared to take ownership of overseas plutonium stored in the UK as a result of which it would be treated in the same way as UK-owned plutonium. In the long term, this approach will help to simplify the implementation of the government's plutonium management policy by reducing uncertainty for both the UK and the overseas owners.

reactor lifetimes, but these are not estimated. These fuels will subsequently be reported as spent fuels.

Table 4 UK-owned unirradiated fuel (Mass in stocks)

Location	Description	Stock at 1st April 2025 (tHM)
Sellafield	Various (1)	~22
Dounreay	Various (2)	~0.13
All UK sites	AGR fuel	~42
All UK sites	PWR fuel	~45
Total		**~110**

(1) Includes unirradiated uranium metal, uranium oxide and MOX fuels.
(2) Includes unirradiated PFR, MOX and carbide fuels.

4.5. Spent fuel

The UK's current stock of spent fuel consists mainly of Magnox, AGR and PWR fuels. It also includes smaller stocks of various spent experimental and research fuels.

Table 5 gives the masses of UK-owned spent fuel at 1st April 2025 and estimated in future arisings. The total mass of spent fuel at 1st April 2025 was about 6,400 tHM, with estimated future arisings of about 580 tHM.[13] The figures for spent fuel at 1st April 2025 exclude about 0.7 tHM of overseas-owned spent fuel at Dounreay.

Reprocessing of spent AGR fuel came to an end in 2018; existing stocks and future arisings produced over the planned lifetimes of the AGR stations will remain in long-term storage.

Spent fuel from shutdown Magnox reactors was reprocessed until 2022. The remaining spent fuel is stored at Sellafield pending decisions about its future disposal.

The Sizewell B PWR station is expected to generate about 1,000 tHM spent fuel over its 40-year operating lifetime. It is currently assumed that this fuel will be held in long-term storage.

[13] Spent fuel from new build reactors (including Hinkley Point C) is not included in estimate.

Table 5 UK-owned spent fuel (Mass in stocks and estimated for future arisings)

Location	Description	Stock at 1st April 2025 [1] (tHM)		Estimated future arisings (tHM)
		In reactor	In storage	
Sellafield	Magnox fuel	-	272	-
	AGR fuel	-	~3,200	- [2]
	SGHWR fuel	-	68	-
	WAGR fuel	-	21	-
	Other fuels [3]	-	~791	-
Dounreay	DFR breeder fuel	6.4	4.2	-
	PFR	-	10.1	-
AGR power stations	AGR fuel	~1,130	~105	~344
PWR power station	PWR fuel	~89	~677	~238
Total		**~1,230**	**~5,140**	**~582**

(1) Fuel 'In reactor' is that in reactor cores; fuel 'In storage' has been removed from reactor cores to storage facilities.
(2) See AGR power stations for future transfers of spent fuel to Sellafield.
(3) Includes miscellaneous fuels (~725 tHM) and overseas origin Light Water Reactor (LWR) fuels from THORP programme transferred to UK ownership (~66 tHM).

4.6. Miscellaneous materials

There are a number of uranic residues at Capenhurst from uranium enrichment operations. Table 6 includes a list of streams and quantities. These materials continue to be processed off-site to recover the uranium content. Any radioactive waste from this activity is being disposed of by the processing site and is included in the 2025 Inventory.

Table 6 Miscellaneous materials (Mass at 1st April 2025 and estimated future arisings)

Site	Stream identifier	Stream description	Stock at 1st April 2025 (tHM)	Future arisings (tHM)
Capenhurst	8A14	Uranic residues	13.5 (1)	0
	M8A1011	Chemical adsorber trap residues (CATR)	32	106 (2)
	M8A1012	Citric sludge	0.456	4.4 (2)
	M8A1013	Degreaser sludge	0.177	4.5 (2)
	M8A1014	Uranic effluents	27 (1)	130 (1) (3)
	M8A1015	Uranic residues	1.01	0.8 (2)

(1) Volume (m^3) of material.
(2) Future arisings are estimated up until 2037.
(3) Future arisings are estimated up until 2066.

4.7. Contaminated land volumes

Table 7 gives volume estimates for potential radioactive land contamination and radioactively contaminated subsurface structures. Included are materials at Sellafield, Springfields, Aldermaston, the LLWR and various MOD sites.

The estimated volume of radioactive land contamination and is about 6,110,000 m^3. Most of this is High Volume VLLW (HVVLLW) and LLW contaminated soil at Sellafield. Much of the radioactively contaminated soil on site can be managed in situ and will not require excavation and treatment as waste.

The estimate of radioactively contaminated subsurface structures is about 235,000 m^3. Most of this comprises building foundations at Sellafield.

The volumes given for Sellafield in Table 7 represent the best estimate of land affected by radioactive contamination in the various waste categories. They are estimates based on the most recent characterisation data and understanding of the site. They are subject to constant review as knowledge of the site improves. The Sellafield strategy is to manage land contamination in situ in the short-term. In the longer term access to the contamination will be possible when extensive decommissioning takes place. It is not envisaged that, on the basis of an overall balance between risk and benefit, all contaminated material will be excavated. In particular, for the most lightly contaminated material within the HVVLLW category the optimum plan may be in-situ management.

At Springfields the stock volume is based on site investigations and the results of soil samples collected from boreholes.

At Aldermaston a methodology for estimating volumes of radiologically contaminated soil waste has been developed. Verification of the volumes can only be achieved once further characterisation is undertaken as facilities approach the final stages of decommissioning and demolition. This is due to the majority of the forecast volume being associated with below ground structures.

Table 7 Potential radioactive land contamination and radioactively contaminated subsurface structures

Site	Stream identifier	Stream description	Estimated volume (m^3) (1)
Sellafield	2D150	Contaminated Soil	1,610
	2D151	Contaminated Soil LLW	2,560,000
	2D152	Contaminated Foundations ILW (2)	2,160
	2D153	Contaminated Foundations LLW (2)	32,900
	2D154	Contaminated Soil from Site Clearance - HVVLLW	3,490,000
	2D155	Contaminated Foundations from Site Clearance – HVVLLW (2)	200,000
Springfields	2E5000#	Radioactive Contaminated Land	<32,500 (3)
Aldermaston	7A5000	Radioactive Contaminated Land	~3,800
Various (MOD)	7S5000	Contaminated soil, ash and rubble	~350 (4)
LLWR	2N101	Vault Profiling Material from PCM Facilities VLLW	~20,900
	2N102	Contaminated Land VLLW	3,710
All sites		**Total**	**6,350,000**

(1) Volumes are currently being managed in situ under existing regulatory requirements for the management of contaminated land and groundwater on nuclear sites. Some of this material may never arise as waste. The optimum management plan may be some form of in situ disposal, particularly for the most lightly contaminated material.
(2) Some of this material may be suitable for beneficial reuse or the optimum management plan may be some form of in situ disposal.
(3) Volumes are uncertain, but will be established during ongoing land contamination projects.
(4) Based on estimates from various MOD sites with known radiological contamination which may require disposal. There is a possibility that future land quality assessments may result in additional volumes.

At the LLWR the estimate of land contamination is based on non-targeted ground investigation and therefore has high uncertainty.

At all sites further site investigation work will give clearer information on potential volumes.

The 2025 Inventory itself includes about 200,000 t of contaminated soil and spoil from radioactive land contamination. It also includes radioactively contaminated subsurface structures as a component of site decommissioning waste streams. This is reported in the Waste Inventory as clean-up plans have been confirmed as discussed in Section 2.6 above.

Appendix: Assumptions used for Reporting Civil Nuclear Materials

The high-level assumptions and exclusions used in compiling the data for the 2025 Inventory are listed below. The assumptions represent the planning positions at 1st April 2025 of the organisations that operate sites where radioactive waste and materials are generated or held. Projections may need to be amended as plans and arrangements are developed. Alternatively, these could be changed for commercial, policy or funding reasons, or if improved data become available. Exclusions clarify where specific radioactive materials are not included in the scope of this report.

ID	ASSUMPTION
Spent Fuel	
A1	For the purposes of estimating spent fuel arisings, it is assumed that currently operational reactors will continue operating until the planned shutdown dates shown in Table A1.
A2	It is assumed that no further UK fuel will be reprocessed.
Separated uranium and plutonium	
A3	Separated plutonium / uranium arise in the UK from reprocessing activities, it is assumed that as these activities have ceased there will be no substantial further arisings.
Enrichment	
A4	It is assumed that 4,100 tHM of depleted uranium will arise for each year that enrichment activities continue at Capenhurst.
A5	It is assumed that enrichment activities at Capenhurst will continue until 2055.

ID	Exclusion
E1	The radioactive materials inventory does not include nuclear materials owned by the MOD or ‘small users’ (i.e. universities and research establishments).
E2	This report does not include spent fuel from new nuclear power stations being (or intended to be) built in the UK. However, spent fuel is being accounted for in the generic design for a GDF.

The planned shutdown dates of operational reactors in the UK used in the production of the inventory are given in Table A1.

Table A1 Operating nuclear power stations in the UK

Station	Planned shutdown date[14]
AGR:	
Hartlepool	2027
Heysham 1	2027
Heysham 2	2030
Torness	2030
PWR:	
Sizewell B	2035

[14] Since the production of the 2025 Inventory EDF Energy has announced its intention to extend operations for the Heysham 1 and Hartlepool power stations up until 2028.

Glossary

	~	About.
	<	Less than.
A ▸	**AGR**	Advanced Gas-cooled Reactor.
C ▸	**CATR**	Chemical Adsorber Trap esidues.
D ▸	**DESNZ**	Department for Energy Security and Net Zero
	DFR	Dounreay Fast Reactor (shut down in 1977).
	DIO	The Defence Infrastructure Organisation (DIO) is responsible for managing the MOD Estate.
	DNLEU	Depleted, Natural and Low Enriched Uranium.
	Dragon	Experimental high temperature reactor project (at Winfrith; shut down in 1976).
	DU	Uranium where the U235 isotope content is below the naturally occurring 0.711% by mass.
E ▸	**Enriched uranium**	Uranium where the U235 isotope content is above the naturally occurring 0.711% by mass.
	Enrichment	The process of increasing the abundance of fissionable atoms in natural uranium.
	Euratom	European Atomic Energy Community.
	Ex situ	‘Off the site’ (in the context of waste disposal).
F ▸	**Fission**	Spontaneous or induced fragmentation of heavy atoms into two (occasionally three) lighter atoms, accompanied by the release of neutrons and radiation.
G ▸	**GDF**	Geological Disposal Facility. Deep underground facility for disposal of higher activity wastes.
	GLEEP	Graphite Low Energy Experimental Pile. Graphite reactor at Harwell site (shut down in 1990).

	Government	A collective term for the central government bodies responsible for setting radioactive waste management policy within the UK. It comprises the UK Government, and the devolved administrations of Scotland, Wales and Northern Ireland.
	GRR	Guidance on Requirements for Release of Nuclear Sites from Radioactive Substances Regulation.
H ▸	**HEU**	Highly Enriched Uranium. Uranium where the U235 isotope content is 20% by mass or more.
	HVVLLW	High Volume Very Low Level Waste.
I ▸	**IAEA**	International Atomic Energy Agency.
	ILW	Intermediate Level Waste.
	In situ	'On the site' (in the context of waste disposal).
L ▸	**LEU**	Low Enriched Uranium. Uranium enriched in uranium-235 to less than 20% by mass.
	LLW	Low Level Waste.
	LLWR	Low Level Waste Repository. The LLWR, south of Sellafield in Cumbria, has operated as a national disposal facility for LLW since 1959.
	LWR	Light Water Reactor.
M ▸	**Magnox**	An alloy of magnesium used for fuel element cladding in natural uranium fuelled gas-cooled power reactors. Also a generic name for this type of reactor.
	MOD	Ministry of Defence.
	MOX	Mixed Oxide. Refers to nuclear fuel consisting of uranium oxide and plutonium oxide.
N ▸	**NDA**	Nuclear Decommissioning Authority. A non-departmental public body responsible for overseeing the decommissioning and clean-up of 17 of the UK's civil public sector nuclear sites.
	NCA	Nuclear Cooperation's Agreement.
	NU	Natural Uranium.
	Nuclear fuel	Fuel used in a nuclear reactor. Most fuel is made of uranium metal or oxide, and produces heat when the uranium atoms split into smaller fragments.
	NWS	Nuclear Waste Services. A subsidiary of the NDA that manages and disposes of the UK's radioactive waste.

O	**ONR**	Office for Nuclear Regulation (an agency of the Health and Safety Executive).
P	**PCM**	Plutonium Contaminated Material.
	PFR	Prototype Fast Reactor (at Dounreay site; shut down in 1994).
	Plutonium	A radioactive element created in nuclear reactors. It can be separated from spent nuclear fuel by reprocessing. Plutonium is used as a nuclear fuel, in nuclear weapons and as a power source.
	Pu	Plutonium.
	PuO_2	Plutonium dioxide.
	PWR	Pressurised Water Reactor.
R	**Radioactive waste**	Waste that contains, or is contaminated with, radionuclides at concentrations or activities greater than clearance levels as established by the regulatory body.
	Radionuclide	A general term for an unstable nuclide that emits ionising radiation (e.g. cobalt-60).
	Reprocessing	The chemical extraction of reusable uranium and plutonium from waste materials in spent nuclear fuel.
S	**SGHWR**	Steam Generating Heavy Water Reactor (at Winfrith site; shut down in 1990).
	Spent fuel	Fuel that has been used (i.e. irradiated) in nuclear reactors that is no longer capable of efficient fission due to the loss of fissile material.
T	**tHM**	Tonnes of heavy metal. A unit of mass used to quantify uranium, plutonium and thorium including mixtures of these elements.
	Thorium	Thorium is a naturally occurring radioactive element that can be mined, extracted and processed to make fuel for certain reactors.
	ThO_2	Thormium dioxide.
	THORP	Thermal Oxide Reprocessing Plant (at Sellafield).
U	**UF_6**	Uranium hexafluoride.
	U_3O_8	Triuranium octoxide.
	UO_2	Uranium dioxide.
	UO_3	Uranium trioxide.
	Uranium	A radioactive element that occurs in nature. Uranium is used for nuclear fuel and in nuclear weapons.

	Uranium-235	The main fissile isotope of uranium. Natural uranium typically contains 0.711% by mass of U235.
	Unirradiated fuel	Fuel that has not yet been used to power nuclear reactors.
V ▸	**VLLW**	Very Low Level Waste.
W ▸	**WAGR**	Windscale Advanced Gas-cooled Reactor (at Sellafield; shut down in 1981).
Y ▸	**Yellowcake**	Yellowcake is concentrated uranium oxide, obtained through the milling of uranium ore. Yellow cake typically consists of 70-90% U_3O_8 with the remainder consisting of UO_2 and UO_3.
Z ▸	**ZENITH**	Zero Energy Nitrogen Heated Thermal reactor. A research reactor at Winfrith that has been decommissioned.

Nuclear Waste Services

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NWS Helpdesk

0300 369 0000

info@nuclearwasteservices.uk

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