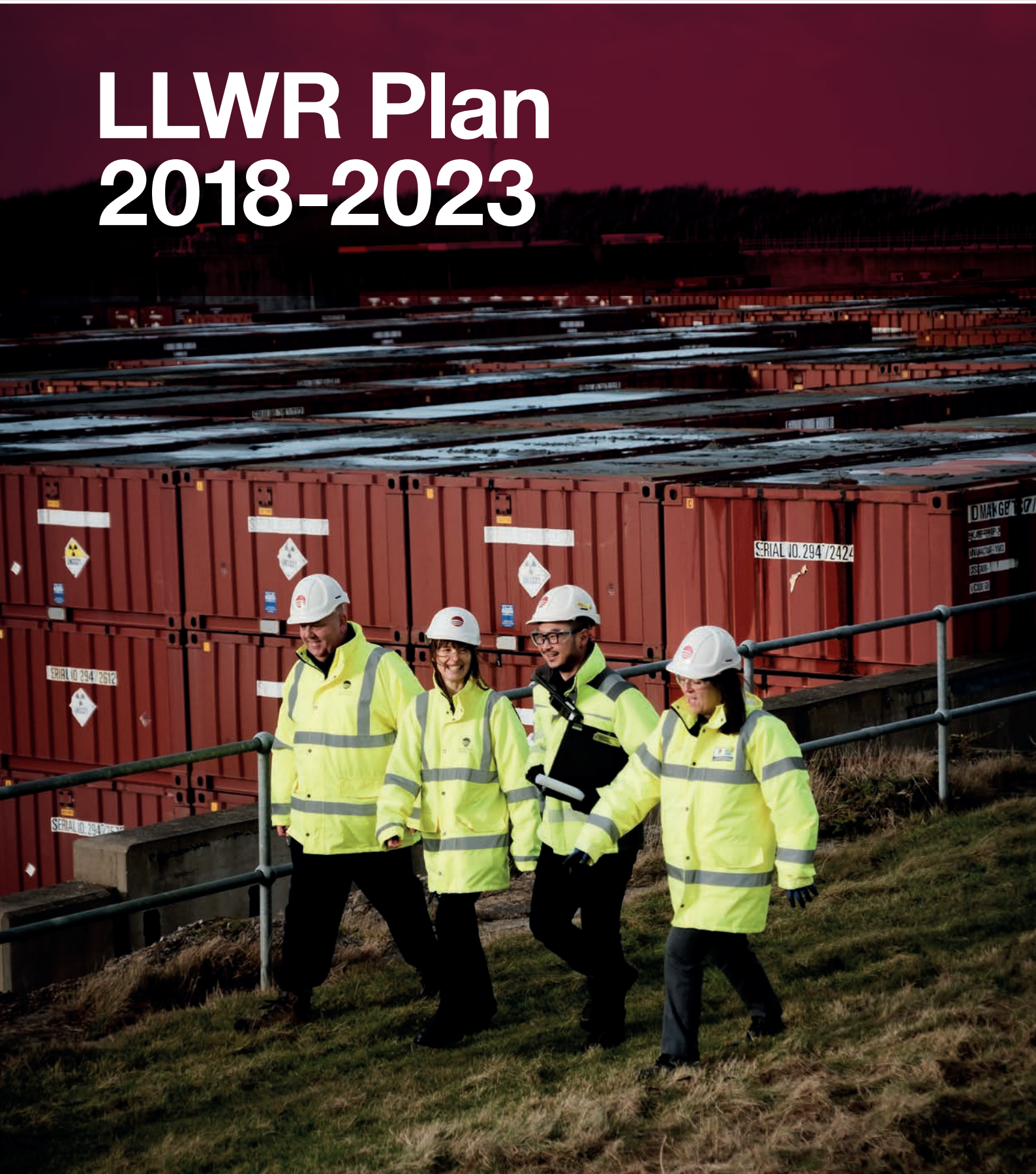
LLW Repository Ltd

Thinking differently about waste

LLWR Plan 2018-2023



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Foreword

Thinking differently about how we run our business

Nuclear Decommissioning Authority

In March 2018 the NDA awarded the third and final 5-year term of the current contract for the management of LLW Repository Ltd (LLWR) and the implementation of the National Low Level Waste (LLW) Strategy to the incumbent Parent Body Organisation (PBO), UK Nuclear Waste Management Ltd (UKNWM).

Alan Cumming, Director of Nuclear Operations, Nuclear Decommissioning Authority

Our mission – to clean up the UK's nuclear legacy with care for people and the environment – is of vital national importance. It relies on the dedication and commitment that has been demonstrated consistently by the people from LLWR, UKNWM and NDA in establishing and delivering against the national waste management and disposal programme to date.

It is pleasing to note that the progress made over the first two terms of the contract has demonstrated high levels of health and safety performance and has allowed us to move forward with our challenge of addressing radioactive waste issues, past, present and future.

Overall, this has enabled us to:

- Secure over £250million savings during the first two terms of the contract by introducing more efficient practices, streamlining processes and omitting unnecessary projects.
- Implement the national LLW Strategy across the NDA Group and other UK waste producers, encouraging the right waste management behaviours and practices.
- Introduce a suite of waste treatment services, alternative disposal routes and extend the life of the repository to 2120s by improving the accuracy of forecasted waste figures.

We remain jointly committed to making publicly available the priorities and objectives for the ongoing delivery of our programmes in the final term of UKNWM's Parent Body Organisation contract.

Parent Body Organisation

Thinking differently about waste

As the PBO, UKNWM, begins its third and final 5-year term for the management and operation of LLWR, it is timely to reflect on the significant challenges faced and the successful outcomes delivered. We intend to meet our third term objectives with the same degree of dedication and continue to exceed expectations.

Gerry McGill, Chairman,
UK Nuclear Waste Management Ltd

1st Term — Establishing

First term commitments focused on solving capacity issues and establishing alternative solutions for managing radioactive wastes.

- ✓ **Eliminate the short-term capacity gap for LLW:** Vault 9 constructed and operational in July 2010 thereby addressing the immediate capacity issue.
- ✓ **Develop and implement the UK LLW Strategy on behalf of the NDA:** Strategy developed and endorsed by UK Government in August 2010.
- ✓ **Submit the LLWR 2011 Environmental Safety Case:** Environmental Safety Case (ESC) developed and submitted to the Environment Agency (EA) in May 2011.
- ✓ **Open up a series of new treatment and alternative disposal routes:** Metallic and Combustible services opened in 2009. Very Low Level Waste (VLLW) disposal, Waste Characterisation and Transport services established in 2011.
- ✓ **Improve accuracy of the LLW inventory:** Working with consignor sites and Joint Waste Management Plans (JWMP) has removed conservatism and improved inventory forecasting.

2nd Term — Embedding

Second term commitments focused on embedding the cultural change in waste management services and strengthening customer/supply chain networks.

- ✓ **Tailor the role of LLWR to reflect the maturity of its customers and the supply chain:** LLWR's waste services have increased in scope and throughput to meet the increased demands from UK decommissioning programmes. The supply chain is now more robust and investing in new capacity and capability.
- ✓ **Eliminate the requirement for a second LLW Repository:** Through sourcing alternative treatment and disposal routes, LLWR is now able to accommodate first generation LLW arisings and eliminate the requirement for a second Repository and associated costs for the UK tax payer.
- ✓ **Significantly reduce historical liabilities at the LLWR Site:** PCM Decommissioning Programme will be complete in 2019 bringing an end to a 50-year legacy issue.
- ✓ **Optimise the site development plan to secure future cost savings:** Environmental Permit secured in 2015 followed by Planning Consent for Repository Development Programme (RDP) in 2016; both permissions are crucial to continued and future operations at the LLWR Site.
- ✓ **Deliver over £200million of estate-wide savings through LLWR's services:** Over £250million estate-wide savings delivered through LLWR involvement/services.
- ✓ **Extend the life of the LLW Repository to 2129:** Implementation of the Waste Hierarchy and introduction of alternative treatment and disposal routes has resulted in extending the life of the Repository to 2135.
- ✓ **The NDA estate will be operating under an efficient low level waste system:** Optimised Waste Services Framework Contracts have underpinned efficient practices in the management of LLW.

3rd Term — Evolving

Third term will focus on evolving the organisation to ensure it is ready to meet requirements now and beyond the next 5 years.

- Support the NDA in delivery of a more integrated approach to ensure wastes are managed in a manner that protects people and the environment, now and in the future, and in ways that comply with government policies and provide value for money.
- Ensure the ongoing viability of the Site by undertaking those works necessary to provide continued capacity for the disposal of LLW in accordance with the ESC and Permit.
- Work collaboratively to underpin the case for an Integrated Radioactive Waste Programme approach and its subsequent implementation.
- Work with waste producers to identify and realise opportunities for management of waste streams that may previously have been categorised as Intermediate Level Waste (ILW) but can in practice be managed as LLW.
- Continue to develop the LLWR workforce.
- Reduce the inherent risks and hazards of the nuclear legacy, by proportionate application of contemporary standards and improving environmental, health, safety and security performance across the NDA Group.

Thinking differently about waste

The next 5 years...

Earlier this year we were delighted to receive confirmation from the NDA that the third and final 5-year term would be awarded. Their decision was based on successful delivery of the previous two terms and their confidence in our ability to meet the requirements set out in the client specification. This is testament to the effort of everyone that works at LLWR – employees and contractors alike – and the support we receive from our stakeholders and local community.

For most organisations, success is dependent on the ability to deliver, to execute plans and turn them into reality. LLWR has a proven track record in successful delivery that is reliant upon having the right people with the right skills, expertise and experience but it is also dependent upon setting standards, embedding the right behaviours and embracing a set of values that have meaning for everyone in the organisation irrespective of the role they carry out or the position they hold.

At LLWR we place a great deal of importance on being able to:

DO the right thing
DEMAND safety
DELIVER commitments
DEMONSTRATE excellence
DEVELOP our staff
DELIGHT our customers

LLW Repository Ltd

Paul Pointon, Managing Director, LLW Repository Ltd

By enacting these values we are able to achieve our Vision "to be our customer's first choice for waste solutions and trusted stewards of the UK's national radioactive waste repository" and realise our Mission "to operate the national LLW Repository; implementing the NDA's strategy through the provision of integrated radioactive waste treatment, logistics and disposal solutions, and supporting the UK's radioactive waste programmes". But none of this is possible without the cooperation and collaboration of our customers and supply chain.

Our next 5-year term is mapped out in immense detail in a suite of documents that when combined make up Life Time Plan 2018 (LTP18). This document captures the key elements of that plan in clear concise language that enables members of the public to hold us accountable for the things we promise to deliver in the Plan.

In 2019 the Plutonium Contaminated Materials (PCM) Decommissioning Programme comes to an end, concluding more than three decades of effort in addressing legacy waste issues generated in the 1950s. The most recent programme will finish four years ahead of schedule and deliver around £25million in savings. It will also mark the end of an era, with a real skyline change at the Repository and pave the way for future development.

RDP is the single largest programme of works the organisation has undertaken. It spans many decades and has planning consent for the next 35 years. It covers installation of the final engineered cap over the trenches and Vaults 8 and 9. It also includes construction of two further Vaults, 10 and 11 which is why the work is split into tranches with phased installation of the cap so that we do not foreclose options should new techniques and/or technologies become available during the intervening period.

It is hard to comprehend what things will look like in 30 years time, but the Repository is now destined to operate for at least another 100 years. With the extension of operations comes many benefits: job security, growth through potential development, sustained spending power with the supply chain and continued benefits to the local community and economy; there is also a huge responsibility to continue to protect people and the environment.

LLW receipts at LLWR's rail sidings

Throughout everything we do, we have a duty of care and we must always consider the type of legacy we want to be remembered for.

I believe that if we continue to do the right thing then our customers and supply chain partners will be happy to do business with us, the NDA will see the value in our operations and our local community will be happy to call us a good neighbour.

Plan Sections

This third and final 5-year term of a 17-year contract builds on the successful delivery of the previous two terms. It aims to maintain excellent delivery in all areas of activity and implement improvements in those areas that require them.

Section 1 includes a Foreword by the NDA, a reflection on performance by the PBO, and an overview from LLWR's MD covering key activities in the next 5-year term to be undertaken by LLWR.

Section 2 provides a history timeline covering key events through the decades. It also provides a general overview of the LLWR Plan including details of key activities and costs for the lifetime of operations.

Section 3 covers the implementation of the UK's Solid Low Level Radioactive Waste Strategy through the National Waste Programme (NWP).

Section 4 describes the various waste treatment and disposal options available through LLWR's Waste Treatment Services Framework.

Section 5 provides a detailed look at Repository Operations including decommissioning of historical facilities, future developments and the final closure of the LLWR Site.

Section 6 captures all business functions required to support the business needs and ensure regulatory compliance.

Section 7 describes activities and practices adopted by LLWR that help generate and/or sustain socio-economic support for our local communities.

Section 8 provides oversight of strategic objectives including benefits across the NDA Group and other UK low level radioactive waste producers.

History Timeline

The history of the Low Level Waste Repository is varied and interesting. From its early days as a Royal Ordnance Factory to present day, the LLWR Site continues to provide a crucial service to the nation.

1939

The LLWR Site was a Royal Ordnance Factory (ROF) used to manufacture explosives during the Second World War.

1944

In the mid-1940s the ordnance factory was closed, but the activities left a legacy of industrial contamination that we continue to manage today.

1957

Ownership of the Site passed to the United Kingdom Atomic Energy Authority (UKAEA) and planning consent for the disposal of LLW waste was granted.

1959

Disposal operations commenced with tumble tipping in lined trenches.

1960

1971

Responsibility for the Site transferred to British Nuclear Fuels Ltd (BNFL) when the company was formed.

1988

Vault 8, an engineered disposal facility, was opened and LLW began to be containerised prior to disposal.

1995

The Grouting Facility was opened completing the transformation of LLW disposal practices at the Site and heralding an end to tumble tipping.

2005

The NDA took ownership of the LLWR Site under the Energy Act 2004.

2006

LLWR was the first NDA site to go through the PBO competition process.

2007

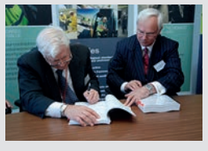
LLW Repository Ltd. became a standalone Site Licence Company (SLC).

2008

2008

LLWR celebrates 50 years of safely managing the UK's LLW whilst securing continued operations with the opening of Vault 9.

2009



UKNWM appointed as the PBO responsible for the management and operation of the company (17 years total 5+5+5+2).

2010

The National LLW Strategy was established to preserve capacity at the Site by implementing new treatment and disposal options.

2011

2011

The ESC was submitted to the EA in May 2011. It establishes the approach we take to manage legacy and future disposals at the LLWR Site.

2012

A suite of Waste Treatment and Disposal routes established.

2013

2014

Enabling waste services introduced.

PBO awarded second 5-year Contract Term.

2015

Environmental Permit granted by the EA.

2016

Planning Consent granted for RDP – engineered closure of the trenches and existing vaults and construction of Vaults 10 & 11.

2016

2017

New Type B Packaging for the transportation of radioactive wastes operational and supporting the NDA decommissioning mission.

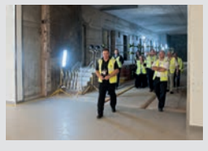
RDP Tranche 1 commenced.

2018

2018

PBO awarded third and final 5-year Contract Term.

2019



Completion of accelerated PCM decommissioning programme, 4 years ahead of schedule and £25million in savings. This concludes the legacy resulting from historic operations across the nuclear estate.

2020

RDP Tranche 1 – Commencement of work pack 3: Final Cap and Trench Cap Repairs.

2021

Major update of the 2011 ESC will be submitted to the EA.

2025 - 2129

Following the completion of RDP Tranche 1, Tranches 2 to 12 will be designed and constructed over a timeframe of 104 years.

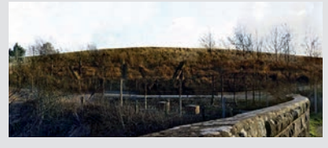
2127

2127

Repository Closure Programme commences.

2130

Completion of RDP.



2130

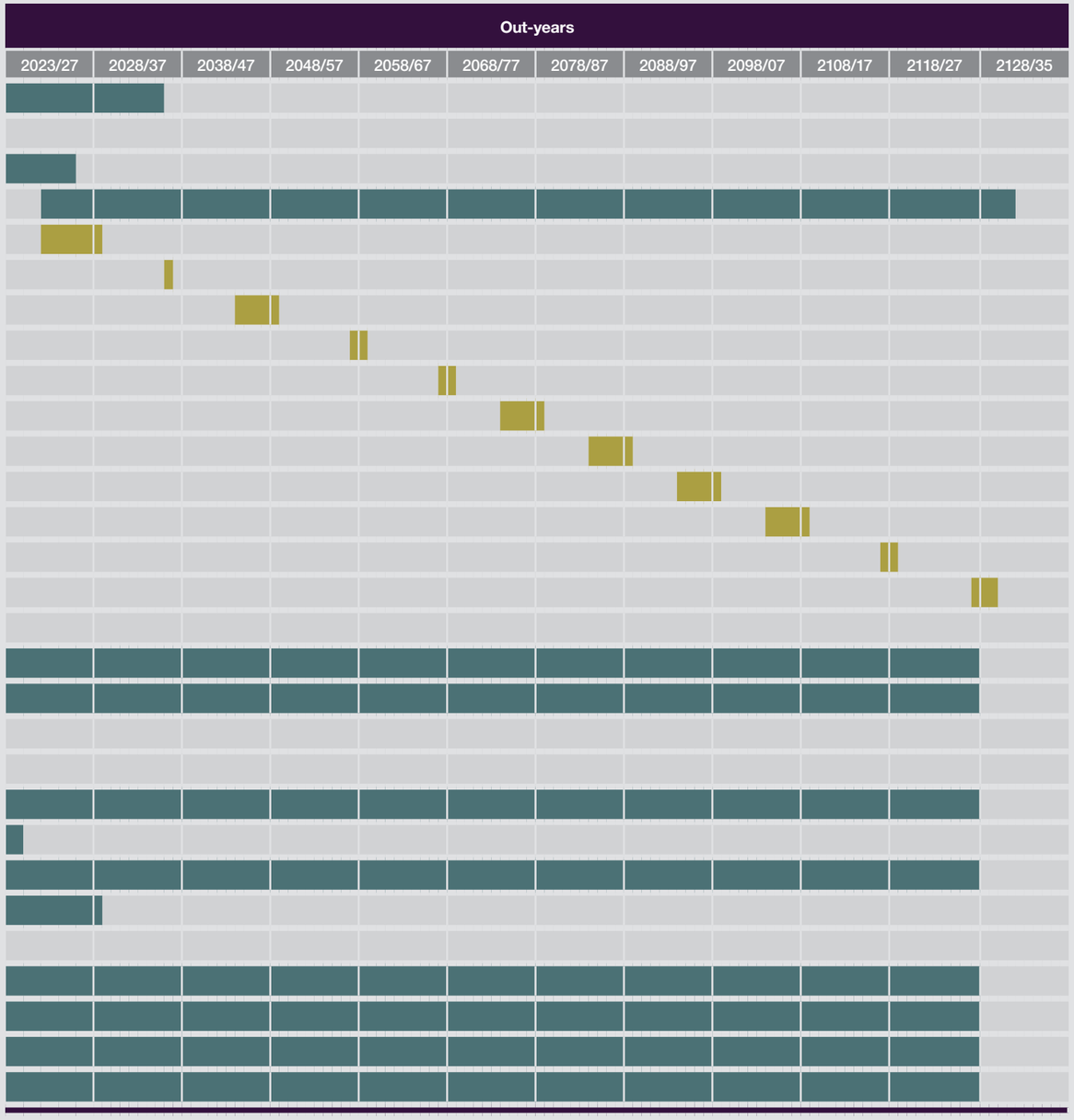
2135

Completion of Repository Closure Programme, including the delicensing of the LLWR Site.

Key Activities and Costs

The chart below provides a high-level overview of the key activities taking place at the LLWR Site during the third term, and beyond to 2135.

Key Work Programmes	BCWS £
National Waste Programme	12,883,910
PCM Decommissioning	7,320,315
RDP Tranches 1	84,478,048
RDP Tranches 2 - 12	264,337,355
– Tranche 2	*10,709,827*
– Tranche 3	*11,719,826*
– Tranche 4	*48,300,226*
– Tranche 5	*5,869,945*
– Tranche 6	*5,999,840*
– Tranche 7	*30,639,642*
– Tranche 8	*37,610,988*
– Tranche 9	*37,538,873*
– Tranche 10	*59,328,209*
– Tranche 11	*8,500,017*
– Tranche 12	*8,119,962*
Repository Closure Programme	64,332,932
EHSS&Q Portfolio	435,859,031
Regulatory Charges	85,425,950
PCM Maintenance and Operations	4,680,722
PCM Facilities Remediation	12,553,577
IT Programme	230,959,714
Repository Infrastructure Programme	13,808,676
Science & Engineering	787,821,067
Type B Packaging Capability	25,262,072
Security Enhancements Project	5,680,635
Business Support	1,563,486,182
Waste Management Services	255,293,043
Repository Operations	963,270,254
Project Delivery Organisation	182,969,908
Total lifecycle costs in 2017/18 money values	**5,000,423,391**



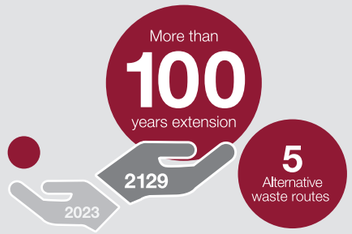
An annual inflation uplift will be applied to the lifecycle cost in line with NDA inflation metrics (typically in line with inflation).

National Waste Programme

Stakeholders to the NWP include: NDA Group; other radioactive waste producers; national and local government; regulators; the MOD and the supply chain.

LLWR is responsible for leading the implementation of the UK's Solid Low Level Radioactive Waste Strategy on behalf of the NDA. It does this through leading the implementation of the NWP.

Repository Operations



Waste Management Services

Enablers

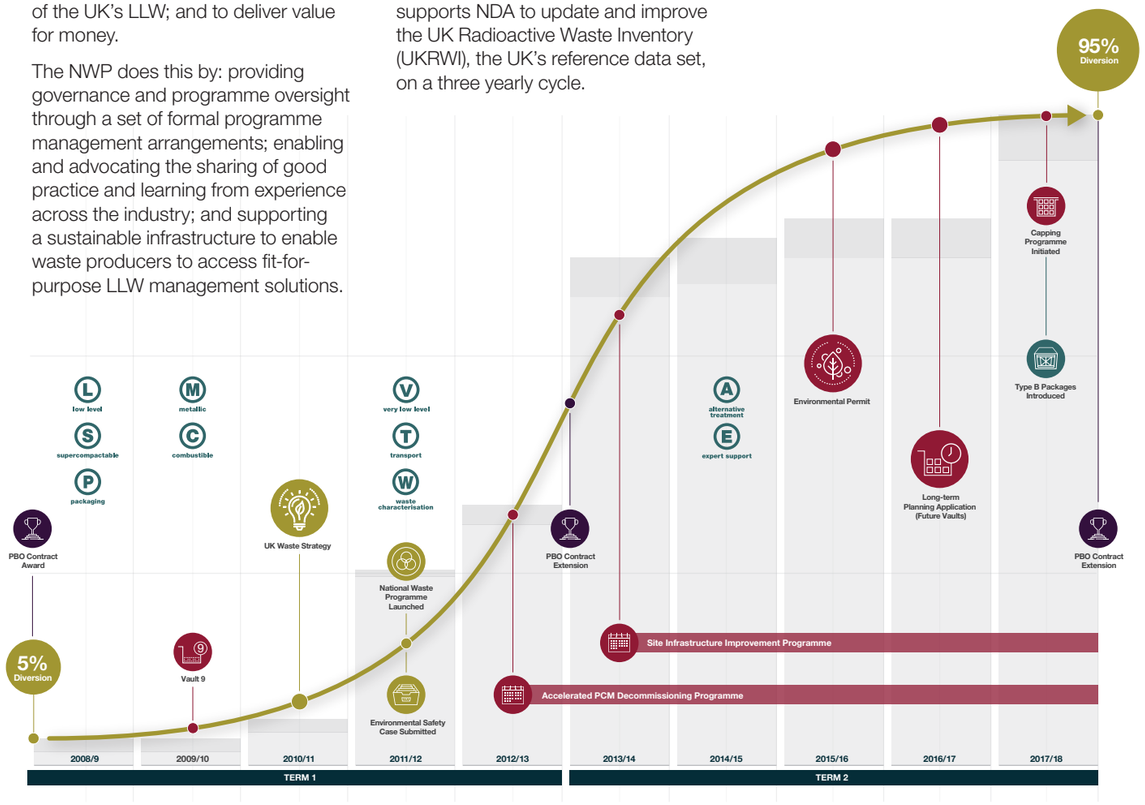
A journey of continuous growth and improvement

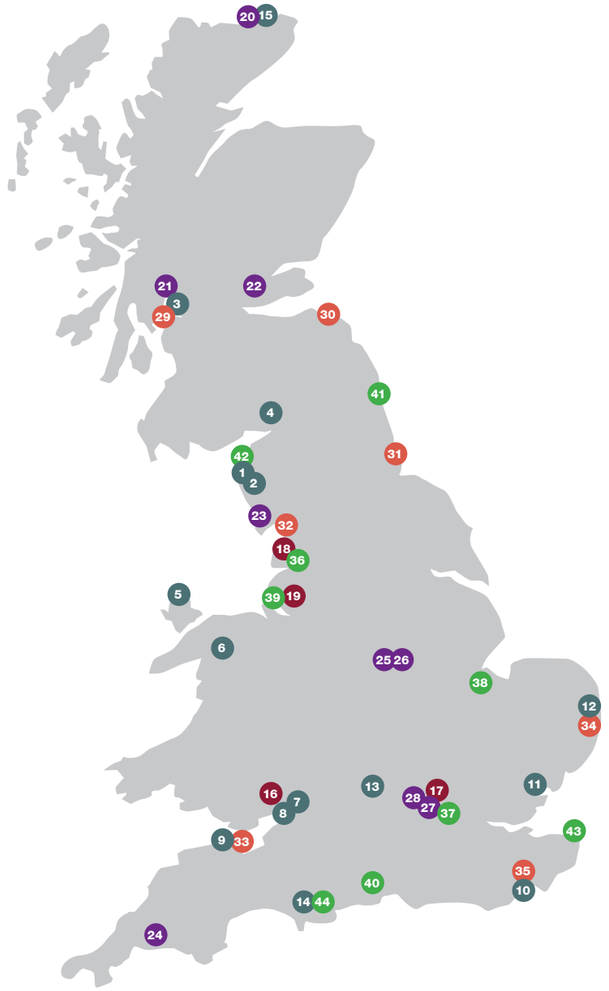
The NWP engages with a broad range of stakeholders. The intent of the Programme is to prolong the lifetime of the LLWR Site, ensuring that there is sufficient capacity for the management of the UK's LLW; and to deliver value for money.

The NWP does this by: providing governance and programme oversight through a set of formal programme management arrangements; enabling and advocating the sharing of good practice and learning from experience across the industry; and supporting a sustainable infrastructure to enable waste producers to access fit-for-purpose LLW management solutions.

Central to the effective implementation of the Strategy is a good understanding of the future arisings of LLW, which then informs the infrastructure needed to manage the forecast volumes. LLWR supports NDA to update and improve the UK Radioactive Waste Inventory (UKRWI), the UK's reference data set, on a three yearly cycle.

Shorter-term forecasts are provided by waste producers through their JWMPs, which are reviewed on a six-monthly basis; to provide more detailed disposal and diversion volumes.





NDA Estate Sites
1. Low Level Waste Repository
2. Sellafield
3. Hunsterston A
4. Chapelcross
5. Wylfa
6. Trawsfynydd
7. Berkeley
8. Oldbury
9. Hinkley Point A
10. Dungeness A
11. Bradwell
12. Sizewell A
13. Harwell
14. Winfrith
15. Dounreay

Chemical Plants And Other Facilities (Non-NDA)
16. Cardiff
17. Amersham
18. Preston
19. Capenhurst

Defence And/Or Submarine Sites (Non-NDA)
20. Vulcan Naval Reactor Test Establishment
21. Clyde Naval Base
22. Rosyth
23. Barrow
24. Devonport Naval Base
25. Raynesway
26. Derby
27. Burghfield
28. Aldermaston

Nuclear Power Stations (Non-NDA)
29. Hunsterston B
30. Torness
31. Hartlepool
32. Heysham 1 & Heysham 2
33. Hinkley Point B
34. Sizewell B
35. Dungeness B

Supply Chain Infrastructure Sites
36. Clifton Marsh
37. Colnbrook
38. East Northants Resource Management Facility
39. Ellesmere Port
40. Fawley
41. Gateshead
42. Lillyhall
43. Sandwich
44. Winfrith

National Waste Programme cont.

The LLW Strategy

Following a review of the long-term management of the UK's LLW, the UK Government published a revised policy statement in March 2007. This set out the principles for the long-term management of LLW and required the NDA to develop a UK-wide strategy for the management of solid low level radioactive waste arising from the nuclear industry.

LLW is defined as radioactive waste with a radioactive content not exceeding four gigabecquerels per tonne (GBq/te) of alpha or 12 GBq/te of beta/gamma activity. This is predominantly made up of building rubble, soil, metallic waste and organic waste from operations and decommissioning activities in the industry.

Following development and consultation, the UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry was approved by the UK Government and devolved administrations in August 2010.

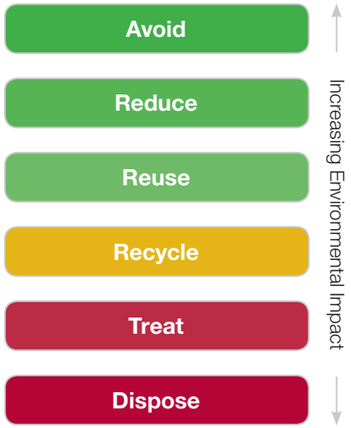
The Strategy was developed by the NDA in conjunction with LLWR and had three themes:

- The application of the Waste Hierarchy.
- Making best use of existing assets.
- Opening of fit-for-purpose waste management routes.

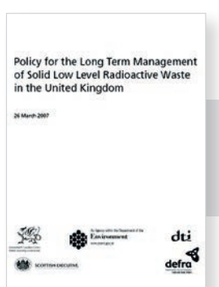
LLWR worked with the NDA in 2014/15 to support their review, on behalf of the UK Government, of the 2010 UK LLW Strategy. This review examined how the Strategy had been implemented and culminated in the publication of a revised Strategy by the Department for Energy & Climate Change (DECC) (now known as Business, Environment & Industrial Strategy (BEIS)), in February 2016. The revised Strategy noted the progress that had been made since the 2010 Strategy and reflected the work that still needed to be undertaken by the industry. The strategic themes remained the same as the 2010 Strategy.

The ongoing implementation of the UK LLW Strategy provides the capability and capacity to manage the treatment and disposal of LLW in the UK. LLWR ensures that the Strategy is implemented through the effective operation of the LLWR Site, assisting waste producers to apply the Waste Hierarchy by providing a range of waste management solutions and by leading the NWP.

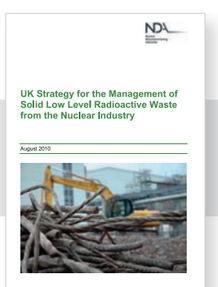
During 2019/20, LLWR will be supporting the NDA and Government with the review of the 2016 UK LLW Strategy.



Policy



Strategy



Implementation

Delivery of the NWP

The work of the NWP will continue to 2030.

Programme Management

The NWP delivers a range of governance activities to support programme oversight and management. These include a framework of regular meetings with different stakeholders to update them on programme progress and to provide opportunities to influence programme direction and priorities. Programme performance is monitored through the reporting of key metrics and programme information through a range of different reports, such as the monthly Waste Metric Dashboard. Programme Management also involves activities such as strategic risk management, communications, participation in external forums and knowledge management.

The NWP has delivered a range of guidance documents, training modules, strategic reviews and national strategic BAT (Best Available Technique) assessments; and regularly updates this suite of documents so they remain fit-for-purpose.

Programme Improvement

Programme improvement involves delivery of a range of activities with waste producers and other stakeholders to improve how LLW is managed across the UK nuclear industry. This is achieved by delivering collaborative projects with stakeholders including work to: identify and share good practice; undertake technical analysis; develop guidance documents; undertake options assessments; and to develop new training modules.

The NWP runs a programme of Peer Reviews, Peer Assists and Peer Learning events to allow waste producers to access learning and experience from elsewhere in the industry to support improvement in their waste management arrangements.

The NWP also participates in a number of Integrated Project Teams (IPTs) established by the NDA; e.g. it works with Radioactive Waste Management (RWM) to lead the Problematic Waste IPT, to drive an industry wide approach to the management of problematic waste.

Integrated Radioactive Waste Programme

LLWR has worked with the NDA and RWM to explore the opportunity for an Integrated Radioactive Waste Programme, to build on the NWP scope. An options paper for an Integrated Radioactive Waste Programme was endorsed by the NDA in October 2017; which set out the case to implement an integrated approach, through an NDA led programme jointly delivered by LLWR and RWM. This programme will enable beneficial change; facilitate the sharing of good practice and learning; and find solutions across the lifecycle and radioactive waste classifications, supporting all waste producers. LLWR, through the NWP, will continue to work with the NDA and RWM on the development and delivery of the Integrated Radioactive Waste Programme.

LLWR's opening presentation at the IWM Conference 2018

Delegates from across the UK attending the conference at Penrith

Waste Management Services

LLWR aims to be our customer's first choice for waste solutions, providing integrated radioactive waste treatment, logistics and disposal services to support the UK's radioactive waste programmes.

Successful delivery of the UK's LLW Strategy requires the availability and use of fit-for-purpose LLW management routes. LLWR provides a range of different LLW management options and other complementary enabling services (such as characterisation and packaging). These are available to waste producers across the nuclear industry and this enables application of the Waste Hierarchy, cost-effective waste management and ensures that only those wastes which require the protection of an engineered vault are disposed of at the LLWR Site.

This is delivered by creating sustainable and mutually beneficial long-term partnerships with customers and the supply chain. This also involves close working with waste producers to understand their requirements, to match them with the right services and to support them through the execution of the waste management process. LLWR uses the knowledge and expertise gathered over the past 10 years of operating these frameworks to provide expert advice and guidance on the management of LLW to its customers.

Over the next 5 years, Waste Management Services will continue to support waste producers across the UK nuclear industry. This will involve: continuing to provide access to the LLW management frameworks; improving and streamlining how these frameworks operate; working with customers and suppliers to identify and make available new services as these are needed by the industry; and providing expert advice and support to enable effective LLW management across the industry.

Waste Management Services cont.

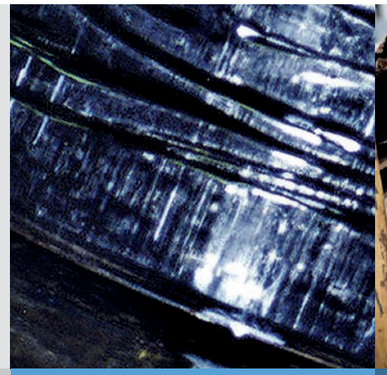
LLWR offers access to a range of waste management services via a series of commercial contracts. These include waste treatment and disposal solutions and enabling services.

Waste Characterisation

297%

increase in waste characterisation service uptake since 2013

Waste characterisation is the process of gathering and understanding information about the physical, chemical and radiological properties of a waste. LLWR offers a waste characterisation service that allows customers to access advice, sampling, analysis, data interpretation, measurement and routing guidance for their wastes. The use of this service enables customers to make the right decisions about how to manage their LLW and helps to ensure that "the right waste is routed to the right place".



Supercompactable Waste

70%

soft waste can be reduced in volume by up to 70% through supercompaction

Supercompaction involves the high-force compaction of soft LLW to ensure that waste which does need to be sent to the LLWR Site has a minimised volume. Soft waste can be reduced in volume by up to 70% through supercompaction, and so the use of supercompaction improves the packaging efficiency of waste in disposal containers.

Metallic Waste

5,137te

treated through LLWR's framework service since 2013

Metallic waste treatment involves the segregation, size-reduction, decontamination, shot-blasting and melting of metallic LLW. Materials such as carbon steel, stainless steel, aluminium, brass, copper, lead and other metals have been successfully treated via these techniques. The use of this service enables customers to recycle metallic waste whilst reducing the volumes of LLW disposed of at the LLWR Site. This brings environmental benefits, more effective use of resource, enables greater flexibility on waste producer sites and supports ensuring that the right waste is disposed of at the LLWR Site.

Combustible Waste

14,498m^3

treated through LLWR's framework service since 2013

Thermal treatment is used to reduce LLW disposal volumes giving waste producers the potential for greater cost efficiencies, increased flexibility and results in less waste being disposed of at the LLWR Site. Combustible waste treatment can reduce volumes disposed of at the LLWR Site, of this type of waste, by up to 100%. The list of wastes that can be accepted for thermal treatment is extensive but typically includes paper, cardboard, packaging materials, plastics, wood, oil and protective clothing. Our suppliers utilise advanced high temperature incineration technology and operate under strict limits defined and monitored by the environmental regulators.

Waste Management Services cont.

Very Low Level Waste

18,064m³

disposed to permitted landfill sites through LLWR's framework service since 2013

The VLLW service involves the disposal of high-volume, low-activity waste at appropriately licensed commercial waste landfill sites. This service enables the disposal of very lightly contaminated waste which does not require the same degree of engineered protections provided by the LLWR Site. The waste managed via this route typically includes rubble, soil and other demolition wastes from decommissioning and site restoration activities.

Low Level Waste

95%

of LLW generated in 2017/18 was diverted from the LLWR Site

The LLW service is for low level radioactive waste that cannot be treated or any residual (secondary) wastes resulting from a treatment process. This is used for disposal of only those wastes that require the engineered protection offered by the LLWR facility. Detailed assessment of each proposed consignment is made against the Waste Acceptance Criteria (WAC) for the LLWR Site; if authorisation for disposal is given, the waste is transferred to the site by rail or road prior to receipt inspection, grouting, and emplacement in the LLWR Vaults.

Transport Services

4,760

transport movements delivered through LLWR's framework service since 2013

Delivery of successful LLW management requires access to transport services to enable waste to be safely and cost effectively transferred between the site of origin and treatment/disposal sites. LLWR offers a complete transport service which includes access to suppliers for the transport of waste consignments to treatment facilities in the UK and internationally, as well as to the LLWR Site. This service also includes help and advice on dangerous goods transport matters relevant to LLW.

Packaging Services

50,923

total number of packages (including containers, drums and soft-sided bags) manufactured since start of contract in April 2008

Access to a supply of fit-for-purpose and appropriately licensed packages is a key enabler to efficient LLW management. LLWR designs, manufactures, licences, and maintains a fleet of packaging, including Industrial Package 2 (IP2) rated packages suitable for road, rail and sea transport and a fleet of Type B containers used for transportation of fissile materials. The fleet includes a number of reusable containers which enable the shipment of waste to and from treatment sites.

Alternative Treatment

£3million

savings on treatment costs for customers through the provision of alternative treatment solutions

Alternative treatment services provides solutions for a wide range of non-standard wastes such as volume reduction, conditioning, or bespoke disposal. This also includes the sorting and segregation of waste where types of waste are separated on the basis of their physical, chemical and/or radiological properties to enable waste handling or treatment and is a key part of the waste management process. LLWR offers a service to enable waste producers to access onsite and offsite capabilities for waste sorting and segregation to enhance decommissioning and waste management activities.

Expert Support

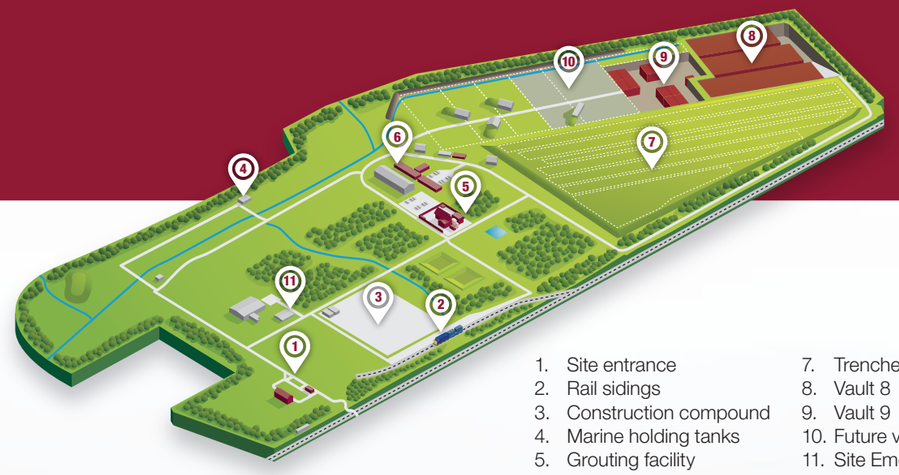
20,000+

hours of additional expert support provided through LLWR's framework service

LLWR has amassed significant knowledge and experience over the 10 years of operating Waste Management Services. We actively look for opportunities to identify and share best practice and lessons learned with others. Waste producers can access our expert advice on waste management which is particularly useful at the early stages of evaluating different waste management and decommissioning options and for managing more complex wastes. Additional expert support is also available through the supply chain that LLWR operates on its other services.

Repository Operations

The LLWR Site is the UK's national disposal facility. Its role is to ensure that low level radioactive waste generated in the UK is disposed of in a way that protects people and the environment. To support the Site's mission until 2135, the Repository has a number of key programmes.



1. Site entrance
2. Rail sidings
3. Construction compound
4. Marine holding tanks
5. Grouting facility
6. Administration buildings
7. Trenches
8. Vault 8
9. Vault 9
10. Future vaults
11. Site Emergency Control Centre (SECC)

Low Level Waste Operations

The LLWR Site receives solid low level radioactive waste from a range of customers such as; the nuclear industry, the MOD, non-nuclear industries, and educational, medical and research establishments. LLW Operations includes all aspects of receipt, treatment, storage and disposal of LLW from UK consignors, as well as waste generated at the LLWR Site.

Management of any liquid effluent from waste disposal operations is conducted in line with the discharge authorisation granted by the EA.

Maintenance

All LLW facilities and infrastructure across the Site require maintenance including; the transport fleet, buildings, drainage systems, fork lift trucks, tugs and trailers and the electrical distribution system and sub-stations. Maintenance is planned and managed to avoid or address potential sources of failure and ensure continued operations at LLWR.

Site Support

In 2017 LLWR combined a number of existing site support teams to form one integrated Site Support Organisation with responsibility for:

- Facilities, Building and Accommodation Management.
- Service Support.
- Consignor and Container Management.
- Emergent Works.
- Utilities.
- Waste Delivery.
- Logistics.

This organisation works across the company to develop and deliver Accommodation and Logistic Strategies in support of the site and the overarching company vision.

Infrastructure Replacement

Infrastructure Replacement manages the replacement or renewal of organisational structures and facilities (e.g. buildings, roads, power supplies and plant) needed for the operation of the LLWR Site until completion of the mission in 2135.

Repository Management

Repository Management provides coordinated and controlled management of work on the LLWR Site (both LLWR and contractors) and includes the Works Control Centre, Emergency Arrangements and Contractor Validation and Assurance departments.

Repository Development Programme

The ESC provides the outline for the future development and closure of the LLWR Site. RDP will deliver the physical works to implement the ESC and is divided into 12 phases referred to as tranches.

RDP – Tranche 1

There are three work packages attached to Tranche 1:

Work Pack 1 – Repository Enabling Works are underway, this work package will provide the infrastructure needed to deliver the later execution works. This includes early construction activities such as installation of site and haul roads, installation of temporary accommodation facilities, surface water management, including installation of a new perimeter drainage system around the historic trenches and future vaults, installation of the cap shoulder/screening earth bunds to reduce impact to external stakeholders, and the preparation of material stockpile areas.

Work Pack 2 – Vault 8 Closure activities are also underway and will prepare the Vault 8 area ready for the placement of profile fill material. The work package will provide methodology and implementation for container ullage fill and the import, stockpile and placement of void filling material (between containers). It also includes the design and installation of a running surface to enable higher stacking (up to 8 high) and the transfer of containers from Vault 9 to Vault 8 to create the higher stacks. Design and construction of a cut-off wall to the north and west of Vault 8, along with design and installation of Vault 8 leachate monitoring system is also included in this phase.

Completion of this work signifies an important milestone for LLWR with interim protection of the waste in Vault 8.

Work Pack 3 – Final Cap and Trench Cap Repairs have commenced. This work package will prepare and construct the engineered final cap over Vault 8 and to the north of the trench cap. This involves profile fill, existing trench cap membrane repairs and the placement of individual engineered layers to ensure the long-term protection of the waste contained within Vault 8 and the northern end of the trenches. In addition, the work package will implement repairs to the existing interim trench cap and the installation of temporary drainage between Vault 8 and the trenches. Preparation of stockpile areas and placement of profile and surcharge material to the north of the trench cap will allow settlement to take place. Installation of a trench cap environmental monitoring system that includes groundwater monitoring wells and trench cap probe holes is included, along with the installation of a batching plant for production of engineered layers. Final landscaping concludes this package of work.

All of the construction works will be overseen by a Construction Quality Assurance (CQA) scheme to monitor activities, during construction on behalf of the EA.

At the end of this work package, a Final Cap will be in place over Vault 8 and the adjacent trenches providing long-term protection to the wastes and the environment.

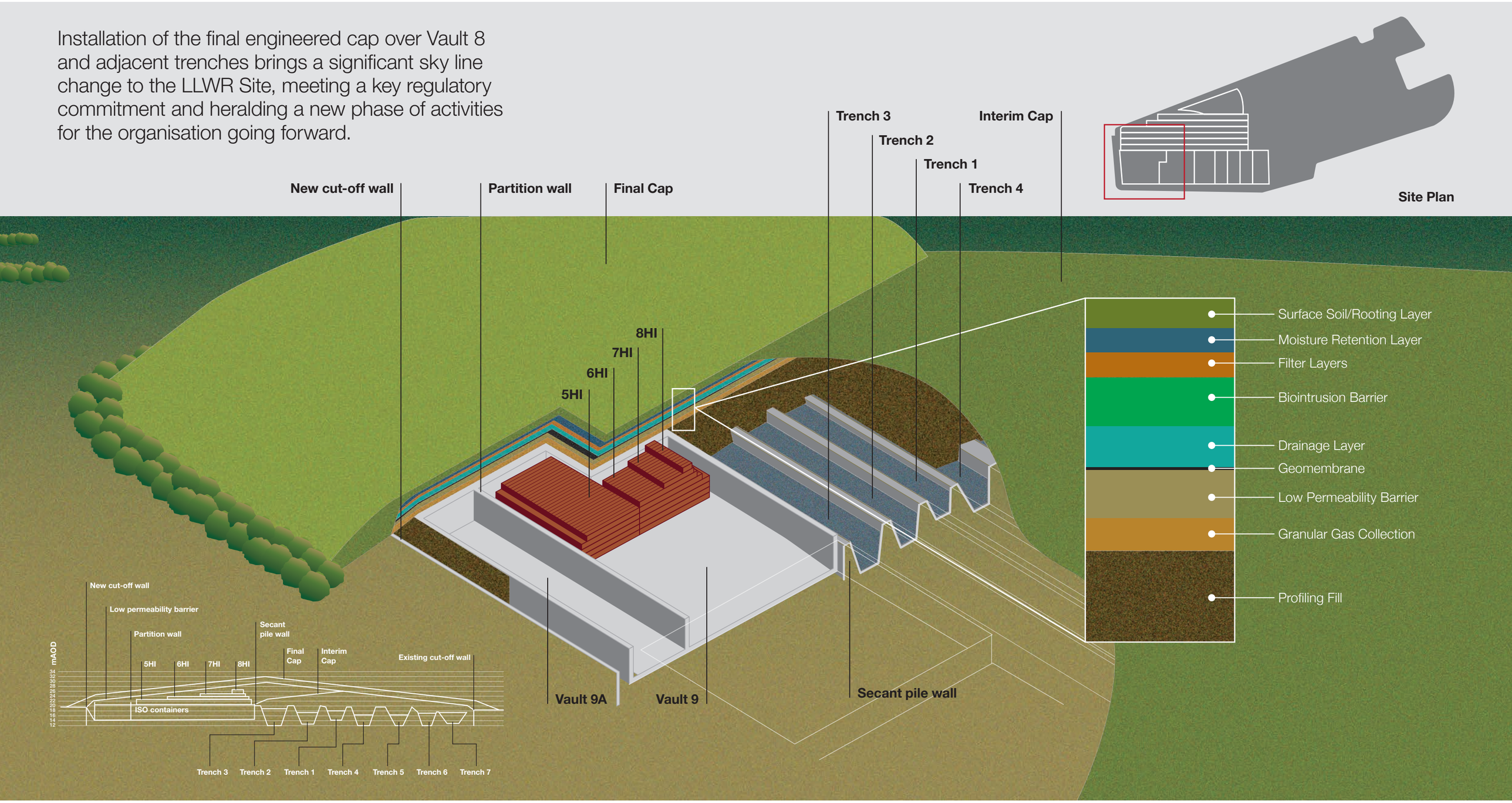
RDP – Tranches 2 to 12

Following the completion of Tranche 1, Tranches 2 to 12 will be designed and constructed over a timeframe of 104 years. This includes the construction of Vaults 9a, 10, 11, 12, 13 and 14 and the closure engineering works required for all vaults and adjacent trenches (subject to the relevant consents being in place).

Through the delivery of Tranche 1 the actual timeframes for the future tranches will be confirmed; especially the construction of Vault 9A due to the interfaces with the capping of Vault 8, the number of containers that remain in Vault 9 after higher stacking and the future plans for removing the leachate out of Vault 8 post capping.

Vault Cap Illustration

Installation of the final engineered cap over Vault 8 and adjacent trenches brings a significant sky line change to the LLWR Site, meeting a key regulatory commitment and heralding a new phase of activities for the organisation going forward.



Repository Infrastructure Programme

In 2011, the NDA developed and published an Asset Management Strategy in order to secure reliable NDA asset performance and enable safe and effective delivery of the Decommissioning and Clean Up mission.

LLWR has implemented a series of measures designed to ensure it meets NDA's expectations and complies with the Asset Management Strategy. These measures include changes to internal governance arrangements and the development and implementation of a suite of documents that form part of the LLWR Integrated Management System.

The Repository Infrastructure Programme (RIP) is the primary vehicle for ensuring that investment is effectively managed and work activities are coordinated in line with the strategic direction of the business. This involves the prioritisation of work in line with available funding and the close management of strategic, regulatory and stakeholder requirements, along with the incorporation of best practice. RIP is designed to safeguard and enhance the sites capability to deliver business strategy and is made up of three streams which are directly linked to the successful and efficient delivery of operations.

RIP has been established to manage the interdependencies between a number of projects that have evolved from business as usual activities. Many of the projects are unrelated in nature but depend upon the same resources to execute and deliver successfully. Collectively they support LLWR's Asset Management Strategy and ensure that the refurbishment of site plant, assets and systems enables the ongoing provision of LLW disposal services, and compliance with our Nuclear Site Licence and Environmental Permit.

Following significant investment and improvements provided in LTP13, further investment is identified in LTP18 to ensure that the condition of the assets are maintained at an acceptable level. Investment in the refurbishment or replacement of assets will result in improvements across the site and transition to a renewal cycle for infrastructure replacement that will ensure the site's assets continue to perform at the required level to meet the performance objectives for the site and operate compliantly.

RIP is closely linked to LLWR's Asset Management arrangements, these arrangements and subsequent outputs, such as System Health Reports are currently maturing and providing valuable information in order to underpin and inform the scope from which projects are developed and executed.

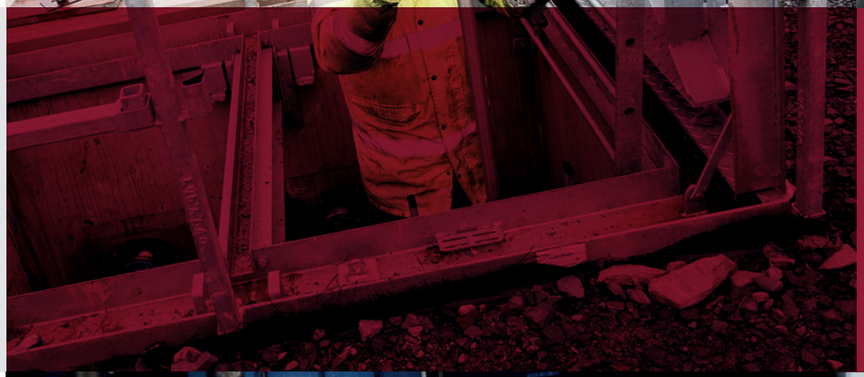
Much has been learned from the implementation of LTP13. This Learning from Experience (LfE) allows RIP to determine the level of maturity various projects and tasks have reached, and apply that knowledge to the business planning process. Projects include:

- Vault Discharge System Upgrade.
- Manhole 11 Refurbishment.

Future projects will be defined from the outputs provided by the System Health Reports, and these will include projects such as:

- Substation Refurbishment.
- Drigg Grouting Facility (DGF) Outage.
- Transport Container DGF Modifications.
- DGF Envirodoor Replacement.
- Improvements to the Leachate System.
- Building Refurbishment.
- Further Site Modernisation Project such as Programmable Electronic Systems (PES) and Configurable Device Implementation.









Decommissioning Historical Facilities

Decommissioning of all PCM Facilities is expected to be completed in 2019. Planning for the demolition of the facilities is underway and will be phased to match the construction material needs of the RDP in line with the Waste Hierarchy.

PCM Decommissioning Programme

When the site was an ordnance factory, concrete bunkers (Magazines) were constructed to store munitions such as TNT. During the 1950s and 1960s PCM generated from operations at Sellafield, and across the country, was stored in some of the Magazines. During the 1990s modern facilities were constructed to enable the removal, repackaging and transport of the PCM for safe storage in modern purpose-built facilities located at the Sellafield site.

Substantial progress has been achieved in decommissioning of the PCM facilities with the final decontamination activities scheduled to be completed in 2019. This will be a major landmark for LLWR and the programme will then move into the demolition phase. The modern retrieval facilities will be removed first and the material consigned off site for metal treatment and reuse where possible or for disposal at a landfill site. Work has already been completed for Magazine 4, which is ready for final demolition. The remaining Magazines will be progressed to the same stage of readiness and demolition will be phased in with the construction material needs of RDP. It is planned to place rubble from the demolition works on top of Vault 8 as part of the profile fill material. The area that will be cleared will be used to manage the various stockpiles of material for RDP and for the location of future vaults. A number of other structures associated with the PCM Decommissioning Programme will also be demolished but the Drum Store Facility will be retained for future use.

Transport of this type of waste requires special high integrity containers; designed, manufactured and licensed to international standards. A new fleet of Novapak containers has been manufactured to serve the LLWR and the UK's needs and will be used to move material from consigning sites to Sellafield. The removal of the legacy drums at the LLWR Site has advanced and plans are underway to dispatch the majority for processing. The remainder will be consigned for storage or, where appropriate, will be disposed in Vault 9.









Security Enhancement and IT Infrastructure Programmes

The Security Enhancement Programme (SEP) is providing improved security facilities and management systems to the LLWR Site and Pelham House.

SEP started in 2014 to implement the requirements of the Nuclear Site Security Plan (NSSP) that was developed in agreement with the Office for Nuclear Regulation (ONR). The installation of a new security fence was completed in 2017, and a new Site Emergency Control Centre (SECC) is currently under construction and scheduled to be completed in 2019. Upgrades to the security and management systems are also planned to provide the LLWR Site and Pelham House with robust security systems aligned to modern standards and nuclear industry norms.

Effective and appropriate Information Technology (IT) is key to enabling modern businesses. With appropriate education and training it enables efficient and collaborative working.

The IT programme will deliver a modern integrated IT environment to enable LLWR to work collaboratively with its customers and suppliers. This integration will drive efficiencies and support LLWR in seeking out opportunities to deliver its mission at a lower cost. Integrated communications will enable meetings to be held without the need for personnel to move from their desks. This increases the amount of effective work time, reduces the risks from road travel and eliminates carbon emissions associated with vehicle use.

LLWR is securing software services to ensure the applications used by the business remain up-to-date and able to integrate with NDA Group. This also enables LLWR to benefit from the economies of scale that can be leveraged through collaboration.

The establishment of an in-house IT support team modelled on Information Technology best practice, will improve the user experience. The team will have the necessary skills and experience to resolve many of the day-to-day issues that arise. More complex problems will be referred to experts contracted to provide that service.

An important aspect and ever increasing demand on the IT Programme is information management and cyber security. LLWR is applying security measures that are proportionate to the risk of data loss or inappropriate exposure. This strengthens security of our management systems by focusing resources where they are needed rather than spreading them thinly over a wide area.

Business Support

Business Support at LLWR includes a wide range of services to ensure the organisation operates safely, legally and efficiently and includes the following areas:

Environment, Health, Safety, Security and Quality Assurance (EHSS&Q)

This function advises, guides, regulates and supports the organisation in:

- Environmental Compliance.
- Radiological Protection.
- Conventional Safety.
- Quality Assurance.
- Protecting Nuclear Materials, Sensitive Nuclear Information and other assets.

Professional Environmental, Health & Safety and Security Advisers ensure LLWR goes about its business with due regard for the environment in a safe and secure manner whilst complying with UK legislation and regulatory requirements.

Business Management

This function provides leadership, corporate governance and support through the:

- Provision of financial corporate governance, development and control of budgets, and performance reporting.
- Enhancement and protection of the LLWR reputation and ensuring that communities have the ability to influence the way LLWR conducts its business.
- Delivery of an appropriate organisational structure with the necessary resources and competencies to deliver nuclear safety and meet the needs of the business ensuring equality, diversity and inclusivity.
- Provision of the SLC Board of Directors and Executive Team to ensure appropriate leadership, site management and governance arrangements are in place to ensure successful delivery of this Plan.
- Provision of IT capability to support the business needs.
- Cross functional support for all commercial, property, procurement and contract management activities delivering value for our business and to our customers and suppliers.

Science and Engineering

This function provides:

- Engineering capability to the organisation for services such as design authority, plant engineering, asset management and project engineering.
- Nuclear safety cases to support site operations involving the handling and storage of radioactive material.
- An ESC which meets the conditions required to operate as a radioactive waste disposal site.
- Environmental Monitoring and Site Characterisation to ensure that LLWR maintains a good understanding of the environment within and surrounding the Repository Site.
- A waste inventory and compliance team who assure the regulatory and technical aspects of waste consignments to the Site.

Project Delivery Organisation

This function provides a standardised approach to project management. It is responsible for running a Project Delivery Office (PDO) that oversees Construction Management, Project Quality Management, Resource Management and Project Supply Chain.

Regulatory Costs

This function captures those regulatory charges levied upon the SLC from LLWR regulators: primarily the EA and the ONR.

Socio-Economic Overview

As a medium-sized company, LLWR directly employs around 250 people and provides temporary employment for a further 150, primarily from the West Cumbria area.

LLWR supporting local schools in the First Lego League championships

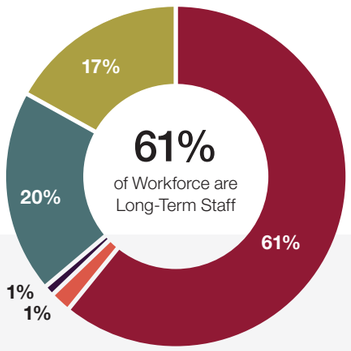

LLWR hosting a Community Open Day at Pelham House

Our People

The evolution of LLWR's services and site programmes has resulted in a 35% increase to the employment base since 2013, with the addition of a number of permanent roles alongside various temporary positions to meet operational demand. Employment costs for financial year 2017/18 were just over £23million, an increase of £5million since 2013, with the vast majority of employees living in West Cumbria, this represents significant spend in the local area.

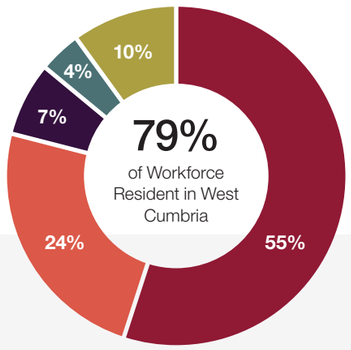
LLWR provides a comprehensive training programme to develop existing and future employees by providing key skills and knowledge that can be transferred to future roles and employment as programmes of work at LLWR complete.

Manpower



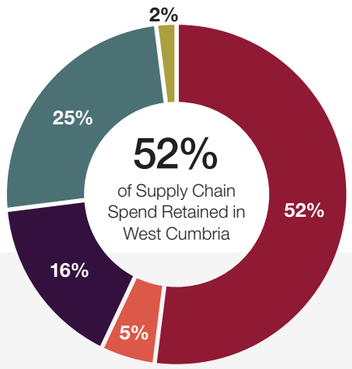
LLWR Staff	
PBO Secondees	
SLC Secondees	
Agency Supplied Workers	
Contract Supplied Workers	

Workforce Geographics



Copeland	
Allerdale	
Rest of Cumbria	
North West	
Rest of UK	

Supply Chain Spend



West Cumbria	
Rest of Cumbria	
North England	
Rest of UK	
Europe	

Supply Chain Spend figures based on FY 2017/18

Our Suppliers

The supply chain remains critical to successful delivery of the LLWR Plan and we anticipate spending around £50million per year with our suppliers on a wide range of works, goods and services. Strategic relationships in the areas of radioactive waste treatment and disposal and engineering design and construction will be further developed.

As a publicly funded body, LLWR procures in accordance with the Public Contracting Regulations and Government policies. As part of the NDA Group, LLWR works with other SLCs and NDA subsidiaries to collaborate on a range of procurement and supply chain activities and initiatives. LLWR also accesses framework contracts made available by the Crown Commercial Service.

The average percentage spend with Small-to-Medium Sized Enterprises (SMEs) over the past five years was 28%. LLWR aims to increase this percentage during the next five years through its Business Services Marketplace (BSM). BSM covers professional and technical services and has been a successful platform for locally based SMEs.

LLWR's supply chain makes a strong contribution to the Cumbrian economy with over 50% of spend being retained in West Cumbria in financial year 2017/18, an increase of 10% since 2013. LLWR will continue to seek opportunities to increase SME and regional spend where appropriate. LLWR will also continue to ensure our activities and spend supports communities and provides sustainable socio-economic benefit. LLWR actively encourages its key suppliers to recruit locally and invest in trainees and apprentices to grow future skills and talent.

Our Community

LLWR takes its responsibility of being a 'good neighbour' very seriously and where possible aims to reduce the impact of operations on community life. Over the last 10 years LLWR has introduced a number of controls to day-to-day operations in order to reduce its impact, including reducing road transports by utilising rail options and applying time restrictions for HGV deliveries to the Site.

Through the NDA, LLWR provides £1.545million per year to the Copeland Community Fund (CCF) to support community projects in Copeland. Of the £1.545million, £50,000 is ring-fenced each year for the Parish of Drigg and Carleton and £15,000 for the Parish of Seascale to enable development/delivery of community based projects. LLWR also set aside an additional £35,000 per year to support community led initiatives within a 15 mile radius of the LLWR Site. Over the past five years approximately £250,000 has been spent on local initiatives this is in addition to the funding provided to CCF.

LLWR actively encourages its employees to engage with community/charitable organisations and has participated in a number of sponsored events raising thousands of pounds for local good causes.

LLWR engages a wide range of stakeholders through a variety of mechanisms. It supports the NDA's Stakeholder Engagement Framework and also provides secretariat to the LLWR Working Group which holds quarterly public meetings in Drigg Village Hall. Monthly liaison meetings are also held with representatives from Drigg and Carleton Parish Council and the community are invited to an annual open day event. A comprehensive visits programme supports hundreds of visitor's to the LLWR Site per year from the UK and overseas.

Strategic Benefits

Operating the national repository; implementing the NDA's Strategy through the provision of integrated radioactive waste treatment, logistics and disposal solutions; and supporting the UK's radioactive waste programmes.

Progress against Strategic Benefits will be monitored through a set of metrics which include the volume of waste diverted from the LLWR Site; utilisation of treatment and alternative disposal routes by customers, savings achieved through the use of treatment and alternative disposal routes and the environmental benefits derived from implementing the programme. These metrics are captured on a monthly waste metric dashboard that is published on the LLWR web site (www.gov.uk/llwr)

Ensuring capacity at the National Low Level Waste Repository until 2129.

Progressing closure of Vault 8 and adjacent trenches.

Supporting an effective radioactive waste management approach across the NDA Group.

Removing all legacy radioactive waste from the LLWR Site.

Deliver £150million of estate wide savings in the next 5 years.

Maintaining a mature and robust supply chain for radioactive waste management.

Optimising the use of the LLWR Site through good stewardship.

To be a disposal site recognised for its safety, environmental and operational excellence.

To provide high quality advice, expertise and services, at the centre of our customers' decommissioning operations.

To create a culture of investment, development and caring for our employees.

To provide a leading role in the NDA's Integrated Radioactive Waste Programme, supporting the acceleration of decommissioning programmes.

To become an organisation that is resilient, agile, embraces change and is ready for the future.

Glossary

ASW	Agency Supplied Worker
BAT	Best Available Technique
BEIS	Business, Environment & Industrial Strategy
BNFL	British Nuclear Fuels Limited
CCF	Copeland Community Fund
CEO	Chief Executive Officer
CQA	Construction Quality Assurance
CSW	Contract Supplied Worker
D&C PC	Drigg and Carleton Parish Council
DECC	Department of Energy & Climate Change
DGF	Drigg Grouting Facility
EA	Environment Agency
EHSS&Q	Environment, Health, Safety, Security and Quality
ESC	Environmental Safety Case
HHISO	Half-Height ISO Container
ILW	Intermediate Level Waste
IP	Industrial Package
IPT	Integrated Project Team
IT	Information Technology
JWMP	Joint Waste Management Plans
LfE	Learning from Experience
LLW	Low Level Waste
LLWR	Low Level Waste Repository Ltd
LTP18	Life Time Plan 2018
LTP13	Life Time Plan 2013
MD	Managing Director
NDA	Nuclear Decommissioning Authority
NSSP	Nuclear Site Security Plan
NWP	National Waste Programme
OJEU	Official Journal of the European Union
ONR	Office for Nuclear Regulation
PBO	Parent Body Organisation
PCM	Plutonium Contaminated Materials
PDO	Project Delivery Office
PES	Programmable Electric System
RDP	Repository Development Programme
RIP	Repository Infrastructure Programme
ROF	Royal Ordnance Factory
RWM	Radioactive Waste Management
SECC	Site Emergency Control Centre
SEP	Security Enhancement Programme
SLC	Site Licence Company
SME	Small to Medium Enterprises
TNT	Trinitrotolene
UK	United Kingdom
UKAEA	United Kingdom Atomic Energy Authority
UKNWM	UK Nuclear Waste Management Ltd
UKRWI	UK Radioactive Waste Inventory
VLLW	Very Low Level Waste
WAC	Waste Acceptance Criteria

LLW Repository Ltd

Pelham House
Pelham Drive
Calderbridge
Seascale
Cumbria CA20 1DB
Website: www.gov.uk/llwr
Telephone: 019467 70200