ED23

CUMBRIA MINERALS AND WASTE LOCAL PLAN

2015-2030

CUMBRIA COUNTY COUNCIL STATEMENT

ON THE SCHEDULE OF MATTERS AND ISSUES FOR EXAMINATION

RADIOACTIVE WASTE

November 2016

Where documents have been referenced in the following text, the *Title* is set out in *italics* and the Submission or Evidence Base document reference follows in brackets, e.g. (LD46).

All documents can be accessed via the Core Document List, located on the Examination web page: **http://www.cumbria.gov.uk/planning-environment/policy/minerals_waste/MWLP/Examination.asp**

Alternatively, all Submission documents can be accessed on the Submission version web page: **http://www.cumbria.gov.uk/planning-environment/policy/minerals_waste/MWLP/submissiondocuments.asp**

And all Evidence Base documents can be accessed via the Evidence Base web page: **http://www.cumbria.gov.uk/planning-environment/policy/minerals_waste/MWLP/EB.asp**

Draft Matters and Issues relating to Radioactive Waste

This document supplements the draft Matters and Issues dated 12 October 2016, and specifically deals with radioactive waste.

Responses to the technical questions were sought from, and supplied by, the Nuclear Decommissioning Authority, Sellafield Ltd and the Low Level Waste Repository Ltd. Clarification, especially of technical terms, has been added by the County Council.

Matter 1a: Duty to Co-operate (DtC)

Issue: Has the DtC been met?

1. Please briefly explain how the DtC has been met with respect to the various nuclear authorities.

There are a wide range of 'nuclear authorities' with whom Cumbria County Council co-operates under the duty. This response includes reference to Local Authorities, the Regulators and the radioactive waste industry.

The Local Government Association's Nuclear Legacy Advisory Forum (NuLeAF) is a voluntary, subscription-based group of waste planning authorities. A Steering Group of officers and Councillors meets quarterly, as does a Radioactive Waste Planning Group (RWPG) comprised of development control and policy planning officers. Ad hoc meetings are also arranged to bring together representatives from waste planning authorities, the nuclear industry, the Nuclear Decommissioning Authority, the Environment Agency and other regulators. As a full member, the County Council is a regular contributor to, and attendee at, meetings of the RWPG and also attends some Steering Group meetings. RWPG agendas include a regular item on DtC, providing opportunity to raise relevant issues for discussion.

RWPG meetings provide the regular opportunity to discuss strategic radioactive waste management issues, as well as the preparation of plans and polices for radioactive waste. Membership of NuLeAF has enabled discussion with Local Authorities that may be affected by, or have interests in, the management of radioactive waste. It has proved to be a valuable forum for developing the radioactive waste policies within the Cumbria Local Plan (SP4: Transparent decision making, SP5: Development criteria for low level radioactive waste sites and SP6: Higher activity radioactive wastes treatment, management and storage).

During the preparation of the Local Plan, Cumbria County Council has regularly held meetings with officers from the District councils, and in particular with Copeland Borough Council, in relation to the management of radioactive waste. Numerous relevant meetings have been attended by County Council and Copeland officers and members, including the West Cumbria Site Stakeholder Group and NuLeAF. Specific DtC meetings have also been held annually with Copeland Borough Council, as well as meetings to discuss or inform their responses to consultations on the Plan. The last meeting was held in July 2016.

When consulted, the County Council also provides responses to draft Local Plans produced by other Local Authorities, where the interests of Cumbria could be affected. For example, the County Council has responded to consultations from North Tyneside Council, Cheshire East Council and North Yorkshire County Council, as these authorities did not provide information on the management of very low level radioactive waste from establishments in their areas, such as hospitals or education facilities. The responses from Cumbria encourage these authorities to consider the management options for this waste stream, rather than assume that the waste could be transported to Cumbria for management. The Low Level Waste Repository in Cumbria is a finite resource and there are alternative options to this highly engineered facility for the management of such waste.

The County Council also assist and provide comments to other Waste Planning Authorities where the management of radioactive waste is undertaken. For example, the County Council has meet with Somerset County Council to discuss and provide comments on their Radioactive Waste Topic Paper, which was prepared to support the development of their new Minerals and Waste Local Plan.

With regard to the radioactive waste industry, the County Council is a key stakeholder and undertakes proactive engagement in the process of life time planning at the nuclear sites in Cumbria. Through its waste planning responsibilities, the Council is also a regulator. The County Council meets regularly with the industry, to discuss the future management of radioactive waste in the county.

The National Waste Programme (NWP) was established to implement the UK's strategy for the management of the nuclear industry's solid low level radioactive waste (LLW). The NWP is an industry-wide collaboration led by the LLW Repository Ltd on behalf of the Nuclear Decommissioning Authority. The County Council attends the quarterly LLW National Programme Regulatory meetings, where issues such as progress on diverting wastes from the Repository and on reducing waste arisings at source, as well as improving forecasting of arisings, are discussed. Regulators (EA, SEPA, NRW and ONR[1]) also attend the meetings and provide updates on key work streams and areas of interest pertinent to the LLW National Programme, such as permit variations at LLW disposal sites across the UK. Engagement with the NWP gives greater insight into how the Repository and LLW are managed and what issues may arise for Cumbria.

As the management of radioactive waste is an important issue for Cumbria, ad hoc meetings on particular topics are convened with the relevant Regulators or operators in the county. The last such meeting was held with the Nuclear Decommissioning Authority, Sellafield Ltd and the Low Level Waste Repository Ltd in August 2015, to discuss the radioactive waste chapter of the draft MWLP.

[1] Environment Agency, Scottish Environment Protection Agency, Natural Resources Wales, Office for Nuclear Regulation

Matter 3 – Radioactive Waste Strategy

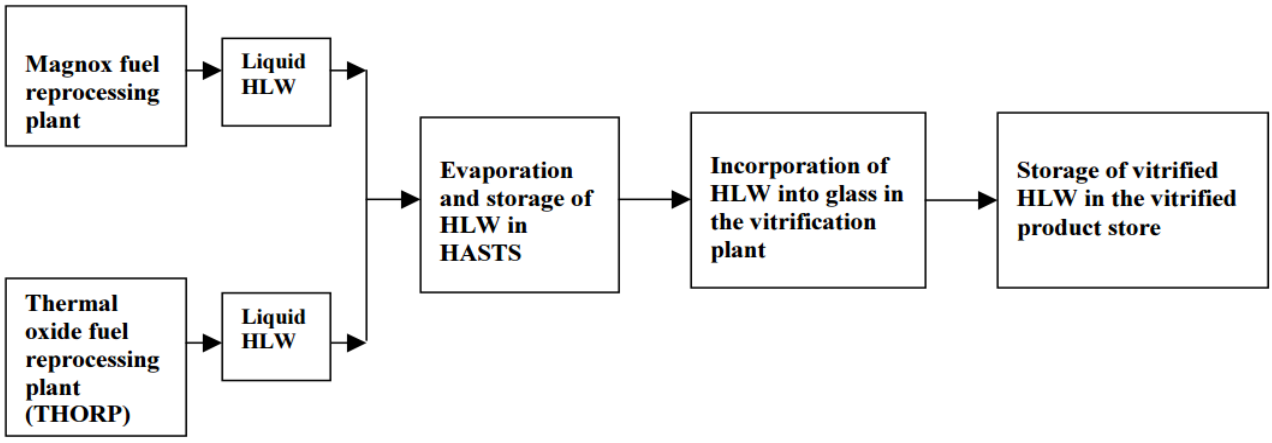
Issue: Whether the Plan provides sufficient opportunities for the management, treatment, safe storage and disposal of radioactive waste from all sources including nuclear fuel reprocessing, and decommissioning/ demolition of nuclear licensed facilities.

High Level Waste

2. The Plan states that High Level Waste (HLW) only consists of waste that is generated from reprocessing spent nuclear fuel at Sellafield. The 2013 UK Radioactive Waste Inventory (RWI) indicates that future arisings will come from Magnox and oxide fuel reprocessing, which are scheduled to end in 2017 and around 2018 respectively. Does this mean that, if all goes to plan, there will be no new HLW generated from reprocessed spent fuel at Sellafield after these dates and, therefore, in the UK?

As Magnox reprocessing is now scheduled to end in 2020, HLW will continue to be generated until this date. Oxide fuel reprocessing is still scheduled to be completed in 2018. HLW will continue to be processed after these dates, but there will be no new arisings from reprocessing.

It is anticipated that, due to HLW arisings from Post Operational Clean Out (POCO) of the reprocessing and storage facilities, the generation of HLW will be completed by around 2030.



3. Is it likely that Sellafield will continue to accept and process new overseas spent fuel, thereby generating new HLW? Is this likely to continue throughout the Plan period and/or beyond? What quantities of overseas HLW are envisaged will be generated over the Plan period? For how long is it anticipated this HLW will be stored at Sellafield before being returned overseas?

There are no plans to accept and process any further overseas fuel. HLW from reprocessing overseas spent fuel will continue to be repatriated to the country of origin; the programme is expected to be completed by around 2021/22.

The first high level waste return was safely completed in January 2010
source: Sellafield Ltd website
http://www.sellafieldsites.com/solution/risk-hazard-reduction/hal-workstream/the-plan/

4. For how long is the HLW stored as Highly Active Liquor (HAL)?

HAL will be stored in the Highly Active Storage Tanks (HASTs), which are underground steel tanks, until they are due to be emptied to a Post Operational Clean Out (POCO) heel[2] by circa 2029/30.

Historic internal view of a Highly Active Storage Tank at Sellafield
source: Sellafield Ltd website
http://www.sellafieldsites.com/solution/risk-hazard-reduction/hal-workstream/enablers/

In order to assure the safety of nuclear installations in the UK, the Office for Nuclear Regulation (ONR) grants a licence to use a site for specified activities; it is a legal document, issued for the full life cycle of the facility. For the Sellafield complex, Site Licence Condition 32 imposes a legal duty on Sellafield Ltd to minimise, so far as is reasonably practicable, its total quantity of HAL stocks.

[2] Heels are the remnant solid layers, from pipes or vessels, that are not removed during routine operations; generally they require removal by suction or water jetting ('Plant Dismantling and Decommissioning Challenges', Innovus, February 2016)

In the 1990's there were 21 HASTs in operation. Records show that there has been a continuous and significant downward trend in the stocks of HAL since the implementation of Nuclear Installations Inspectorate (precursor to ONR) specifications in January 2001; by 2011, stocks of HAL were less than half those that were stored in 2001[3].

5. What is the current requirement for HAL storage and how is it likely to change over the Plan period in terms of facilities and land-take?

As set out in the response to Q4, HAL will be stored in the HASTs until they are due to be emptied to a POCO heel. POCO and tank emptying is a sequential process with no more than two tanks in POCO at any one time, and two tanks held to feed the Waste Vitrification Plant (WVP). HAST POCO is due to start circa 2020, following the cessation of reprocessing. HASTs and the VWP will support liquor management from the reprocessing plants whilst undergoing Highly Active Liquor Evaporation and Storage (HALES) plant POCO. HAST POCO is due to complete circa 2029/30 but this potentially could extend to 2035 or further. There are no plans for a replacement.

Shipping of new Evaporator (D) modules for HALES plant
source: Sellafield Ltd website
http://www.sellafieldsites.com/solution/risk-hazard-reduction/hal-workstream/the-plan/

In the HAL stocks Specification, ONR enforce a safety limit based on the mass of uranium (te(U)) in the unprocessed fuel from which the HAL was derived. ONR also require long-term steady-state limits, in order to prevent unacceptable delays to vitrification, and therefore site and national hazard reduction. These values enable Sellafield Ltd to accelerate its reprocessing and vitrification programmes, supported by legally enforceable limits set to regulate HAL stocks to levels as low as reasonably practicable. The settings of these lower limits will change year by year in line with Sellafield Ltd's reprocessing plans and vitrification performance.[4]

[3] 'The Storage of Liquid High Level Waste at Sellafield: Revised Regulatory Strategy', Office for Nuclear Regulation, 2011
[4] ibid.

6. What is the current requirement for storage of vitrified glass blocks and how is it likely to change over the Plan period in terms of facilities and land-take?

The current requirement is to store high level vitrified waste from operations and POCO in an engineered storage facility until its planned export to the GDF starting circa 2089. This HLW is stored in Vitrified Product Store 1 (VPS1) with a replacement store also included in the lifetime plan. The replacement for VPS1 will be built in a different location within Sellafield to the existing store (otherwise the waste would have to be moved twice), but is it likely to be of a similar size as the existing store.

The vitrification process takes place at Sellafield in the Waste Vitrification Plant, which has been in operation since 1991. The liquid HLW is dried to a powder, mixed with silica sand and other glass-forming chemicals, then heated to a temperature of around 1,150°C (2,100°F). The molten mixture is poured into stainless steel containers and allowed to solidify into dense solid glass blocks - this solid waste volume is about a third of its original liquid volume. The canisters are then placed into the air-cooled Vitrified Product Store, until a suitable disposal route becomes available. Current practice is for the facility to store the vitrified HLW for at least 50 years before disposal; this allows much of the radioactivity to decay away and the waste to cool. The waste is then easier to transport and dispose of. When a disposal facility becomes available, each individual canister will be placed inside two further containers before disposal.

Vitrified high level waste store Sellafield
source: Sellafield Ltd website
http://www.sellafieldsites.com/solution/risk-hazard-reduction/hal-workstream/

7. The RWI forecasts that vitrification will cease in around 2021, albeit further vitrified HLW will arise from post operational clean out until about 2027. Does this mean that the generation of all HLW will have ceased before 2027?

As set out in the response to Q2, it is anticipated that the generation of HLW will be completed by around 2030.

8. On the understanding that there is no disposal route for this waste type at the current time, will the quantity of vitrified packages existing at that time be the maximum that will require long-term storage?

Yes.

9. What are the forecast future arisings of new HLW?

Further to the responses to Q2 and Q3, there will be no new HLW generated.

10. What is the forecast quantity of total HLW requiring long term storage?

A total of around 7,500 HLW containers are expected to be stored on the Sellafield site. This figure assumes that all HLW from overseas fuel has been exported.

11. Is it envisaged that all of this long-term storage will occur at Sellafield, pending the location and preparation of an acceptable Geological Disposal Facility (GDF)?

Yes.

12. What is the current capacity for storage at Sellafield?

Storage capacity in the Vitrified Product Store for HLW is 7,960 containers.

13. Will there be any HLW waste generated from any other processes or operations such as decommissioning?

No.

Intermediate Level Waste

14. What are the main waste streams constituting Intermediate Level Waste (ILW)?

Waste streams constituting ILW fall into 4 key categories[5]:

- Operational wastes, including those from AGR fuel dismantling, Magnox and THORP reprocessing, flocs from treatment of effluents, and Miscellaneous Beta Gamma Waste (MBGW) from general site operations
- Legacy wastes, including sludges, fuel cladding and miscellaneous solid wastes, fuels and fuel bearing wastes
- Decommissioning wastes, including contaminated metals and other materials, mixed wastes (principally miscellaneous activated and contaminated materials), and graphite from the Calder Hall and Windscale piles reactors
- Plutonium Contaminated Material (PCM) from current operations and decommissioning - includes wastes transferred from legacy stores at the LLW Repository

[5] more detail can be found in 'An Overview of NDA Higher Activity Waste', Nuclear Decommissioning Authority, November 2015

Windscale Pile 1 and Advanced Gas-cooled Reactor

15. The Plan/RWI indicates that as of 1 April 2013 the reported volume of UK ILW was 95,600m³ of which about 69,600m³ (73%) was stored at Sellafield. How much of the UK's total ILW is generated at Sellafield as opposed to being stored there? How much is imported from elsewhere both within Cumbria, such as the Low Level Waste Repository (LLWR), and from outside?

Almost all of the ILW stored at Sellafield is generated internally. The main exception is ILW (PCM) from Harwell, of which approximately 500m^3 has already been delivered to Sellafield, with a further 300m^3 planned over the next 3 or 4 years. Sellafield will also receive approximately 2,300 concrete-lined drums from Harwell and around 250 drums of Dragon[6] fuel from the former research reactor at Winfrith, over the next few years. There may also be a small quantity of waste generated (a few hundred m^3) during the decommissioning of storage vaults at LLWR. In addition, the Atomic Weapons Establishment (AWE) is engaging with NDA regarding the processing at Sellafield of approximately 1,000m^3 of PCM generated at Aldermaston.

16. The RWI refers to conditioned ILW comprising various types of waste immobilised in cement or polymers in containers, and that about 88% (47,569 packages) of the UK total of such packages are in long-term storage at Sellafield. The Plan indicates that the 47,569 packages make up a 73% share of the total. Is there a discrepancy?

Yes there is a discrepancy. The UKRWI states that the UK total volume of <u>conditioned and unconditioned</u> waste was 96,500m^3, of which 69,600m^3 (73%) was at Sellafield. The UK total number of <u>conditioned</u> ILW packages was 54,129, of which 47,569 (88%) were at Sellafield.

17. The RWI states that the quantity of conditioned ILW in stores is increasing. How much of the ILW at Sellafield is conditioned?

At April 2015, over 35% of Sellafield ILW had been conditioned.

18. How is any unconditioned ILW managed at Sellafield and what type of waste is this?

Generally:

[6] an experimental high temperature, gas-cooled reactor at Winfrith in Dorset

- unconditioned ILW (including PCM) from operations, is stored in approved containers in engineered stores;
- unconditioned Miscellaneous Beta Gamma Waste from operations and external consignors, is stored in approved containers in the MBGW Store;
- unconditioned ILW is also stored in the legacy ponds and silos buildings, pending their retrievals and treatment

19. The RWI/Plan forecasts future ILW waste arisings in the UK as being 190,000m³. Over what time period is this likely to be generated? Why is this forecast expressed as a finite figure?

In the case of Sellafield, the time period for the site's contribution to the 190,000m^3 is from 2013 through to 2120. The total figure is based on each waste producer's best estimate of their total lifetime arisings of ILW. The 2013 UKRWI also gives a lower estimate of 126,000 m^3 and an upper estimate of 332,000m^3.

20. The Plan indicates that about 59% of future arisings are forecast to come from Sellafield and about 0.3% from the LLWR. Over what time period is this ILW likely to be generated? How much is likely to be generated over Plan period?

As mentioned in Q19, future arisings of ILW from Sellafield will be generated up to 2120. As mentioned in Q21 below, approximately 17,000m^3 will be generated within the Plan period (to 2030).

21. What quantity of ILW is likely to be managed overall at Sellafield during the Plan period? How much of this is likely to be generated from Sellafield and the LLWR and how much is likely to come from outside Cumbria?

During the Plan period, it is expected that Sellafield will generate around 17,000m^3 of ILW, which includes the wastes from Harwell and Winfrith mentioned in the response to Q15.

22. How much, if any, ILW is likely to be exported out of the County?

It is not planned to export any ILW consignments out of the county. Application of waste management techniques (segregation, decontamination, etc.) may enable a proportion of the forecast inventory to be re-categorised and managed as LLW, which may then be treated outside the county.

23. What is the current capacity for storage of ILW at Sellafield?

Capacity of Sellafield engineered stores is as follows:
- Encapsulated Product Stores (EPS/WPEPS) - 81,113 drums (500 litres)
- Miscellaneous Beta Gamma Waste Store (MBGWS) - 1,836 boxes
- AGR[7] Dismantler Store - 11,166 drums (500 litres)
- Windscale AGR Store - 213 WAGR (6m^3) boxes
- Engineered Drum Stores (EDS1/2/3) - ~99,000 x 200 litre drum equivalent.

[7] (Windscale) Advanced Gas-cooled Reactor

ILW grouted into steel drums
source: Sellafield Ltd website
http://www.sellafieldsites.com/solution/waste-management/ilw-treatment-and-storage/

24. As there is currently no disposal route for ILW what additional long-term storage facilities are likely to be required for the ILW managed at Sellafield?

Future Stores planned at Sellafield, identified in the Lifetime Plan, include:

- BEPPS1/2/3/4 (same design basis as EPS2/3)
- Class 2 Store (for low order ILW)
- EDS4/5 (for PCM)
- Interim Storage Facility (ISF)
- Large Item Buffer Store

Low Level Waste

25. What are the main types of Low Level Waste (LLW)?

The 2013 UKRWI[8], identifies that the majority of forecast arisings of LLW is from decommissioning of reactors and other sites and site remediation; the remainder (approximately 15%) is operational waste. Typically, LLW consists of building rubble, soil, metal items and soft organic waste.

Figure 1 illustrates the composition of unconditioned LLW reported in the 2013 UKRWI.

[8] 2013 UK Radioactive Waste Inventory: Waste Composition (URN 14D040 NDA/ST/STY(14)0011), February 2014

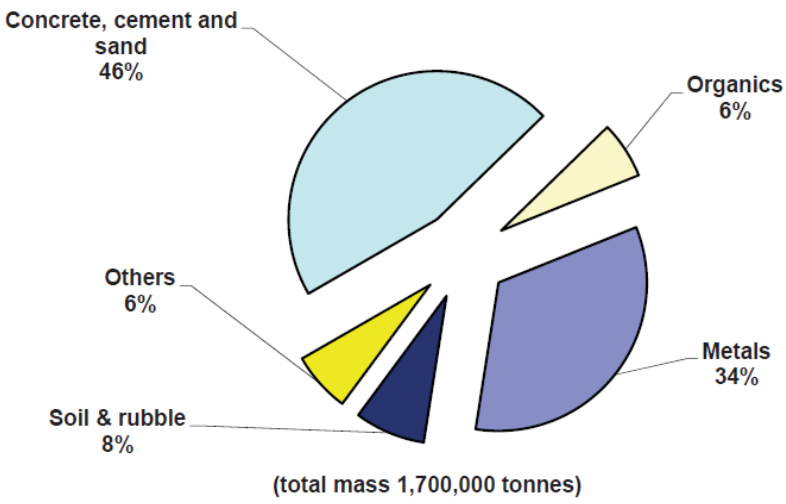


FIGURE 1: Composition of unconditioned Low Level Waste

26. What options are there for the management/disposal of LLW?

There are a range of options for the management/disposal of LLW, including:

- **Disposal at the Low Level Waste Repository** - waste is received at the Low Level Waste Repository (LLWR) site, usually in half-height ISO-freight containers, by rail or road. Containers of LLW are grouted using low viscosity cement-based grout, to produce a solid monolithic block before being disposed of in the engineered vault.
- **Supercompaction** - compactable LLW may be crushed by high force compaction (supercompacted) to reduce its volume, before being placed into containers for disposal at the LLWR. High force compaction reduces the overall volume by up to 70%. Waste for supercompaction can be sent to one of two treatment facilities in the UK (Sellafield in Cumbria and Inutec in Dorset) in loose (bagged) or drummed form.
- **Disposal of lower activity LLW to suitably licensed commercial landfill sites -** high volume lower activity waste, which does not require the degree of engineered protection provided by the LLWR, can be disposed of to landfill sites, which hold an environmental permit and planning permission allowing the disposal of lower activity LLW.
- **Incineration -** incineration of combustible waste reduces the volume of waste requiring disposal at the LLWR (by up to 100%). A wide variety of materials are suitable for incineration, including paper and cardboard, packaging materials, plastics, wood, oil and protective clothing. In the UK, there are four commercial incinerators that are permitted to accept radioactive waste (Grundon at Colnbrook, Berkshire ;Tradebe at Fawley, Hampshire; Veolia, Ellesmere Port, Cheshire; SRCL Ltd, Ashford, Kent).
- **Metal Treatment -** metal treatment can be used to allow contaminated or activated metal to be recycled into the clean metals market or used in the manufacture of products for the nuclear industry (such as shield blocks); or for volume reduction prior to disposal. A range of techniques can be used, including surface decontamination (shot-blasting), smelting and size reduction. Secondary waste arising from the process, such as shot blast media or slag

from smelting, would then be managed via the most appropriate route (including disposal to the LLWR).

27. Is all non-recyclable LLW able to be disposed of or does some need to be stored?

There is a relatively small volume of LLW in the inventory that will not be suitable for management or disposal by the existing available waste routes. This waste will be managed as Intermediate Level Waste (ILW) and stored, pending disposal to a future GDF.

28. The Plan/RWI indicates that as of 1 April 2013 the UK's total LLW was about 66,700m³ and that about 5% (3,450m³) was stored at Sellafield. How much was generated at Sellafield? Where was this managed/disposed of?

The 2013 UKRWI identifies that most of the LLW stored at Sellafield was steel pond skips and other furniture, along with multi-element bottles and spent fuel flasks. The management strategy is decontamination, to allow the metal to be released into the clean metals market, and plans are being developed to dispose of these wastes as they become available over the next few years.

In addition, there may have been small volumes of LLW in storage prior to supercompaction and disposal to the LLWR. The steel skips, pond furniture, etc., would have been generated at Sellafield; whereas a small volume of the waste awaiting supercompaction may have come from sites outside Cumbria.

29. The RWI indicates that about 32,800m³ of LLW was stored at the LLWR. Was any LLW generated at the LLWR? Where did the rest of this waste originate from?

The 2013 UKRWI reflects that, at that time, the LLWR only had planning permission and an environmental permit to dispose of LLW in Vault 8; thus the waste received at the site and placed in Vault 9 was classed as stored waste. Some waste was also stored in Vault 8 (higher stacked containers). In November 2015, LLWR received a revised permit from the Environment Agency, to allow disposal in Vault 9 and future vaults; and in July 2016, planning permission was granted for disposal in Vault 9, for higher stacking in Vault 8, and for future vaults (to Vault 11).

A small volume of this waste will have been generated at the LLWR site; however, the majority of the waste will have been generated by nuclear sites across the UK, including Sellafield, the Magnox sites, MOD sites and smaller waste producers.

30. The RWI/Plan gives a figure of 1,300,000m³ for the future generation of UK LLW, of which 291,000m³ (about 22%) is estimated to come from Sellafield. Over what time period is this likely to be generated? Why is this forecast expressed as a finite figure? How much is likely to be generated over the Plan period?

The 2013 UKRWI forecasts this volume of LLW to be generated over the period 2013 – 2120. Over the Plan period (2015 – 2030), around 80,000m^3 is forecast to be generated at Sellafield.

The UKRWI forecast volume is a current best estimate, and this has been used in the Minerals and Waste Local Plan. The waste composition report (see footnote 8, Q25) recognises that waste producers have provided appropriate factors where they have been able to quantify lower and upper uncertainties, and the report provides overall lower and upper waste volume estimates for each waste type.

31. Is any LLW likely to arise from the LLWR?

The 2013 UKRWI forecasts future arisings of LLW from the LLWR as 2,320m^3.

32. How much of the future forecast LLW is likely to be managed/disposed of at Sellafield?

It is not intended to dispose of any LLW at Sellafield during the lifetime of the Minerals & Waste Local Plan.

The current Sellafield site end state, assumes the licensed area of the site to be reduced, with some Lower Activity Waste and Special Nuclear Materials remaining. This approach will generate a significant amount of waste that requires management and disposal at significant cost. Work is currently underway (with a large number of external stakeholders engaged) to determine the appropriate end state for the site. In the longer term, this may result in some contaminated materials remaining in-situ and/or alternative LLW management capabilities being developed on or adjacent to the site.

33. What is the current capacity to manage/dispose of LLW at Sellafield?

Sellafield currently has the capacity to manage all LLW arisings. The approach is aligned to the three themes in the *UK Strategy for Management of Solid Low Level Waste from the Nuclear Industry* (ND150), with a focus on the application of the Waste Management Hierarchy; best use of assets; and use of fit for purpose waste management routes.

On site capabilities include handling, segregation and measurement capabilities; a metals recycling capability; and a supercompaction plant. Off-site capabilities include metals recycling (both within and outside the County), incineration (outside the County) and LLW disposal to the LLWR.

34. How much of the future forecast LLW is likely to be managed/disposed of at the LLWR?

LLW Repository Ltd submitted a paper - Need for Disposal Capacity at the LLWR (reference: RP/340737/PROJ/00033 version 2) - to Cumbria County Council in January 2015, which estimated in its reference case that 1,160,018m^3 of the forecast UK LLW is likely to require disposal at the LLWR site between 2013 and 2120.

35. What is the current capacity to manage/dispose of LLW at the LLWR?

See below for a table of vault volumes assumed in the LLWR planning permission and the 'Need for Disposal Capacity at the LLWR' paper (ref: RP/340737/PROJ/00033

version 2). The volumes quoted are 'air space' allowing for higher stacking, i.e. the volume to be taken up by containers (each 22.8 m^3). It should be noted that the volumes for Vaults 8 and 9 do not account for wastes already received. The table shows volumes for up to Vault 11, the number of vaults with planning permission. There is additional potential capacity at the site up to Vault 20, but any further disposal capacity would be subject to a future planning application.

2011 ESC[9] vault disposal capacities

Vault	Volume (m^3)[10]
Vault 8	308,000
Vault 9	247,000
Vault 9A	23,000
Vault 10	120,000
Vault 11	120,000

36. Overall, what are the figures likely to be for imports of LLW into the County and exports of LLW from the County over the Plan period?

Imports of LLW into the County over the Plan period, is estimated to be around 134,629m^3 based on analysis undertaken for the 'Need for Disposal Capacity at the LLWR' paper (ref: RP/340737/PROJ/00033 version 2).

Exports of LLW over the Plan period are estimated to be approximately 37,800 m^3. This figure is based on extrapolation of current volumes of wastes transferred from Sellafield to alternative routes such as incineration, metal decontamination/melting and VLLW disposal.

Very Low Level Waste

37. The RWI/Plan indicates that as of 1 April 2013 most Very Low Level Waste (VLLW) generated in the UK came from Sellafield and all was in temporary storage awaiting disposal to landfill. What is the current position and what, if anything has happened to this VLLW?

In the 2013 UKRWI, 1170m^3 of stored VLLW was reported by waste producers, of which 1080m^3 was at Sellafield. These volumes represent a small proportion of the VLLW arising annually at nuclear sites, which are generally sent for disposal to permitted landfill, if suitable, at the earliest opportunity after they are generated. For example, in 2015/16 6092m^3 VLLW from waste producers across the UK was disposed to suitably permitted landfill sites and, additionally, 3736m^3 was disposed by Sellafield to its on-site disposal facility, Calder Landfill Extension Segregated Area (CLESA).

The 1080m^3 reported by Sellafield was predominantly derived from the removal of lagging from the secondary circuits of the Calder Hall reactors. It was temporarily

[9] Environmental Safety Case, Low Level Waste Repository Ltd, May 2011
[10] air space volumes to the nearest 1000 m^3

stored in Full Height ISO containers, awaiting the development of arrangements to consign the material to an appropriately permitted specified landfill; 865m^3 of this material has now been disposed. In general, at Sellafield (and other nuclear sites) LLW and VLLW is managed for onward treatment or disposal as it arises.

38. What is the current capacity to deal with such waste in the County?

There is one permitted commercial landfill site in the county that is able to accept VLLW – the FCC Environment site at Lillyhall. The planning permission allows disposal at the site until 2029, with limits to the volume of radioactive waste that can be disposed there of 582,000m^3 in total and 26,000m^3 annually; the site is permitted to accept VLLW of up to 4 Becquerels/gram. To date, no VLLW has been disposed of to the site.

The CLESA facility at Sellafield, which can only accept the site's own VLLW, has a total capacity of 120,000 m^3 and a remaining capacity of 63,000 m^3. It is estimated that the CLESA will be full by 2025.

39. The RWI/Plan forecasts future UK arisings of VLLW as being about 2,840,000m³, about 97% (2,760,000m³) of which is likely to come from Sellafield. Taking account of the uncertainties over how much (about 70%) may not actually fall under radioactive waste regulatory control due to its low levels of radioactivity, what additional capacity is likely to be required?

It is not envisaged that any additional capacity will be required over the lifetime of the Local Plan, other than the development of a specified landfill capability (CLESA-2) adjacent to the Sellafield site.

40. How much VLLW is likely to be exported out of the County over the Plan period?

Based on the 2013 UKRWI, Sellafield Ltd plan to generate some 96,344m^3 of VLLW over the Plan period; with over two thirds of this volume (60,866m^3) planned to be routed to its on-site landfill facility, CLESA. The remaining 35,478m^3 is expected to be consigned as VLLW for disposal at an authorised landfill, which is likely to be outside of the County.

LLWR has no forecasted VLLW arisings over the Plan period in the 2013 inventory.

41. How much VLLW is likely to be imported into the County over the Plan period?

It is difficult to forecast the volume of VLLW that might be imported into the County during the Plan period, since VLLW would only be imported into the County if it was to be disposed of to the Lillyhall facility and, as noted in response to Q38, none has been disposed of to this site to date. The reason for this is the activity limit in the Environmental Permit, which is 4 Becquerels/gram (there are two landfill sites elsewhere in England – Clifton Marsh in Lancashire and Kings Cliffe in Northamptonshire, which are able to accept up to 200 Bq/g). FCC Environment had been considering submitting a variation to their Permit, to be able to accept waste of

up to 200 Bq/g, but has not done so yet. It is unknown whether they will submit a variation in the future.

The Sellafield CLESA facility is not able to accept VLLW from other sites; it can only take wastes from within Sellafield.

All Radioactive Wastes

42. Paragraph 4.19 of the MWLP refers to various techniques. For radioactive waste generated or managed in Cumbria, at what facilities do these techniques take place? Do they have sufficient capacity to accommodate forecasted waste arisings over the Plan period?

The waste techniques referred to in paragraph 4.19, are compaction or incineration (for solid wastes); evaporation or filtration (for liquid wastes); grouting or vitrification (for higher activity wastes).

Waste **compaction** takes place at two facilities within Sellafield, the WAste Monitoring And Compaction plant (WAMAC) and the Waste Treatment Centre (WTC). WAMAC compacts LLW arising on the Sellafield site and also LLW from all other nuclear waste producers across the UK. The compacted wastes are packaged into ISO-freight containers and consigned to LLWR by rail. At LLWR they are grouted and disposed in the LLWR vaults. WTC receives alpha contaminated ILW (PCM) from Sellafield and also some specific wastes from Harwell (see response to Q15). This waste is compacted and the resulting 'pucks' placed into a 500 litre stainless steel drum, which is grouted and placed into an Engineered Drum Store (see responses to Q23 and Q24) pending disposal at a future GDF. Both facilities have sufficient capacity to accommodate forecasted waste arisings over the Plan period.

Some LLW is consigned for **incineration**. This takes place at specifically permitted facilities outside of the county. Four facilities exist, at Ellesmere Port, Southampton, east Kent and Slough. There are no anticipated capacity issues expected over the Plan period.

Evaporation is a specific part of the HLW treatment process carried out at Sellafield. It is carried out at the Highly Active Liquor Evaporation and Storage plant (HALES). The plant takes highly active liquid wastes (HAL) from fuel reprocessing and concentrates it prior to vitrification. A new Evaporator (D) has been constructed and this will ensure that sufficient capacity is available to complete the HLW processing (see responses to Q2, Q4 and Q6).

Filtration is carried out at a number of plants and facilities across Sellafield, to remove suspended solids from effluent streams before treatment and discharge. A key plant is the Site Ion Exchange Plant, SIXEP, which undertakes both filtration of solids and removal of soluble radioactive caesium and strontium from pond waste purges. No anticipated capacity issues are expected over the Plan period.

Grouting takes places at a number of facilities at Sellafield, where ILW from a range of processes is grouted into stainless steel containers and placed into storage, pending

future disposal at a GDF. Facilities include the Magnox Encapsulation Plant (MEP), Waste Encapsulation Plant (WEP) and Waste Packaging & Encapsulation Plant (WPEP). These plants grout solid wastes from the fuel reprocessing plants. Additional grouting and encapsulation plants are scheduled to be constructed to treat wastes from decommissioning processes. There are no anticipated capacity issues expected over the Plan period.

Vitrification is the process where HLW is vitrified to produce a glass product for storage prior to disposal to a GDF. This process takes place in the Waste Vitrification Plant at Sellafield. There are no anticipated capacity issues expected over the Plan period.

The table below gives an overview of how and where wastes are treated.

	Sellafield	**LLWR**	**out of county**
compaction solid waste	√ ILW √ LLW	-	-
incineration solid/liquid waste	-	-	√ LLW
grouting solid waste	√ ILW	√ LLW	-
evaporation liquid waste	√ HLW	-	-
filtration solid/liquid waste	√ ILW √ LLW	-	-
vitrification liquid waste	√ HLW	-	-

43. How does the MWLP apply the waste hierarchy to the various categories of radioactive waste?

Paragraphs 4.19 to 4.28 of the MWLP, Planning for Radioactive Waste Management, make reference to a range of supporting policy and strategy documents, particularly the *NDA Strategy III* (ND151) and the *UK Strategy for Management of Solid Low Level Waste from the Nuclear Industry* (ND150). These documents promote the application of the waste hierarchy to all categories of radioactive waste where it is appropriate to do so. There are also regulatory requirements on all waste producers to apply Best Available Technique (BAT) and As Low As Reasonably Achievable (ALARA) principles in their waste management operations.

As set out in paragraph 4.21 of the *Cumbria Minerals and Waste Local Plan 2015-2030 Submission Version* (SD01), many of the principles applicable to non-radioactive waste, such as the waste hierarchy, can also be applied to radioactive wastes. Policy SP4 requires proposals for radioactive waste facilities to demonstrate how the development complies with, amongst other principles, the waste hierarchy.

Regarding the lower activity wastes, paragraph 4.29 of the Plan explains that, since 2010 when the first solid UK LLW waste management strategy was published, there has been increased use of waste treatment techniques, either to divert such waste from disposal or to decrease the volume of waste requiring disposal. The Plan supports this direction, taking into account the diversion of radioactive waste from

disposal, whilst accepting that there is still a need for some radioactive waste to be disposed of to land. Paragraphs 4.37 to 4.41 of the Plan provide more detail on this, with Policy SP5 requiring proposals to be in line with the principles of sustainable waste management.

Higher activity wastes require storage in secure containers and Policy SP6 sets out how the Council will deal with such proposals. The Policy ensures a flexible approach to higher level wastes so that they can be managed in the most appropriate way. It is difficult to apply the waste hierarchy to these wastes, other than ensuring they are minimised in the first place; there are limited options for management/storage until a GDF is developed.

44. Does the MWLP reflect the Nuclear Decommissioning Authority's Nuclear Waste Strategy of April 2016? Briefly explain how the main elements of the Strategy have been taken into account.

Yes, paragraph 4.23 of the Plan clearly states that the NDA Strategy should be taken into account in the preparation of Local Plans and also summarises the key principles that should inform strategic decisions about radioactive waste management. These are also reflected to some extent in the respective Policies SP4, SP5 and SP6 (also see response to Q46).

The County Council has worked with the NDA during the development of the Plan, consulting them at every stage. The NDA suggested amendments during the Regulation 19 consultation on the Plan, including comments to ensure that the Plan is in line with the *NDA Strategy III* (ND151). Where considered appropriate, the Council has proposed modifications to the Plan to take these into account – see *Outcomes Report on Regulation 19 Minerals and Waste Local Plan Consultation* (SD45).

There are five strategic themes within the NDA Strategy, which are further divided into individual topic strategies. Overall, the Strategy is looking ahead to the end state of each of the NDA's 17 nuclear licensed sites; the aim is to make each one suitable for its next planned use. On that journey, which may take many decades, the NDA must make choices about how to cost effectively reduce risks and hazards, decide the appropriate pace and priority of decommissioning, consider options on the consolidation of nuclear materials, spent fuel and waste, and decide on investment that will enable the reduction of risks to people and the environment.

The themes of the Strategy are relevant to the Local Plan in the following ways:

Theme: Site Decommissioning. The priority at Sellafield is to reduce high hazard risks, which is supported by the County Council. The Strategy supports site-specific assessments to identify redundant facilities and manage land quality, as well as seeking opportunities, such as the beneficial reuse of waste on site. This could include using decommissioning rubble for landscaping and void filling; this is currently being undertaken on Sellafield and is supported.

Theme: Spent Fuel Management. Both Magnox and oxide fuels are reprocessed at Sellafield. The Strategy commits the THermal Oxide Reprocessing Plant (THORP) and

the Magnox reprocessing plant to complete their programmes in the next 5 years. This is supported by the County Council.

Theme: Nuclear Materials. The Strategy facilitates the consideration of options for dealing with the inventory of uranics and plutonium currently stored on Sellafield. It aims to consolidate nuclear materials in order to ensure their safe, secure and cost-effective management. This is supported by the County Council.

Theme: Integrated Waste Management (IWM). This is the most important theme with regard to the Local Plan, as strategic decisions about managing all forms of waste arising from operating and decommissioning at Sellafield, including waste retrieved from legacy facilities, is informed by a number of key principles; these principles reflect the aims, objectives and principles of the Local Plan:

- support key risk and hazard reduction initiatives by enabling and delivering a flexible approach to long-term waste management;
- apply the Waste Hierarchy;
- promote timely characterisation and segregation of waste;
- support and promote the use of robust decision-making processes to identify the most advantageous options for waste management;
- enable the availability of sustainable, robust infrastructure for continued operations, hazard reduction and decommissioning.

Theme: Critical Enablers. These enable delivery of the NDA's mission. The relevant enablers for the Local Plan are the NDA's continuing commitment to a Research & Development programme, provision of a skilled workforce, supply chain development, supporting the economic development of communities affected by the NDA's activities, public and stakeholder engagement.

45. Briefly explain how the main elements of other strategies referred to in paragraph 4.24 of the MWLP have been taken into account. (If any of these strategies are not within the Exam library, please have them uploaded).

For HLW/ILW, the key strategic documents referenced are the White Papers on Managing Radioactive Waste Safely and Implementing Geological Disposal. The development of geological disposal capability is a Nationally Significant Infrastructure Project (NSIP) and falls outside of the MWLP process. However, there is a requirement for the provision of suitable storage capability whilst the GDF is being developed and a significant proportion of this inventory will be managed at the Sellafield site. Policy SP6 and the preceding paragraphs of the MWLP, support flexibility in the management of these wastes during the GDF development process. For LLW management, the Government policies and strategies for non-nuclear LLW and NORM are very closely aligned to the UK Nuclear LLW strategy, and the key principles from these strategies align with the NDA Strategy, i.e. application of waste hierarchy, best use of existing facilities, etc. As discussed above, there is alignment between the MWLP and the NDA Strategy.

All the strategies referred to in paragraph 4.24 of the MWLP are within the Examination library - see document references below:

- *Managing Radioactive Waste Safely: a framework for implementing geological disposal* (LD44)
- *Implementing Geological Disposal* (ND139)
- *Higher Activity Waste Treatment Framework* (ND180)
- *Policy for the long term management of solid low level radioactive waste in the UK* (LD42)
- *Strategy for the management of solid low level radioactive waste from the non-nuclear industry in the United Kingdom, Part 1 anthropogenic radionuclides* (ND63)
- *Strategy for the management of Naturally Occurring Radioactive Material (NORM) waste in the United Kingdom* (ND142)
- *UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry* (ND150)

46. In Policy SP4, as amended in the submission version, what is meant by "the national strategy for managing radioactive wastes"?

National strategies for managing radioactive wastes are encompassed within the *UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry* (ND150) and the Government White Paper *Implementing Geological Disposal* (ND139). The *NDA Strategy III* (ND151) is approved by Government and applies to all of the sites covered by the 2004 Energy Act obligations. Paragraphs 4.22 and 4.23 of the Local Plan refer to an earlier planning enquiry for the Kings Cliffe facility in Northamptonshire, which concluded that the NDA Strategy should be taken into account in the preparation of Local Plans when considering the full range of radioactive wastes.

A number of the Strategies are periodically reviewed, so by not being too specific on the title, the Policy is more flexible to change.

47. What is the current position with the planning application at the LLWR referred to at paragraph 4.31 of the MWLP? Please give more details of what it is for.

On 15 July 2016, planning application 4/15/9012 was granted permission for the phased construction of Vaults 9a, 10 and 11 and for the disposal of low level radioactive wastes within these new Vaults and within the existing Vault 9 with higher stacking; for the retention of temporarily higher stacked containers in Vault 8 with additional higher stacking; and phased construction of a permanent engineered capping layer over Trenches 1 to 7 and Vaults 8 to 11, with other ancillary works.

The permission provides additional disposal capacity for LLW. It will increase the existing capacity of Vault 8 (which was almost full – around 6,800m^3 remaining 9 May 2016) to 308,000m^3 and provide additional disposal capacity within Vaults 9 to 11 of around 510,000m^3. The waste disposal operations would cease no later than 31 December 2045, and the site would be fully restored within 5 years of the permanent cessation of the disposal of waste or by no later than 31 December 2051.

48. What are the alternatives to disposal at Lillyhall landfill should the operator decide not to continue with the facility. With reference to paragraph 4.34 of the MWLP, is there any reason to suspect that the operator might not want to continue?

Within the UK, there are currently three commercially operated landfills capable of accepting very low level wastes: Lillyhall in Cumbria; Clifton Marsh in Lancashire; and Kings Cliffe in Northamptonshire. As with all privately operated commercial facilities, there is a risk that facilities could close or withdraw from particular market sectors if they are no longer financially viable.

There are potential changes in European legislation, which may impact on disposal facilities, particularly with regard to the provision of civil nuclear liability insurance. Currently, this is provided by NDA through LLWR Ltd; however, proposed changes introduced by the Basic Safety Standards Directive, will mean that the sites will be required to maintain their own insurance arrangements until such time as Government can issue legislation to remove these facilities from the requirements to hold nuclear liability insurance. Changes to legislation are expected to be introduced towards the end of 2017 and the sites may have to have insurance for a period of several years. The cost of providing insurance would be recovered through enhanced disposal fees; however, sites are currently in the process of investigating the implications of this and the likely costs and timescales before making a final decision once the regulations are introduced. There is an expectation that at least one or more of the sites would continue to operate following the legislation changes. Sellafield also operate their own on-site disposal site for these types of wastes.

49. In broad terms, what are the critical path activities that are likely to occur when carrying out decommissioning at Sellafield and what are the likely timescales involved? How is it envisaged the various waste types will be managed/disposed of?

The responses to Q2 to Q24, provide a broad summary of the activities and schedule for Sellafield. Over the next five years there will be significant changes at the site as fuel reprocessing operations cease and the site moves into decommissioning. The key focus will be on the Legacy Ponds and Silos and creating the infrastructure and capability to enable the retrieval and export of wastes from these aging facilities. A high level summary of the Sellafield site activities can be found in the *NDA Strategy III* (ND151), Section 9.0 - Site Licence Companies and Designated Sites and Installations.

50. Should the finding and hosting of a GDF site within the Plan period trigger a review of any part of the Plan?

The process to find and host a GDF site is a designated Nationally Significant Infrastructure Project (NSIP); the process of finding a suitable site will commence in 2017. This process will take several years to complete and the planning assumption for a GDF being available to receive wastes is 2040. The early phases of the GDF development involve community volunteerism, followed by detailed investigative work to assess the geological suitability for site development. It is unlikely that this type of

work would trigger a review of the Plan, by virtue of the timescales involved; this is reflected in paragraph 4.50 of the Local Plan.

51. What is the current position on the Government's consideration of sites for interim storage of ILW from decommissioned nuclear powered submarines (as referred to in paragraph 4.54 of the MWLP)?

The MoD held a consultation on the Submarine Dismantling Project in early 2015, which included a shortlist of five sites with the potential to interim store 27 defuelled reactor pressure vessels, regarded as ILW, until they could be processed and sent to a Geological Disposal Facility; Sellafield was one of the sites shortlisted. In July 2016, the MoD announced that Capenhurst Nuclear Services, at Capenhurst in Cheshire, had been selected as the MoD's preferred storage site, with AWE Aldermaston in Berkshire chosen as the fall back site.

Like all the sites shortlisted, operators Capenhurst Nuclear Services already manage radioactive materials, and were found to best meet the project's requirements, including offering value for money. There are two options at Capenhurst; the preferred option is to use an existing facility, with a second on-site contingency option of constructing a new store.

52. Explain how the MWLP is sufficiently flexible to accommodate the uncertainties surrounding generation of radioactive waste and its management, storage and disposal.

The MWLP recognises that Cumbria hosts a significant number of nuclear facilities and that West Cumbria has the largest concentration of nuclear waste management facilities in the UK. It also recognises that there needs to be flexibility for the management of radioactive wastes, as the Sellafield site completes its operational phase and moves into decommissioning; this is set out in paragraph 4.52 of the Local Plan and in the response to Q45.

The MWLP allows applications for the treatment, management, storage or disposal of different levels of radioactive waste to be made on a case-by-case basis, ensuring that decisions are in line with the policies in the Plan and other relevant policies. The Plan identifies sites for radioactive wastes, which have been identified in liaison with the nuclear industry and assessed by the Council, and are therefore considered to be the most likely places where such development would come forward.

Matter 7 – Site Allocations Policies

Issue: Whether sufficient land is allocated or designated in appropriate locations to meet objectively assessed need and to provide choice and flexibility.

53. Are the sites allocated in Policy SAP3 the most appropriate for providing additional radioactive waste capacity?

Yes. Three sites are considered to be suitable locations for additional capacity, subject to planning permission. The process through which these sites were selected has been thorough and rigorous at each stage of consultation. The Council has worked with industry to identify the most appropriate locations for the radioactive waste stream.

CO32 - land adjacent to Sellafield. This particular allocation was identified in 2009, primarily in response to Sellafield Ltd putting forward this NDA-owned land for a waste park in 2007, which would attract commercial enterprises to develop new and innovative waste treatment technologies. Although this proposal was subsequently dropped, more recent discussions with Sellafield Ltd have led to identification of the land for potential storage of construction and demolition waste arising from Sellafield's decommissioning, which cannot be accommodated on the space-constrained site. This is in addition to the potential for the NDA-owned land to be able to host the successor to the Calder Landfill Extension Segregated Area (CLESA), termed CLESA-2, once that on-site landfill is full, around 2025. A feasibility study was carried out by Sellafield Ltd in 2013, to investigate this potential. The allocation of site CO32 and the range of uses for which it could be considered, is in accord with Sellafield Ltd's and the NDA's decommissioning strategy for Sellafield.

CO35 - the Low Level Waste Repository (LLWR), near Drigg. This is an operating, nationally important facility for the storage and/or disposal of LLW and has the potential to be considered for additional capacity. In July 2016, planning permission was granted for additional disposal capacity for LLW. It will increase the existing capacity of Vault 8 (which was almost full – around 6,800m^3 remaining 9 May 2016) to 308,000m^3 and provide additional disposal capacity within Vaults 9 to 11 of around 510,000m^3. The waste disposal operations would cease no later than 31 December 2045.

CO36 - land within Sellafield complex. This is already a licensed nuclear waste management site, so it is considered appropriate to take it forward as an allocated site for the location for future radioactive waste management activities, for all categories of waste. Although the site is constrained in terms of available space, opportunities have arisen in recent years for the re-use of redundant buildings and for the temporary storage of inert CD&E wastes in screening/landscaping mounds around the perimeter of the site. The Development of Sellafield Decommissioning Strategy is being prepared, which will set out a critical path of what activities have to occur when and where, in order to carry out an effective and efficient decommissioning programme.

54. What capacity is it envisaged they will provide and for what type of radioactive waste management options?
55. What categories of radioactive waste are envisaged will be managed at these sites?

Questions 54 and 55 are answered together.

CO32 - land adjacent to Sellafield. Policy SAP3 of the Local Plan identifies this site allocation for potential consideration of additional capacity for radioactive waste disposal or storage, should a proposal come forward within the Plan period. There is potential for this site to be considered for the development of a CLESA-2, for disposal of Sellafield's own VLLW. It also has the potential for long-term, temporary storage of non-radioactive wastes, linked to an approved Sellafield site decommissioning strategy; this could encompass construction, demolition and excavation wastes (CD&E). It is not possible to estimate volumes at this stage.

CO35 - the Low Level Waste Repository (LLWR), near Drigg. Currently, the Local Plan states that Policy SAP3 safeguards the LLWR for the treatment, management and storage of LLW within the Plan period – now that the Repository has gained planning permission for disposal of LLW, this will also be safeguarded. Current permitted capacity for disposal is 818,000m^3, which will be within Vaults 8 to 11; permission end date is 2045. The 'Need for Disposal Capacity at the LLWR' paper (ref: RP/340737/PROJ/00033 version 2) anticipates that further Vaults (12 to 20) could accept around 1,001,000m^3 of LLW, up to an end date of 2127 – these further Vaults would require planning permission.

The site also has the potential to be considered for additional capacity for the storage and/or disposal of the appropriate levels of LLW activity (LLW/VLLW), especially within the cap for the Trenches and Vaults; there could be opportunity for further LLW storage and/or disposal at the appropriate levels of activity outside the highly engineered containment facilities, but this has not been investigated to date. CD&E wastes, from within the LLWR or from nearby Sellafield, could also be used in the future for storage, capping or landscaping – again, this has not been investigated to date. It is not possible to estimate any of these volumes at this stage.

CO36 - land within Sellafield complex. Policy SAP3 safeguards the Sellafield complex for continuation of its current activities, for all levels of radioactive and non-radioactive waste.

There are current permissions for long-term, temporary storage of CD&E waste in screening/landscaping mounds – these have spare capacity for c7,000m^3, up to 2027. Further such storage and/or disposal, could continue until site closure around 2021. It is not possible to estimate volumes at this stage.

The CLESA has permission until 2027 for disposal of the site's own VLLW; there is spare capacity of c63,000m^3, but it is likely to be full by 2025. There is the potential for CLESA-2 to be developed on Sellafield, if it proves impractical within adjacent land (allocation CO32), but it is not possible to estimate volumes at this stage.

The current volumes of LLW that are treated (e.g. compaction) and managed (consignment to appropriate treatment, storage or disposal routes) are unknown, but it is expected that these waste management operations will continue until site closure around 2021. The site may also be suitable for LLW disposal at some future date. It is not possible to estimate any of these volumes at this stage.

Similarly, the current waste management operations for ILW are expected to continue until the stored wastes can begin to be emplaced in a GDF, around 2089. Processing of spent fuel to produce HLW, is anticipated until around 2030; after that time, the containers will remain in storage until they can be emplaced in a GDF, from c2089.

In order to give a quick overview of capacity, waste management types and activity levels, I have tried to present the details provided by the nuclear waste industry, coupled with data from planning permissions, in the table below. Some data is factual, some is estimation.

	HLW	**ILW**	**LLW**	**VLLW**	**CD&E**
CO32					
future capacity	-	-	-	unknown	unknown
waste management	-	-	-	- storage - disposal CLESA-2?	- storage - landscaping
CO35					
current capacity	-	-	818,000m^3 to 2045	-	-
waste management	-	-	- disposal V8 to 11	-	-
future capacity	-	-	1,001,000m^3 to 2127	unknown	unknown
waste management	-	-	- disposal V12 to 20	- storage - disposal	- storage - capping - landscaping
CO36					
current capacity	unknown to c2030	c17,000m^3 to 2030	unknown to 2030	63,000m^3 to 2027 (full c2025)	c7,000m^3 to 2027
waste management	- evaporation - vitrification - storage	- compaction - grouting - filtration - storage	- compaction - metal recycling - segregation - storage	- disposal CLESA	- storage mounds
future capacity	7,500 containers to c2089	c190,000m^3 to 2089	unknown to 2021	unknown to 2021	unknown to 2021
waste management	- storage	- compaction - grouting - filtration - storage	- compaction - metal recycling - segregation - storage - disposal?	- disposal CLESA-2?	- storage - landscaping

56. Will the sites provide sufficient capacity for the right type of waste, at the right time and in the right place?

Yes. The sites have been identified in liaison with industry who will be delivering the facilities.

57. Do any of these sites have any significant planning constraints?

Site allocations CO35 and CO36 have a number of planning constraints, which are outlined in the *Site Assessments - Copeland* (SD20). However, given the nature of the existing activity on the sites, it is reasonable to expect that existing mitigation measures are of the highest technical specification and rigidly enforced. Any future planning applications would be expected to require similar mitigation measures, in order to be acceptable.

The boundary of CO32 was identified using the County Council's GIS system. Basing the allocation on the total land owned by the NDA to the east of Sellafield site, the GIS was used to identify constraints and cut back the boundary to avoid those constraints. The area identified is larger than that expected to be taken up by any waste management development, in order to provide options for location. It is also expected that access to any facilities for radioactive waste management within CO32, would be an extension of the road or rail access within Sellafield site itself. Access for any non-radioactive waste management within CO32, could come from within the site or from the A595(T) on the minor road towards Calder; the latter route may have significant planning constraints due to its size and current usage, but this would need further investigation at pre-application stage, if proposed.