

27th March 2017

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Dear ██████████

**RSR Environmental Permit (KP3690SX) CLESA Variation Application**

This letter supports a variation application for the RSR Environmental Permit. The application follows the Sellafield Ltd (SL) annual RSR permit review (reference 1), and covers several issues, driven by timescale requirements relating to changes to the Permitted 'specified waste type' and activity limits associated with the CLESA site landfill.

Detail explaining the change in specified waste type and increased activity limits and the negligible effect on environmental impact is provided specifically in the PCRSA (reference 2). A summary is provided in Appendix 1 to present the proposed Permit changes and explain why they are required, i.e. application of BAT in enabling SL to route higher activity wastes for disposal on site at CLESA instead of sending to off-site landfill. The application is being made now to seek a variation by 1<sup>st</sup> August 2017 which will facilitate the waste disposals programme (decommissioning, dismantling and disposal of the Pile 1 Chimney).

The other Permit changes requested are;

- Reclassification of AHF scheduled stack (A14) as an 'other outlet' (removal of limits).
- Removal of limits for A5 and A6, and registering ongoing minor discharges (from other facilities) as additional 'other outlets' in the CEAR

**Reclassification of AHF stack**

The scale of aerial discharges from this facility has now reduced to such a level that the stack should be reclassified as an 'other outlet', in line with agreed SL arrangements and rationalisation criteria. The justification, reference 3, has been shared as part of the annual RSR permit review. This will be registered as an 'other outlet' following agreement with EA.

**Removal of A5 and A6 stacks**

The major aerial discharges from Magnox reprocessing and Magnox Cell Vent stacks have been successfully diverted to the new operational Separation Area Ventilation (SAV) stack since April 2016. These 'scheduled stacks' in the Permit can now be removed. There are ongoing minor discharges from these stacks and these have been, or are being registered in the CEAR as permanent and temporary other outlets.

Regarding A5, the booster fan will be covered by temporary other outlet and stack demolition

is already covered by other outlet registration EAGLE ref 357 (First generation reprocessing facility stack demolition).

Regarding A6, current demolition is being covered by other outlet registration EAGLE ref 358 (Pile 1 diffuser demolition. Future PFR discharges are covered by other outlet registration EAGLE ref 399 (PFR via Pile 1 CV extract), reference 4.

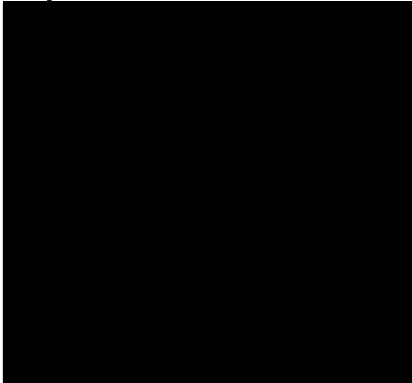
Future consideration is being given to revising other outlet registration EAGLE ref 358 and renaming to cover all diffuser and barrel decommissioning activities.

Please do not hesitate to contact me if you require any further information.

Yours sincerely



**Copied to**



### References

1. RSR Final Permit Review Report 2016, EM/2016/34, October 2016.
2. PCSRA Issue 1, 6049337/MARP003, March 2017
3. AHF discharge assessment and proposal to downgrade the stack, RP/GEN-DECOM/SAFE/00010, May 2016.
4. Other outlet form 'PFR via Pile 1 CV extract', EAGLE ref 399.

## Appendix 1: CLESA Permit Variation Application – activity limit change

Calder Landfill Extension Segregated Area (CLESA) is located in the south western corner of the Sellafield site, in the north-western part of the Calder Floodplain Landfill, some 1.5km to the north-west of Seascale, Cumbria. CLESA is an Environmental Permitting Regulations (EPR) authorised Low Activity - Low Level Waste (LA-LLW) containment landfill for the disposal of non-hazardous radioactive waste generated at Sellafield. The specified waste types which are currently permitted to be disposed by burial at CLESA are radioactive solid wastes not exceeding 37 Bq/g (with the activity concentration of alpha emitting radionuclides not exceeding more than half of the total activity concentration limit). The annual volume limit of disposals is 36,000m<sup>3</sup>. The 'basal' section (Phase 1) of CLESA received regulatory approval for disposals in November 2007, and the remaining voidspace (Phase 2) received regulatory approval in February 2011. CLESA has an authorised capacity of 120,000m<sup>3</sup> of which circa 65,000m<sup>3</sup> is still available and an estimated remaining site life of ten to fifteen years, dependant on rate of infill.

A post-closure radiological safety assessment (PCRSA) was undertaken for CLESA in 2006, before any wastes were disposed to the site. Further work was undertaken in 2009 to respond to regulatory review comments from the Environment Agency (EA) on the 2006 assessment. This original PCRSA assessed the potential post-closure impacts for a generic waste-stream fingerprint that was considered to be representative of the wastes that might be disposed at CLESA. The assessment results showed that the potential impacts were consistent with regulatory criteria. The use of an activity limit of 37 Bq/g was underpinned, though optimisation of activity limits was not within the scope of the assessment.

An update of the CLESA Environmental Safety Case in 2015 recommended that the PCRSA should be reviewed to ensure that the best utilisation is made of CLESA's radiological capacity. This was to undertake a review based on actual CLESA operational information and modified assessment techniques, such as actual disposal inventories, monitoring results, review of assumptions and use of the ERICA assessment tool. The CLESA disposal activity limits were also reviewed as an increasing amount of low activity solid waste (up to 200 Bq/g) from Sellafield was being consigned off-site to disposal sites elsewhere in England. It was questioned as to whether this represents BAT or whether use of the site CLESA landfill was a viable preferred option, consistent with application of the proximity principle for waste management. The use of CLESA would minimise the overall total disposal volumes as overpacking/stabilisation of the wastes to meet public road transport regulations would not be required; and the environmental impact associated with transport to off-site disposal sites, would be avoided. Whilst disposal of additional wastes at CLESA under revised activity limits will impact on CLESA lifetime, this is negligible against the benefits e.g. the disposal of all the Pile 1 Chimney wastes would shorten CLESA lifetime by less than a year.

The PCRSA was reviewed in 2016/17 and a revised report completed and issued to the

Environment Agency on 02 March 2017 in support of this Permit variation application. The report concluded that:

*"The updated PCRSA results show that the existing disposals to CLESA and current disposal limits remain consistent with regulatory criteria. An assessment of the radiological capacity has shown that there is scope to safely increase the disposal limits. Radiological capacity calculations show that if future disposals have an activity of 200 Bq/g and a fingerprint similar to the PCRSA fingerprint, only a fraction of the radiological capacity for alpha + beta would be used. Also for the PCRSA fingerprint, if there is no beta then the maximum limit for alpha would be significantly higher. Therefore, it is concluded there is sufficient radiological capacity to only require a single disposal limit of 200 Bq/g alpha + beta. A separate limit is not required for alpha."*

A number of options for new disposal limits were proposed, all of which involved moving to an average activity limit of 200 Bq/g for a consignment (a single vehicle load), for disposals to the main body of the site. Specific controls which may be agreed with the EA to allow better utilisation of CLESA, while keeping within the site radiological capacity, as shown in the PCRSA, are:

- A higher maximum activity limit should be considered to cover hotspots within a consignment or surface contaminated decommissioning wastes within a consignment (40,000 Bq/g beta and 1,700 Bq/g alpha). The PCRSA shows that calculated doses from blocks of waste with such localised specific activity does not exceed 20 µSv.
- The concentration of Radium-226 in the shallowest disposals that could be potentially excavated requires special consideration. The limiting case used and the depth of cap used on closure (and/or activity restrictions in the near-surface disposals) result in different options. The scenario considered most applicable to CLESA is PCRSA 'Option C'. This is based on a 1 metre thick cap and considers that Human Intrusion through the cap is not credible apart from boreholes. This allows an average 'sum of all radionuclides' activity limit of 200 Bq/g throughout the main body of the site with additional Radium-226 controls of 0.35 Bq/g applying to the top 3 metres of disposals in the horizontal top plane.
- For disposals of Tritium, the PCRSA shows that radionuclide specific disposals, orders of magnitude above 200 Bq/g will not significantly impact on doses received. The most limiting calculated activity is 1.0E+05 Bq/g and it is proposed that this nuclide specific limit should apply for CLESA disposals (subject to a final site tritium inventory not exceeding 1.4E+01 TBq, which is 1% of limiting activity of its most restrictive case).

<b>Radioactive Waste Type</b>	<b>Disposal Route</b>	<b>Activity Limit</b>	<b>Annual Volume Limit</b>
Radioactive solid waste in which the total activity concentration does not exceed 200 Becquerels per gram when averaged over a consignment (a single vehicle load).	Calder Floodplain Landfill Extension – Segregated Area	Sum of all radionuclides <sup>#</sup> : 200 Bq/g	36,000m <sup>3</sup>

# For disposals of Radium-226, the additional limit of 0.35Bq/g should apply to the top 3 metres of disposals in the horizontal top plane of the facility.

For disposals of Tritium, the nuclide specific limit of 1.0E+05 Bq/g should apply (subject to a final site inventory not exceeding 1.4E+01 TBq).

