

**Sellafield Site**

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30 June 2023

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Gillan Way  
Penrith 40 Business Park  
Penrith  
CA11 9BP

SL Ref: EM/2023/031

Dear [REDACTED]

**Environmental Permit for Radioactive Substances Activities KP3690SX, Variation Application 2023 Supporting Information**

This letter supports an application for a variation to the Environmental Permit for Radioactive Substances Activities (RSA) KP3690SX and provides details of the proposed changes as required by the application forms (reference Form RSR-C3, 2c.2). The application covers several issues and is driven by timescale requirements relating to registration of the new Magnox Swarf Storage Silo (MSSS) Retrievals Ventilation System (RVS) stub stack. Detail explaining the need for the permit change, consideration of the application of best available techniques (BAT) and further technical information including proposed plant notification levels (PNLs) is provided in the supporting note for the record (reference 1) and a summary is provided below.

The application is being made now to seek an RSA permit variation effective 1<sup>st</sup> October 2023 which will facilitate inactive commissioning of the RVS stack, currently projected to commence in Autumn 2023.

**Registration of the MSSS RVS Stack**

MSSS is an aging facility which continues to deteriorate with time and is one of the most hazardous facilities on the Sellafield site. The removal and storage of the highly radioactive waste inventory from the facility is essential in reducing both the radiological and environmental associated risks. As part of the preparations towards full sustained retrievals on the MSSS facility, a new RVS is being constructed to minimise and reduce facility gaseous discharges during operational activities which will include additional and improved gaseous abatement using High Efficiency Particulate Air (HEPA) filters. This new stack requires registration in the RSA Permit and appropriate Plant Notification Levels setting. The RVS is expected to be brought in to service in the 2024/25 financial year but is due to commence inactive commissioning in Autumn 2023.

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Initial discussions were held with Sellafield Subject Matter Experts (SME), MSSS Plant Management and the Environment Agency (EA) to discuss appropriate options and methods of setting the initial PNLs for the RVS Stub Stack and are stated below:

1. Use the existing MSSS 2nd Extension Stack PNLs and 'transfer' them to the RVS Stub Stack.
2. Utilise the estimated gaseous discharges as per the RVS Flow sheet.
3. Any alternative approach used industry wide following guidance from EA.

Option 2 was determined as the appropriate methodology for setting the initial PNLs for the MSSS RVS as it is accepted that in the absence of actual data, a setpoint is required that has the closest possible theoretical link to expected discharges and the flowsheet data forms this best available dataset.

The proposed PNLs are presented in the table below:

Stack	Radionuclide (MBq per year)			
	Alpha	Beta	Cs-137	Sr-90
PNLs for implementation to permit				
Initial PNL for RVS Stub Stack	3.22E-02	1.23E+00	6.25E-01	1.72E-01

The proposed PNLs still represent a near 99% reduction in the existing 2nd Extension PNLs for all radionuclide/ nuclide groups. SL reviews all PNLs on an annual basis and it is expected that the initial setpoints will reduce when data are available to underpin routine discharge levels.

The other requested changes to the permit are:

- Registration of Outfall X
- Removal of gaseous site discharge limits and plant notification levels for Krypton-85 (Kr85) and Antimony-125 (Sb125)
- Reduction in the Radium-226(Ra226) disposal limit and update to the Site Plan (Schedule 7)

### Registration of Outfall X

In January 2023 SL applied to discharge construction related aqueous waste arisings (non-sewage trade waste) to the river Calder via surface water drainage at Outfall X. This route needs to be permitted under the RSA permit because construction related aqueous waste generated on the Sellafield site has the potential to include very low levels of radioactivity. Discharge of aqueous waste via Outfall X is permitted through S3.2C W4 as an approved outlet under issue 25 of the CEAR (reference SEL/O/23/023).

The RSA permit will be varied to permit discharge via Outfall X under S3.2C as a new outlet reference W5 and Outfall X will be removed from the CEAR as an approved outlet. It is SL's intention, considering that any radioactivity present will be below typical limits of detection (LOD), that Outfall X will be managed through existing management system arrangements (ensuring the application of BAT) and will not be subject to any monitoring or discharge reporting against Site limits. SL proposes that Outfall X be added to pre-existing pre-operational measure S1.3B.5 alongside Factory Sewer and Calder Interceptor Sewer which states that "the Operator shall submit proposals for any new engineered routing of aqueous radioactive waste via the Calder Interceptor Sewer or Factory Sewer, including a report which demonstrates how best available techniques (BAT) will be used to minimise the activity of discharges of aqueous radioactive waste to the environment and to minimise its radiological effects on the environment and members of the public. These proposals will require approval in writing from the Environment Agency prior to such disposals being made."

### Removal of Gaseous Kr-85 & Sb-125 Annual Site Limits

In 2018 SL applied for a major variation to the RSA permit including proposals to remove the gaseous Site discharge limits for Kr85 and Sb125. SL presented the case that gaseous discharges of these species would reduce significantly following the end of reprocessing. EA accepted the justification subject to SL demonstrating the reduction in discharges prior to removal of the limits by continuing to collect discharge, modelled and environmental data over a suitable period. SL notified the EA of the end of Magnox bulk reprocessing (July 2022) and submitted a BAT justification (reference 2) in May 2023 demonstrating the subsequent decline in discharges. EA accepted this justification and the gaseous Site limits, plant notification levels and associated reporting requirements for Kr85 and Sb125 were removed effective 31<sup>st</sup> March 2023 through issue 25 of the CEAR (SEL/O/23/023). The annual gaseous site limits for Kr85 and Sb125 and notification levels (Kr85 for Separation Area Ventilation Stack and Sb125 for Fuel Handling Plant Stack) should be removed from the permit.

### **Reduction to Ra226 limit and update to the Site Plan – Schedule 7**

SL are applying to extend the Calder Landfill Extension Segregated Area (CLESA) into an adjacent 'valley area'. This would increase CLESA's volumetric capacity by around 23% and could extend the facility lifetime by around 5 to 6 years (based on typical historical disposal rates). The types of wastes that would be disposed to the valley area are the same as those disposed to the existing disposal area. There would be no increases to the radionuclide activity limits or changes to the working methods. Further detail is provided within the PCRSA addendum (reference 3) which the EA has agreed is an appropriate approach to underpin an application to extend disposals into the valley area. The valley extension would require an update to the drawing of the Calder Tip/ Calder Landfill Extension Main Area (CLEMA)/ CLESA located in Schedule 7 – Site Plan of the RSA permit, noting that there are no required changes to the site boundary. SL propose that detail of the CLESA/ CLEMA provided through colour coding is removed from Schedule 7 of the permit and an updated Site plan with this detail removed has been provided as part of this application (Reference 4). The updated Site plan meets the EA Form Guidance EP-RSR: How to apply for an environmental permit – Part RSR-A. SL are proposing to include more detailed drawings of the Calder Tip/ CLEMA/ CLESA within internal management system document SLSP 2.11.100 Techniques for determining the activity of waste disposals made under the Environmental Permit for Radioactive Substances (KP3690SX).

The permit limits the activity of Ra-226 to 0.35 Bq/g in the top 3 metres of disposals in the top plane of the facility. Updated dose coefficients for Rn-222 gas indicate this should be reduced to 0.16 Bq/g. This limit is not expected to constrain disposals or introduce characterisation challenges, because Ra-226 in CLESA waste is typically naturally occurring and the associated exposures can be excluded from assessment.

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

Yours Sincerely



RSA Permit

Environmental Permitting and Process  
Copeland Offices  
Catherine Street  
Whitehaven  
CA28 7SJ



On behalf of Sellafield Ltd

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NRG North (EA)

Regulator Liaison Office (SL)

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### Enclosed References

1 ████████.MSC/2023/034 - Note for the Record defining the Magnox Swarf Storage Silo Retrievals Ventilation System registration proposal for Plant Notification Level inclusion within the Environmental Permit, EPR KP3690SX.

2. EM/2023/005 BAT Case to justify the removal of the Kr85 and Sb125 gaseous Site discharge limits and respective environmental monitoring requirements from the Radioactive Substances Activities Permit KP3690SX

3. CLESA Valley Development – PCRSA Addendum: 60672670-ACM-RP-EN-004\_C

4. RSAMap20230629a – Site Plan