

Permitting Decisions- Bespoke Permit

We have decided to grant the permit for Altilium Metals Ltd operated by Altilium Metals Ltd.

The permit number is EPR/AP3728SG/A001

The permit was granted on 09/09/2026.

The application is for a black mass recovery facility. This facility converts black mass from li-ion batteries into cathode active material (CAM) for use in li-ion battery manufacturing. It is regulated under Section 4.2 of EPR as a chemicals manufacturing facility, comprising acid leaching, precipitation, solvent extraction, blending of the refined materials and heating in a calcination furnace to produce the final CAM.

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

Purpose of this document

This decision document provides a record of the decision-making process. It:

- summarises the decision making process in the decision considerations section to show how the main relevant factors have been taken into account
- highlights key issues in the determination
- shows how we have considered the [consultation responses](#)

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

Read the permitting decisions in conjunction with the environmental permit.

Key issues of the decision

- Choice of scheduled activities – consideration of the “most apt” scheduled activity as a result of recovery of critical minerals from waste streams falling into several sections under *The Environmental Permitting (England and Wales) Regulations 2016* (“the Regulations” of “EPR”)
- Choice of Best Available Techniques (BAT) guidance documents
- Emissions to air from the use of waste containing hazardous substances
- Environment Assessment Levels (EALs) for cobalt dihydroxide, lithium carbonate, lithium hydroxide and kerosene where there are no published EALs and there is a need for the Operator to follow published guidance to derive site-specific EALs

Decision considerations

Confidential information

A claim for commercial or industrial confidentiality has been made.

We have accepted the claim for confidentiality.

We have excluded detailed descriptions of the processes, equipment layout plans and chemicals used within the process.

We consider that the inclusion of the relevant information on the public register would prejudice the applicant’s interests to an unreasonable degree.

The decision was taken in accordance with our guidance on confidentiality.

Identifying confidential information

We have not identified information provided as part of the application that we consider to be confidential.

The decision was taken in accordance with our guidance on confidentiality.

Consultation

The consultation requirements were identified in accordance with the *Environmental Permitting (England and Wales) Regulations (2016)* and our public participation statement.

The application was publicised on the GOV.UK website.

We consulted the following organisations:

- UKHSA
- HSE
- Local Authority – Planning (Plymouth County Council)
- Local Authority – Environmental Protection Department (Plymouth County Council)
- Fire and Rescue

The comments and our responses are summarised in the consultation responses section.

Operator

We are satisfied that the applicant (now the operator) is the person who will have control over the operation of the facility after the grant of the permit. The decision was taken in accordance with our guidance on legal operator for environmental permits.

The regulated facility

We considered the extent and nature of the facility at the site in accordance with:

- Regulatory Guidance Note (RGN)2 *Understanding the meaning of regulated facility*
- Appendix 2 of RGN2 *Defining the scope of the installation*
- Appendix 1 of RGN 2 *Interpretation of Schedule 1*

The extent of the facility is defined in the site plan and in the permit. The activities are defined in table S1.1 of the permit.

The production of the Cathode Active Material (CAM) from waste shredded batteries (“black mass”) using hydrometallurgical processes is not regulated as a single holistic activity under the Regulations. The need to recover critical materials for use in the manufacture of new materials is an emerging sector; in this case, the “raw” materials are wastes and the solvent-based recovery process is considered to be novel and currently confidential.

With no definitive activity description, we must consider the “most apt” description for the stages of processing and to do this, we consider the intent of the process in terms of the outputs at the end of all recovery stages and if any intermediate, saleable products result part way through the process. For this application, there are metal compounds produced that fall under activity descriptions in EPR Schedule 1, Part 2, Chapter 4 (Inorganic Chemicals):

- Section 4.2A(1) (a) (iii) – Producing inorganic chemicals such as bases
- Section 4.2A(1) (a) (iv) – Producing inorganic chemicals such as salts
- Section 4.2A(1) (a) (v) – Producing inorganic chemicals such as non-metals, metal oxides, metal carbonyls or other inorganic compounds

A similar approach is taken for deciding which is the most apt description where metals are the intended outcome of the process. The process requires removal of copper but the production of elemental copper is not the intended purpose of the process as a whole. Ideally, the production of pure copper would be considered as a Section 2.2 A(1)(a) activity, however, RGN2 (see below) indicates that where a product needs further processing, this is not considered to be production of a non-ferrous metal. There are no sections within Section 4.2 A(1)(a) that include the manufacture of a pure metal. With this process not described in the Regulations, this activity will be regulated as a Directly Associated Activity (DAA).

RGN2, Note 2.2.3: How to determine whether metals are produced: If the result of an activity is a non-ferrous metal that is usable in a metallurgical sense, then that activity is taken to have produced non-ferrous metal even where processing raw materials which would not of themselves be described as non-ferrous metal. If such an activity produces an intermediate product, e.g. a non-ferrous metal concentrate, which needs considerable further processing to produce non-ferrous metal that is usable in a metallurgical sense then that activity has not “produced a non-ferrous metal”. The production instead occurs at the point where the non-ferrous metal is produced from the intermediate product.

In summary, the recovery of CAM from black mass is deemed to fall under Section 4.2 of the EPR Regulations i.e. production of inorganic chemicals, as a result of any metals produced being in compound forms and not elemental metals.

The site

The operator has provided a plan which we consider to be satisfactory. These show the extent of the site of the facility including the emission points. The plan is included in the permit.

Site condition report

The operator has provided a description of the condition of the site, which we consider is not satisfactory. The decision was taken in accordance with our guidance on site condition reports and baseline reporting under the Industrial Emissions Directive.

We have advised the operator what measures they need to take to improve the site condition report but consider that this responsibility should be part of the Operator's ongoing management to continuously review and update the site condition report such that it is relevant for use as and when operations cease at the site and the permit is surrendered.

In addition, the permit contains at *condition 3.1.3* a requirement for periodic monitoring at least every 5 years for groundwater and 10 years for soil (unless such monitoring is based on a systematic appraisal of the risk of contamination).

Nature conservation, landscape, heritage and protected species and habitat designations

We have checked the location of the application to assess if it is within the screening distances we consider relevant for impacts on nature conservation, landscape, heritage and protected species and habitat designations. The application is within our screening distances for these designations.

We have assessed the application and its potential to affect sites of nature conservation, landscape, heritage and protected species and habitat designations identified in the nature conservation screening report as part of the permitting process.

Operational controls/emission limits have been placed in the permit to protect the following Site of Special Scientific Interest (SSSI):

- Plymbridge and Estover SSSI

Emission limits and associated monitoring for hydrogen fluoride, sulphuric acid, sulphur dioxide, oxides of nitrogen and ammonia have been added. These will ensure that those pollutants do not breach the critical levels and critical loads for the adjacent SSSI.

We have consulted Natural England on our SSSI assessment and taken their comments into account in the permitting decision.

The decision was taken in accordance with our guidance.

Environmental risk

We have reviewed the operator's assessment of the environmental risk from the facility.

The operator's risk assessment is satisfactory.

The assessment shows that, applying the conservative criteria in our guidance on environmental risk assessment all emissions may be screened out as environmentally insignificant with the exception of:

- Nickel - long and short-term process contributions (PC) are not insignificant at the most impacted human health receptor, however the predicted environmental concentration (PEC) is below the environmental standard.

General operating techniques

We have reviewed the techniques used by the operator and compared these with the relevant guidance notes and we consider them to represent appropriate techniques for the facility.

The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.

Choice of Best Available Techniques reference document (BRef):

The applicant proposed that the following guidance documents are relevant for their activities:

- Environment Agency's Sector Guidance Note S5.06: *Recovery and disposal of hazardous and non-hazardous waste* (to cover waste acceptance and storage of black mass prior to introduction into the production process)
- Speciality Inorganic Chemicals BRef
- How to Comply with your Environmental Permit Additional Guidance for: The Inorganic Chemicals Sector (EPR 4.03)
- Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilizers BRef (to cover the proposed BAT-AEL for emissions of sulphuric acid to air)
- Common Waste Gas Management and Treatment Systems in the Chemical Sector BRef (to cover the proposed BAT-AELs for emissions to air (excluding sulphuric acid) and monitoring approach).

We agree that the *Speciality Inorganic Chemicals BRef* and *How to Comply with your Environmental Permit Additional Guidance for: The Inorganic Chemicals Sector* (EPR 4.03) are appropriate for the activities being undertaken onsite.

The Operator proposed using the BAT conclusions (BATc) from the *Common Waste Gas Management and Treatment Systems in the Chemical Sector* BRef to select associated emission levels (BAT-AELs) for their activities, however this is a European document and is no longer applicable within the UK. A draft UK-BAT document is available but has not been brought into regulation at the time of permit issue. We consider the European guidance and UK BAT conclusions are broadly similar and we have applied these BAT-AELs within the process. This approach was supported by the Operator who requested their use in the absence of other suitable BAT-AELs.

We do not agree that the *Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilizers* BRef is suitable for deriving the BAT-AEL for emissions to air of sulphuric acid; the acid is not being “produced”, only “used” in the production of CAM. However, the proposed BAT-AEL of 35 mg/m³ is acceptable because it screens out as ‘not significant’ in the air emissions risk assessment and is not likely to lead to any breaches of the EAL.

We have also considered the Environment Agency's Sector Guidance Note *S5.06: Recovery and Disposal of hazardous and non-hazardous waste* and whether the operator had considered the wider BAT expectations contained within the guidance:

- Prevention and minimisation of emissions.
- Selection and performance of abatement systems.
- Monitoring of key pollutants.
- Protection of sensitive ecological receptors.
- Demonstration that emissions do not result in unacceptable environmental impacts.

The *Non-Ferrous Metals (NFM) BREF* (2017) is also relevant to the assessment of this proposal, containing relevant BAT conclusions and supporting information for hydrometallurgical and pyrometallurgical processes. We consider these to be more representative of the proposed battery recycling and CAM production activities than the *Sector Guidance Note for the Surface Treatment of Metals and Plastics (S2.07)* or the *Large Volume Inorganic Chemicals BREF*.

The NFM BREF provides information on potential air emissions associated with hydrometallurgical operations, including particulate matter, metal compounds and acid gases, together with applicable emission prevention and abatement techniques. However, whilst this document is relevant for understanding the process and available control measures, it does not provide any additional information that materially alters the conclusions of the air quality assessment or the determination of appropriate emission limits for the installation.

Operating techniques for emissions that do not screen out as insignificant

Emissions of total Volatile Organic Compounds (VOCs), sulphuric acid, hydrogen fluoride, ammonia, nickel, manganese, lithium and cobalt cannot be screened out as insignificant. We have assessed whether the proposed techniques are Best Available Techniques (BAT):

- Total VOCs – these are abated using a liquid scrubber from emission point A1 and activated carbon from emission point A2. Activated carbon would not be suitable for emission point A1 due to the presence of acid gases and other pollutants that are not effectively treated by wet scrubbing.
- Sulphuric acid – this is abated using a liquid scrubber from emission point A1 and a carbon filter from emission point A2. The carbon filter on emission point A2 is primarily intended for VOC removal and is not abatement for acid gases.
- Hydrogen fluoride – this is abated via the liquid scrubber from emission point A1, an established abatement technique for acid gases.
- Ammonia – this is abated using the liquid scrubber from emission point A1 and activated carbon from emission point A2

- Nickel – this is abated using a liquid scrubber from emission point A1 and an inline fabric filter followed by a HEPA filter from emission point A3.
- Manganese – this is abated using an inline fabric filter and HEPA filter from emission point A3
- Lithium carbonate - this is abated using an inline fabric filter and HEPA filter from emission point A3
- Lithium hydroxide - this is abated using an inline fabric filter and HEPA filter from emission point A3
- Cobalt dihydroxide - this is abated using an inline fabric filter and HEPA filter from emission point A3
- Acid and nutrient nitrogen deposition – impacts are minimised through the control of acid gases and ammonia using abatement as described above.

The proposed techniques/emission levels for emissions that do not screen out as insignificant are in line with the techniques and benchmark levels contained in the technical guidance and we consider them to represent appropriate techniques for the facility. The permit conditions enable compliance with relevant BAT reference documents (BREFs) and BAT Conclusions, and Emission Limit Values (ELVs) deliver compliance with BAT-Associated Emission Levels (AELs).

Operating techniques for emissions that screen out as insignificant

Emissions of PM₁₀, PM_{2.5}, kerosene (as n-hexane), carbon monoxide, manganese, sulphur dioxide, oxides of nitrogen, lithium (as sodium hydroxide) and cobalt (as Cr(III)) have been screened out as insignificant, and so we agree that the applicant's proposed techniques are Best Available Techniques (BAT) for the installation.

The Operator provided further information during determination about potential VOCs from emission points A1 and A2. This highlighted that the solvent being used was 99% de-aromatized and therefore no toluene should be present. They further highlighted that tetrachloroethylene should not be present, as it is not found in the raw materials being used.

Testing, however, showed that these two VOCs may be present; the Operator believes this to be associated with the construction of the extraction pipework.

We have not included these two VOCs in the permit emission table S3.1 for air emissions; instead including an Improvement Condition (IC6) requiring demonstration that they are not present. If they are found to be present, and in not-insignificant concentrations, then they will be added to the emission points table. We consider that the emission limit for total VOCs included in the permit will offer sufficient protection relating to emissions of these substances, if found to be present but before they are added into the emission points table.

We consider that the emission limits included in the installation permit reflect the BAT for the sector.

Management of per- and polyfluoroalkyl substances (PFAS) and the use of an Improvement Programme in a new bespoke permit

The Government's PFAS Plan, published in February 2026, recognises that PFAS are persistent substances which may pose risks to human health and the environment and sets out a long-term approach to improve understanding of PFAS sources, pathways and exposures whilst reducing environmental releases. The Plan also confirms that action to manage PFAS risks should not be unnecessarily delayed where scientific uncertainty remains.

The Environment Agency considers that black mass may contain PFAS and that the proposed recovery process provides an opportunity to improve the evidence base for PFAS management within the waste treatment sector. The Improvement Programme included within this permit requires the operator to characterise PFAS, develop a PFAS mass balance, undertake an environmental risk assessment and implement a PFAS Management Plan. These measures will improve understanding of PFAS within the process and ensure that emissions and environmental risks are identified, assessed and managed using the best available information.

The Environment Agency considers that this approach is proportionate, consistent with the principles and direction set out in the Government's PFAS Plan and provides an appropriate mechanism to secure environmental protection whilst supporting the development of innovative resource recovery technologies

National Air Pollution Control Programme

We have considered the National Air Pollution Control Programme as required by the National Emissions Ceilings Regulations 2018. By setting emission limit values in line with technical guidance we are minimising emissions to air. This will aid the delivery of national air quality targets. We do not consider that we need to include any additional conditions in this permit.

Dust management

A dust emissions management plan was included in the application, however due to the facility type, waste types and storage arrangements it is deemed that a dust emissions management plan is not required.

Waste types

We have specified the permitted waste types, descriptions and quantities, which can be accepted at the regulated facility.

We are satisfied that the operator can accept these wastes for the following reasons:

- they are suitable for the proposed activities
- the proposed infrastructure is appropriate; and

- the environmental risk assessment is acceptable.

We have restricted the following wastes for the following reasons:

- 16 03 03* and 16 03 04 have been “limited to off specification ‘black mass’ from the manufacture of lithium ion batteries only”. This is because the site is only designed to recover black mass from li-ion batteries.
- 19 12 11* has been “limited to lithium ion battery derived ‘black mass’ only”. This is because the site is only designed to recover black mass from li-ion batteries.

Pre-operational conditions

Based on the information in the application, we consider that we need to include pre-operational conditions.

We have included PO1 in the permit requiring the operator to undertake a baseline ecological survey of the Plymouth Pear Tree within the Plymbridge and Estover SSSI, adjacent to the site.

The survey requirement is part of Natural England’s agreement to the permit and is specifically concerned with potential impacts of hydrogen fluoride and nitrogen deposition.

The survey will provide a baseline for future comparison. There is no requirement to repeat the survey. A review of impacts on the protected site may be triggered if evidence indicates damage at the site, during a permit review or variation, or if similar operations are proposed nearby. If any change is attributable to the operator, further action may be required.

Improvement programme

Based on the information in the application, we consider we need to include an improvement programme.

We have included an improvement programme to demonstrate that assumptions made with regards to predicted emissions are verified once operational data is available.

IC1 requires monitoring of point source emissions to air to ensure actual emissions are consistent with those detailed within the air quality assessment and identify if additional abatement or emission limits are required.

IC2, IC3a and IC3b are required to establish if PFAS are present within the black mass being processed and identify potential pathways for exposure. Targeted PFAS monitoring must be undertaken to identify the specific PFAS compounds, quantity concentrations and develop a substance specific characterisation.

IC4 is included to establish the presence or absence of substances thought to be part of the infrastructure pipework and not attributable to the use of black mass.

Finally, once data has been gathered the operator must undertake a refined risk assessment to determine the quantities of PFAS entering and leaving the process, whether PFAS are accumulating in waste streams, whether emissions pose an unacceptable risk and whether further controls are needed.

Table S1.3 Improvement programme requirements

Reference	Requirement	Date
IC1 Air emissions	The Operator shall submit a written report to the Environment Agency for technical assessment and written approval. The report must contain: • Results of monitoring on three separate occasions during normal operations from the emission points listed in table S3.1 and using the monitoring methods and reference periods detailed in that table. • An updated air emissions risk assessment, which must be in line with the online guidance 'Air emissions risk assessment for your environmental permit'. This is only required if the emitted concentrations are above the concentrations used in the air emissions risk assessment. • Detailed air dispersion modelling where the emissions do not screen out within the revised air emissions risk assessment. • A proposal of the method(s) and/or emission limits to be taken to reduce or abate emissions where detailed modelling shows likely breaches of EALs, critical loads or critical levels at the receptors, including timescales for completion. The Operator shall implement any agreed method(s) and/or emission limits identified within the report in accordance with the Environment Agency's written approval and within the approved timescales.	9 months from the date of issue of permit EPR/AP3728SG/A001
IC2 PFAS Characterisation, and Mass Balance	The Operator shall provide a per- and polyfluoroalkyl substances (PFAS) mass balance methodology to the Environment Agency for technical assessment and written approval. The methodology shall include: a) Identification of PFAS (speciated where possible) to be included in an assessment including justification for their inclusion; b) Identification of all relevant process inputs, intermediate process streams, outputs, products, residues, waste streams and emissions to be assessed; c) Methodology for quantifying and assessing PFAS entering, leaving, being recovered, emitted, transformed, destroyed or potentially accumulating within the process. The methodology should also include a sampling and monitoring programme, sampling locations, monitoring frequencies, analytical methods and limits of detection d) Timescales for implementing the methodology. The Operator shall implement the methodology to timescales agreed with the Environment Agency	3 months from the date of issue of permit EPR/AP3728SG/A001

IC3a PFAS Environmental Risk Assessment	The Operator shall provide a risk assessment to the Environment Agency for technical assessment and written approval, based on the findings of IC2. The risk assessment shall include: a) assessment of the environmental risks to air, land and water associated with PFAS throughout the permitted operations; b) identification of any uncertainties, limitations or data gaps relevant to the assessment; c) proposals for any further monitoring or investigation; d) proposals for control measures necessary to minimise environmental risk including timescales for their implementation The Operator shall implement the proposals to timescales agreed with the Environment Agency.	3 months from completion of IC2
IC3b PFAS Management Plan	The Operator shall provide a PFAS Management Plan to the Environment Agency for assessment and written approval. The Plan shall include proposals for the frequency at which the emissions inventory and mass balance shall be reviewed and other criteria where changes would trigger a review. These changes shall include but not be limited to: • feedstock composition • process operation • performance of abatement systems • monitoring results that indicate an adverse trend in emissions • regulatory requirements The PFAS Management Plan shall form part of the Environmental Management System and shall be used to demonstrate the ongoing identification, characterisation and control of PFAS emissions, transfers and accumulation within the installation.	1 month from completion of IC3a
IC4	The Operator shall submit a written report to the Environment Agency for assessment and approval. The report must contain: • Results of monitoring on three separate occasions during normal operations from emission points A1 and A2 for tetrachloroethylene and hexamethyltrisiloxane using CEN TS 13649 or US EPA Method 18 or CEN TS 17337 or other suitable method to be agreed with the Agency. • If these substances are present above the limits of detection, then the report must also contain an updated air emissions risk assessment, which must be in line with the online guidance 'Air emissions risk assessment for your environmental permit'. • Detailed air dispersion modelling where the emissions do not screen out within the revised air emissions risk assessment. • A proposal of the method(s) and/or emission limits to be taken to reduce or abate emissions where detailed modelling shows likely breaches of EALs, critical loads or critical levels at the receptors, including timescales for completion. The Operator shall implement any agreed method(s) and/or emission limits identified within the report in accordance with the Environment Agency's written approval and within the approved timescales.	6 months from the date of issue of permit EPR/AP3728SG/A001

Table S1.4 Pre-operational measures	
Reference	Pre-operational measures
PO1	Plymouth Pear Baseline Survey Prior to commencement of operations authorised by this permit the operator shall submit a baseline ecological survey of the Plymouth Pear Tree and its immediate habitat within the Plymbridge Lane and Estover Road SSSI. The report must contain a reference dataset against which future environmental monitoring results can be compared and must capture information on tree condition, tree health, habitat context and potential stressors. Photographic records sufficient to document the tree condition and surrounding habitat with location and viewing direction recorded should be included. The survey report shall be submitted to the Environment Agency for information before operations authorised by this permit commence.

Emission Limits

Best Available Techniques Associated Emission Levels (BAT-AELs)

BAT-AELs were taken from the *Common Waste Gas Management and Treatment Systems in the Chemical Sector* BAT conclusions (BATc), however some BAT-AELs are not applicable, as detailed below:

- SO_x – no BAT-AEL required as flow <500g/h for emission point A3. Operator has stated 5 mg/m³ in their assessment, which is within the BAT range, however we have included an emission limit values (ELV) as emissions of SO_x are 'not significant' and therefore are medium risk.

Under Best Available Techniques (BAT) conclusions, strict BAT Associated Emission Limits (BAT-AELs) enforce lower numerical limits for Volatile Organic Compounds (VOCs) and dust or particulates identified as CMR substances.

CMR stands for Carcinogenic, Mutagenic, or Reprotoxic and defines a group of high-consequence chemical substances strictly regulated under industrial and environmental frameworks.

The following pollutants were assessed and have the following CMR ratings:

- Nickel oxide – CMR 1
- Manganese - none
- Cobalt – CMR 1
- Lithium – none
- Kerosene – none

We consider the BAT-AEL relating to the sum of all CMR 1 and CMR 2 VOCs is not needed since a lower limit of 3mg/m³ was included for Total VOCs.

A limit for dust of 2.5mg/m³ was included for emission point A3 as emitted dust will contains two CMR substances (nickel and cobalt).

Assessment of Volatile Organic Compounds (VOCs)

The Operator only assessed emissions for total VOCs at 1mg/m³, however there are three separate speciated VOCs each with an emission at 1mg/m³, therefore the air emissions risk assessment was reviewed with a 3mg/m³ limit for benzene, which, in the absence of specific reference data for speciated VOCs, is used as a worst case “proxy” substance, as outlined in our published guidance.

Modelling showed the Process Environmental Contribution (PEC) was ‘not significant’ at 1.9% of long term EAL, with the short term Process Contribution (PC) screening out as ‘insignificant’. A limit for total VOC of 3mg/m³ was set.

Background pollutant concentrations

We disagreed with the background used by the Operator for nickel; this was taken from a rural source. Instead we used a background concentration from Port Talbot to better represent an industrial area. When using the revised background of 0.0025 µg/m³ the PEC screened out at stage 2 of the air emissions risk assessment.

Assessment of pollutants with no Environmental Assessment Level (EAL)

Some pollutants have no EAL and proxies were proposed by the Operator, as prescribed in our guidance, based on the relevant hazard codes relating to human health. These proxies were deemed suitable for the assessment and we accepted the following proxy proposals:

Pollutant without EAL	Pollutant Hazard Codes (relevant to human health)	Proxy with EAL	Proxy Hazard Codes	Justification for Proxy
Lithium	H314	Sodium hydroxide	H314	These two substances have comparable chemical reactivity
Cobalt	H317 H334 H341 H350 H360F	Chromium III	H350 and H317	Chromium and cobalt are both transition metals and have similar hazard properties including <i>H350: carcinogenic</i> and <i>H317: Aquatic chronic</i> . Chromium also causes skin sensitivity and is toxic to aquatic life like cobalt but has further hazardous properties with regards to its effects on water environments which exceed the potential effects of cobalt.
Kerosene	H304	n-Hexane	H315 H304 H336 H372 H361f	Similar VOC

Assessment of pollutants with no Environmental Assessment Level (EAL)

Some pollutants emitted from the installation do not have published Environment Assessment Levels (EALs). In accordance with Environment Agency guidance, the Operator initially proposed the use of proxy substances and subsequently provided additional health-based assessments and justification for site-specific assessment criteria where required.

The use of proxies and the derivation of assessment criteria for cobalt compounds, lithium compounds and kerosene were reviewed by the UK Health Security Agency (UKHSA). UKHSA initially requested further information regarding the assessment methodology and the consideration of background exposure and receptor sensitivity. Following submission of revised air quality modelling, EAL justification and Margin of Exposure (MoE) assessments, UKHSA concluded that emissions of cobalt dihydroxide, lithium hydroxide and lithium carbonate were unlikely to present a significant risk to health at assessed receptors.

For cobalt compounds, UKHSA advised that background exposure should be taken into account when undertaking the health assessment. The Operator therefore calculated margins of exposure using predicted environmental concentrations (PECs) that included both modelled process contributions and measured background concentrations. The process contribution at the nearest residential receptor was 0.0006 µg/m³ and the calculated margins of exposure exceeded the Committee on Carcinogenicity benchmark value of 10,000, indicating that exposure is unlikely to be of concern.

UKHSA concluded that n-hexane was not an appropriate proxy for kerosene. However, a separate fraction-based assessment indicated that emissions of kerosene were unlikely to pose a significant risk to health.

For lithium compounds, the Operator derived assessment criteria using REACH Derived No Effect Levels (DNELs) for lithium hydroxide and lithium carbonate. UKHSA noted uncertainties regarding the derivation of the DNELs but concluded that the predicted process contributions were several orders of magnitude below the assessment criteria and were therefore unlikely to result in significant impacts on human health.

Emission Limit Values (ELVs) based on Best Available Techniques (BAT) have been added for the following substances:

- Hydrogen fluoride from emission point A1
- Ammonia from emission points A1 and A2
- Nickel from emission points A1 and A3
- Dust from emission point A3
- Cobalt dihydroxide from emission point A3
- Lithium carbonate and lithium hydroxide as lithium from emission point A3

Emission Limit Values (ELVs) are included based on environmental need (as impacts are 'not significant' in the air emissions risk assessment) have been added for the following substances:

- Sulphuric acid from emission points A1 and A2
- Total VOCs from emission points A1 and A2

Monitoring

We have decided that monitoring should be carried out for the parameters listed in the permit, using the methods detailed and to the frequencies specified.

These monitoring requirements have been included in order to demonstrate compliance with the emission limits and where no emission limits are set, they are in line with the *Common Waste Gas Management and Treatment Systems in the Chemical Sector* BATc requirements.

We made these decisions in accordance with the *JRC Reference Report on Monitoring of Emissions to Air and Water from IED Installations* and the *Common Waste Gas Management and Treatment Systems in the Chemical Sector* BATc.

Based on the information in the application we are not fully satisfied that the operator's techniques, personnel and equipment have either MCERTS certification or MCERTS accreditation as appropriate however the external labs and sampling personnel will be accredited.

Reporting

We have specified reporting in the permit.

We made these decisions in accordance with our guidance.

Management System

We are not aware of any reason to consider that the operator will not have the management system to enable it to comply with the permit conditions.

The decision was taken in accordance with the guidance on operator competence and how to develop a management system for environmental permits.

Financial competence

There is no known reason to consider that the operator will not be financially able to comply with the permit conditions.

Growth duty

We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit.

Paragraph 1.3 of the guidance says:

“The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation.”

We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections.

We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards.

Consultation Responses

The following summarises the responses to consultation with other organisations, our notice on GOV.UK for the public and the way in which we have considered these in the determination process.

Responses from organisations listed in the consultation section:

Response received from UKHSA.

Brief summary of issues raised:

September 2025

Chromium III for cobalt. UKHSA did not consider Chromium III to be an appropriate proxy for cobalt. Chromium III is generally not carcinogenic or genotoxic, whereas cobalt and some cobalt compounds are considered probably carcinogenic and have strong evidence of genotoxicity. UKHSA states that although emissions are unlikely to be of concern, it is not possible to completely exclude health risks. They recommend considering background cobalt exposure in addition to the process contribution when assessing health impacts.

Sodium hydroxide as lithium UKHSA does not consider sodium hydroxide to be a suitable proxy for lithium. They were unable to identify suitable health-based guidance values (HBGVs) for lithium. A detailed toxicological evaluation is required before the health impact of lithium emissions can be assessed.

n-hexane for kerosene. UKHSA notes that n-hexane may not be a suitable proxy for kerosene. However, a fraction-based assessment suggests kerosene emissions are unlikely to present a significant health risk.

Recommendations to the Environment Agency:

UKHSA recommended that the EA consider:

- The facility is a novel metal processing operation, meaning there is uncertainty regarding actual emissions.
- Emissions monitoring data from the smaller Devon laboratory-scale operation could be reviewed to confirm all relevant pollutants have been identified.
- Confirmatory emissions monitoring should be undertaken once the facility is operational to verify that actual emissions match those assumed in the assessment.
- Additional consideration of background exposure for cobalt.
- A detailed toxicological assessment for lithium.

February 2026

Cobalt dioxide. UKHSA could not verify the applicant's proposed EAL because the referenced REACH links did not work and they could not locate data for cobalt dioxide. They therefore assessed risk using cobalt toxicity data and concluded emissions are unlikely to be of health concern, although some uncertainty remains. They noted a lack of background data and suggested the EA consider whether cobalt background concentrations should be included.

Lithium hydroxide and lithium carbonate: UKHSA identified REACH dossiers containing DNELs lower than those used by the applicant. Despite uncertainties in the DNEL derivation, the predicted concentrations were many orders of magnitude below these values, indicating no significant health risk is expected.

Nickel: UKHSA recommended assessment of short-term nickel exposure against the short-term EAL.

Commercial receptors: UKHSA recommended that nearby business and commercial premises be assessed because predicted concentrations are expected to be higher than at residential receptors.

Summary of actions taken:

The operator was required to revise their Air Quality Assessment; we completed our assessment of emissions to air. We referred to UKHSA requesting advice regarding cobalt and the margins of exposure calculated for nearby businesses.

June 2026

Cobalt dihydroxide: In the absence of substance-specific toxicological information, UKHSA considered assessment against cobalt to be appropriate. They concluded emissions are unlikely to be of health concern at nearby business and commercial receptors, assuming typical working-hour exposure

Lithium hydroxide and lithium carbonate: UKHSA noted uncertainties in the derivation of the REACH DNELs used in the assessment but concluded that the very low predicted process contributions indicate that significant health effects are unlikely.

Nickel: Short-term predicted environmental concentrations were below the relevant EAL. They considered short-term health risks unlikely but noted that the EA may wish to consider whether a long-term exposure assessment is required for workers at nearby businesses.

Sulphuric acid and hydrogen fluoride: UKHSA suggested the EA consider assessing these pollutants at nearby business and commercial premises, even though they screened out for residential receptors.

Recommendations to the Environment Agency:

- Obtain emissions monitoring data from the operator's existing small-scale black mass processing facility to confirm all relevant pollutants have been identified.
- Require confirmatory emissions monitoring once the process is operational to verify that actual emissions are consistent with those assumed in the assessment.
- Consider a long-term nickel assessment for business receptors.
- Consider assessing sulphuric acid and hydrogen fluoride impacts at business and commercial premises.
- Consider whether a standalone Fire Prevention Plan is required given the flammable nature of the materials handled.

Summary of action taken

We carried out modelling and sensitivity analysis to several of the assumptions and input parameters. These included annual air quality standards for the protection of human health at the business and commercial receptors and did not predict any exceedances. This included nickel, sulphuric acid, hydrogen fluoride and lithium.

We have included conditions within the permit requiring the operator to verify emissions.

Black mass is not considered a WEEE waste and does not enquire a standalone Fire Prevention Plan. However, the risk of fire posed from the storage of black mass must be considered within the Environmental Management System.