BESPOKE ENVIRONMENTAL SUPPORT

SCHEDULE 5 RESPONSE No. 2
BAT ASSESSMENT

EPR/BM4945IW/V009 Schedule 5 response

Client: Britannia Refined Metals Ltd

Document date: 4 April 2025

Contents

1. Introduction

This document has been prepared to support the variation of Britannia Refined Metals' (BRM) environmental permit EPR/BM4945IW at Botany Road, Northfleet.

This variation, reference V009, relates to a request to commence importing secondary raw materials for the purpose of melting into new refined lead products. Some of these products may be defined as controlled waste.

Although this activity is already undertaken for a limited number of approved controlled wastes, the Environment Agency considers that the application should be amended to include the production of new metal from secondary raw materials as a new permitted activity under section 2.2 A(1)(a) of Schedule 1 to the Environmental Permitting (England and Wales) Regulations 2016 (as amended) (EPR 2016).

As such, it has required an assessment of the process's compliance with the Best Available Techniques (BAT) for the Non-Ferrous Metals Industries[1] be undertaken as part of a Schedule 5 notice requiring further information, dated 13 December 2024.

2. Environment Agency requirement

Section 9 of the above Schedule 5 notice requires a full BAT assessment against relevant sections of the Non-Ferrous Metals BRef, BATC and How to Comply guidance. The assessment needs to include (but not limited to) use of the rotary furnace to process the waste types, the emissions capture systems and the emissions abatement systems.

This is required because you need to demonstrate that the methods you use (rotary furnace, followed by kettles) are suitable to process these waste types into the final products that are of a similar standard to those that would be produced when using virgin raw materials. You also need to demonstrate that the emissions capture and abatement systems will suitably capture and abate pollutants generated by the proposed waste types.

The following sections in the Non-Ferrous Metals BRef may provide useful information to aid your assessment:

- *Section 2.5.1.10 – incineration and pyrolysis (may be relevant to wastes with high contaminant content)*
- *Section 2.12.4.3 –containment of fugitive emissions from open furnaces*
- *Section 4.3.4.4 – this refers to the selection of furnace for aluminium, but the principles may also be applicable to lead*
- *Section 5.1.3.1 – details the recovery of lead from batteries, but may be applicable to other waste types.*
- *Section 5.1.3.5 – methods of production*

[1] Gianluca Cusano, Miguel Rodrigo Gonzalo, Frank Farrell, Rainer Remus, Serge Roudier, Luis Delgado Sancho; Title; Best Available Techniques (BAT) Reference Document for the main Non-Ferrous Metals Industries, EUR 28648, doi:10.2760/8224

- *Section 5.1.4 – refining kettles*
- *Section 5.3.2.1 – reducing emissions from material preparation and storage.*
- *Section 5.3.4.1 – reducing fugitive emissions*
- *Section 5.3.4.6 – emissions of PCCD/F*

And the following sections of the Non-Ferrous Metals BATc:

- *BAT 92 – sealed furnaces for batch operations*
- *BAT 98 – reduction of organic compounds in emissions to air*
- *BAT 104 – smelting wastewater treatment sludge*

Where a technique is not listed in the BRef or BATc (i.e. a novel process) and therefore an assessment of whether it is BAT cannot be easily made, then IED Annex III provides a pathway showing what information would be required so that a decision could be made.

3. Approach to the assessment

The Northfleet refinery undertakes an activity within the scope of the BAT Reference (BREF) document for the Non-Ferrous Metals Industries (NFM), published in 2017. Chapter 11 of the BREF lists 184 techniques, known as BAT Conclusions, that represent BAT within these industries. However, not all of these are relevant to this application.

The company's compliance with the following BAT conclusions, which are relevant to BRM's operations, have been evaluated:

- Chapter 11.1 General BAT conclusions (BATC 1-19)
- Chapter 11.4 BAT conclusions for lead and/or tin production (BATC 90-107)
- Chapter 11.6 BAT conclusions for previous metals production (BATC 134-149)

Additional BREFs were evaluated for their relevance to the proposed operation. The Waste Treatment BREF specifically excludes smelting of metal-bearing materials, referring users to the NFM BREF on page xxviii. The scope of the Waste Incineration BREF is restricted to relevant activities in chapter 5 of EPR 2016. Therefore, compliance with the BAT conclusions within these documents have not been assessed.

The Emissions from Storage BREF is now an old document and its relevant requirements are already captured within NFM BREF.

In this document, each relevant requirement is outlined and the current compliance status is documented. Any gaps identified during the assessment are highlighted, and a "RAG rating" given to the relevant BAT conclusion.

EPR 2.03, the Environment Agency's regulatory guidance for the NFM industries, also identifies indicative BAT points. These have been assessed where relevant. Relevant sections identified within the guidance are:

- 1.1 Accident management
- 1.2 Energy efficiency
- 1.3 Avoidance, recovery and disposal of wastes

- 2.3 Lead, zinc and cadmium operations
- 3.4 Noise and vibration

Other emissions and monitoring guidance was not deemed relevant to this application as the activity at the installation is not proposed to change insofar as it relates to emissions.

4. BAT assessment

The details of the BAT assessment are provided in Appendix A .

The proposed changes to the permit, adding a new *production of non-ferrous metal* activity, do not fundamentally change the best available techniques associated with the site and the existing lead refining activity currently operates in accordance with the relevant standards. The production activity is limited to the acceptance of third-party metal-bearing secondary raw materials, its storage and subsequent submission to a rotary furnace.

Molten metal of the required quality is then tapped and formed into ingots for subsequent refining within the main ISA refinery building in the manner described in section 5.1.4 of the BREF and already authorised as a section 2.2 A(1)(b) activity within the installation.

The melting of clean scrap lead directly into a melting kettle would not be within the scope of the 2.2 A(1)(a) activity is new metal is not being produced; this would continue to be considered an activity under the existing 2.2 A(1)(b) process.

Raw materials of the type requested are already processed at the installation, or were processed there in the past. However, these either arise on site and are not waste, or are wastes already authorised by previous iterations of the permit.

Table S2.2 below includes the wastes that BRM wishes to have the flexibility to import from third-parties, should material of suitable quality become available on the market. Most represent streams that are already being processed as non-waste material at the installation.

Table S2.2 Permitted waste types and quantities for melting of non-ferrous metals	
Maximum quantity	None specified
Waste code	Description
10	**WASTES FROM THERMAL PROCESSES**
10 04	**wastes from lead thermal metallurgy**
10 04 02*	dross and skimmings from primary and secondary production
10 04 04*	flue-gas dust
10 04 05*	other particulates and dust
10 05	**wastes from zinc thermal metallurgy**
10 05 01	slags from primary and secondary production
10 05 03*	flue-gas dust
10 05 04	other particulates and dust
12	**WASTES FROM SHAPING AND PHYSICAL AND MECHANICAL SURFACE TREATMENT OF METALS AND PLASTICS**
12 01	**wastes from shaping and physical and mechanical surface treatment of metals and plastics**

Table S2.2 Permitted waste types and quantities for melting of non-ferrous metals	
12 01 03	non-ferrous metal filings and turnings
12 01 04	non-ferrous metal dust and particles
17	**CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)**
17 04	**metals (including their alloys)**
17 04 03	lead
19	**WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE**
19 10	**wastes from shredding of metal-containing wastes**
19 10 02	lead and non-ferrous alloys and mixtures containing lead
19 12	**wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 03	lead, silver and non-ferrous alloys containing lead or silver
19 12 11*	lead-bearing residues and products from mechanical treatment of waste
20	**MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS**
20 01	**Separately collected fractions**
20 01 40	lead and silver

Having undertaken a comprehensive review of the BAT conclusions, it has been found that the BRM installation is fully compliant with all relevant BAT specified within the BREF.

The process itself is an established one, consisting of the thermal treatment of secondary raw materials in a rotary kiln furnace. Impurities are emitted through the gas collection system and extracted as dust, or are encapsulated in the slag.

The use of rotary furnaces for this purpose is identified within the BREF, including within section 5.1.3.2. Rotary furnaces are also commonly used for scrap recovery in other non-ferrous metals industries. The process is considered to be BAT for this type of operation.

However, it is recognised that importing new material could introduce the risk of contamination of the feedstock and, as such, the impact of such changes should be kept under review.

Specific observations made during the assessment include:

BATc 9

The BAT conclusion identifies the use of off-gas flow optimisation using computerised fluid dynamic studies and tracers as a means of improving management of diffuse emissions. At present, BRM has no specific site issues relating to diffuse emissions that are related to poor gas collection performance. The other techniques listed in BAT conclusion 9 are being

implemented and appear to be effective in managing this risk. However, regard can be had to this should the situation change in the future.

BATc 94

BRM does not currently undertake preparatory activities on secondary raw materials within its storage sheds. However, should it intend to do so in the future then BAT 94 would apply and the company should seek to equip these areas with suitable extraction and filtration systems.

BATc 99

The emissions of dioxins and furans is primarily related to the presence of halogens and incomplete combustion within a thermal process. Emissions of these compounds are monitored at BRM and have never historically been present at notable concentrations. However, the impact of new secondary raw materials on the process could result in the potential for an increase in dioxins and furans formation. Combustion is already managed in such a way as to maximise combustion efficiency within the rotary furnaces. This is evidenced by the history of very low carbon monoxide and VOC emissions detected at the stacks.

The presence of halogens in incoming waste will be primarily managed through pre-acceptance procedures. However, ongoing monitoring will enable BRM to identify any increase in these pollutants and assess whether additional control measures such as those listed in section 5.3.4.6 of the BREF need to be implemented.

BATc 100

As above, SO_2 emissions from the rotary furnace emissions are currently very low, but the presence of sulphur compounds in third-party wastes could give rise to increased SO_2 concentrations. As with BATc 99, this will be controlled through feedstock and ongoing monitoring. As the site rarely detects SO_2 > 1mg/m^3 in its stack emissions, there has been no need for techniques such as alkali leaching of feedstock at the installation in the past. Assessment of whether such a process is required going forward should be kept under review.

Abatement plant

Both rotary furnaces at BRM are equipped with bag filter systems, which comply with the requirements of BATc 96 for the smelting process within secondary lead production. Emissions from the abatement plant are compliant with BAT-AELs.

Of the wastes proposed for acceptance in Table S2.2, the plant is currently processing similar non-waste or waste forms of these materials with no evident impact on the effectiveness of the abatement plant.

Appendix A

<table>
<tr><th>Guidance/BATc reference</th><th>Requirement</th><th>Current compliance status</th><th>Compliance gaps</th><th>RAG</th></tr>
<tr><td colspan="4">Iron & Steel BREF</td><td></td></tr>
<tr><td>BATc 1</td><td>BAT is to implement and adhere to an environmental management system (EMS) that meets the specification contained in the BREF</td><td>BRM operates an integrated management system that is certified to meet the ISO14001:2015 standard.

Diffuse dust and maintenance are managed through appropriate procedures and engineering management arrangements.</td><td>None</td><td></td></tr>
<tr><td>BATc 2</td><td>In order to use energy efficiently, BAT is to use a combination of the techniques given below:

<table><tr><th></th><th>Technique</th><th>Applicability</th></tr><tr><td>a</td><td>Energy efficiency management system (e.g. ISO 50001)</td><td>Generally applicable</td></tr><tr><td>b</td><td>Regenerative or recuperative burners</td><td>Generally applicable</td></tr><tr><td>c</td><td>Heat recovery (e.g. steam, hot water, hot air) from waste process heat</td><td>Only applicable for pyrometallurgical processes</td></tr><tr><td>d</td><td>Regenerative thermal oxidiser</td><td>Only applicable when the abatement of a combustible pollutant is required</td></tr><tr><td>e</td><td>Preheat the furnace charge, combustion air or fuel using the heat recovered from hot gases from the melting stage</td><td>Only applicable for roasting or smelting of sulphide ore/concentrate and for other pyrometallurgical processes</td></tr><tr><td>f</td><td>Raise the temperature of the leaching liquors using steam or hot water from waste heat recovery</td><td>Only applicable for alumina or hydrometallurgical processes</td></tr><tr><td>g</td><td>Use hot gases from the launder as preheated combustion air</td><td>Only applicable for pyrometallurgical processes</td></tr><tr><td>h</td><td>Use oxygen-enriched air or pure oxygen in the burners to reduce energy consumption by allowing autogenous smelting or the complete combustion of carbonaceous material</td><td>Only applicable for furnaces that use raw materials containing sulphur or carbon</td></tr><tr><td>i</td><td>Dry concentrates and wet raw materials at low temperatures</td><td>Only applicable when drying is performed</td></tr><tr><td>j</td><td>Recover the chemical energy content of the carbon monoxide produced in an electric or shaft/blast furnace by using the exhaust gases as a fuel, after the removal of metals, in other production processes or to produce steam/hot water or electricity</td><td>Only applicable to exhaust gases with a CO content > 10 vol-%. Applicability is also influenced by the composition of the exhaust gas and the unavailability of a continuous flow (i.e. batch processes)</td></tr><tr><td>k</td><td>Recirculate the flue-gas back through an oxy-fuel burner to recover the energy contained in the total organic carbon present</td><td>Generally applicable</td></tr><tr><td>l</td><td>Suitable insulation for high temperature equipment such as steam and hot water pipes</td><td>Generally applicable</td></tr><tr><td>m</td><td>Use the heat generated from the production of sulphuric acid from sulphur dioxide to preheat gas directed to the sulphuric acid plant or to generate steam and/or hot water</td><td>Only applicable for non-ferrous metals plants including sulphuric acid or liquid SO_2 production</td></tr><tr><td>n</td><td>Use high efficiency electric motors equipped with variable-frequency drive, for equipment such as fans</td><td>Generally applicable</td></tr><tr><td>o</td><td>Use control systems that automatically activate the air extraction system or adjust the extraction rate depending on actual emissions</td><td>Generally applicable</td></tr></table></td><td>A combination of the techniques listed is in use.

BRM operates an integrated management system that is certified to meet the ISO50001:2018 standard.

Techniques A, N, and O are in use at the BRM installation. Legacy equipment that does not yet include these features is included within the site’s asset management programme for upgrade at a suitable time.

Technique H is employed in the site’s rotary furnaces.

Technique D is not currently in use. A need for this technology has not been identified due to past compliance with permitted emission limits.

Technique I is adopted as required; raw materials are stored dry inside appropriate containers and storage buildings.

Techniques C, E, F, J and M are not relevant to the processes undertaken at BRM.</td><td>None</td><td></td></tr>
<tr><td>BATc 3</td><td>In order to improve overall environmental performance, BAT is to ensure stable process operation by using a process control system together with a combination of the techniques given below.</td><td>BRM operates strict control over feedstocks to thermal processes to ensure that quality outputs are achieved. Furnaces are equipped with process monitoring systems that meet BAT requirements, and suitable monitoring is undertaken on extraction abatement equipment.

Techniques A, B, E, F, J are used throughout the installation’s thermal processing equipment. G, I and K are not relevant.</td><td>None</td><td></td></tr>
</table>

Guidance/BATc reference	Requirement	Current compliance status	Compliance gaps	RAG
	<table><tr><th></th><th>Technique</th></tr><tr><td>a</td><td>Inspect and select input materials according to the process and the abatement techniques applied</td></tr><tr><td>b</td><td>Good mixing of the feed materials to achieve optimum conversion efficiency and reduce emissions and rejects</td></tr><tr><td>c</td><td>Feed weighing and metering systems</td></tr><tr><td>d</td><td>Processors to control material feed rate, critical process parameters and conditions including the alarm, combustion conditions and gas additions</td></tr><tr><td>e</td><td>On-line monitoring of the furnace temperature, furnace pressure and gas flow</td></tr><tr><td>f</td><td>Monitor the critical process parameters of the air emission abatement plant such as gas temperature, reagent metering, pressure drop, ESP current and voltage, scrubbing liquid flow and pH and gaseous components (e.g. O_2, CO, VOC)</td></tr><tr><td>g</td><td>Control dust and mercury in the exhaust gas before transfer to the sulphuric acid plant for plants including sulphuric acid or liquid SO_2 production</td></tr><tr><td>h</td><td>On-line monitoring of vibrations to detect blockages and possible equipment failure</td></tr><tr><td>i</td><td>On-line monitoring of the current, voltage and electrical contact temperatures in electrolytic processes</td></tr><tr><td>j</td><td>Temperature monitoring and control at melting and smelting furnaces to prevent the generation of metal and metal oxide fumes through overheating</td></tr><tr><td>k</td><td>Processor to control the reagents feeding and the performance of the waste water treatment plant, through on-line monitoring of temperature, turbidity, pH, conductivity and flow</td></tr></table>			
BATc 4	In order to reduce channelled dust and metal emissions to air, BAT is to apply a maintenance management system which especially addresses the performance of dust abatement systems as part of the environmental management system.	BRM operates a SAP preventative and engineering maintenance system that includes all key assets, including abatement systems. Routine monitoring is undertaken at emission stacks.	None	
BATc 5	In order to prevent or, where this is not practicable, to reduce diffuse emissions to air and water, BAT is to collect diffuse emissions as much as possible nearest to the source and treat them.	The site operates in accordance with the Dust Emissions Management Plan that identifies the main risk sources and aims to contain potential diffuse emission sources and remove surface contamination by sweeping where necessary. Works liable to generate diffuse dust, such as construction or demolition, are evaluated and appropriate measures like water sprays can be implemented when necessary.	None	
BATc 6	In order to prevent or, where this is not practicable, to reduce diffuse dust emissions to air, BAT is to set up and implement an action plan on diffuse dust emissions, as part of the environmental management system, that incorporates both of the following measures: a. identify the most relevant diffuse dust emission sources (using e.g. EN 15445); b. define and implement appropriate actions and techniques to prevent or reduce diffuse emissions over a given time frame.	Documented dust management controls are included within the site's environmental management system. An updated Dust Emissions Management Plan has been provided with this application in the response to the first Schedule 5 information request, dated 4 June 2024. New secondary raw materials will be packaged and stored within appropriate containers (i.e. drums, UN-approved bags) or in buildings to minimise the risk of diffuse emissions associated with storage and handling. EN 15445 reverse dispersion modelling is not appropriate for this installation; the sources of emissions are already well understood through direct monitoring of stacks and ambient air.	None	
BATc 7	In order to prevent diffuse emissions from the storage of raw materials, BAT is to use a combination of the techniques given below.	A combination of the techniques listed is employed at the installation.	None.	

<table>
<tr><th>Guidance/BATc reference</th><th>Requirement</th><th>Current compliance status</th><th>Compliance gaps</th><th>RAG</th></tr>
<tr><td></td><td><table>
<tr><th></th><th>Technique</th></tr>
<tr><td>a</td><td>Enclosed buildings or silos/bins for storing dust-forming materials such as concentrates, fluxes and fine materials</td></tr>
<tr><td>b</td><td>Covered storage of non-dust-forming materials such as concentrates, fluxes, solid fuels, bulk materials and coke and secondary materials that contain water-soluble organic compounds</td></tr>
<tr><td>c</td><td>Sealed packaging of dust-forming materials or secondary materials that contain water-soluble organic compounds</td></tr>
<tr><td>d</td><td>Covered bays for storing material which has been pelletised or agglomerated</td></tr>
<tr><td>e</td><td>Use water sprays and fog sprays with or without additives such as latex for dust-forming materials</td></tr>
<tr><td>f</td><td>Dust/gas extraction devices placed at the transfer and tipping points for dust-forming materials</td></tr>
<tr><td>g</td><td>Certified pressure vessels for storing chlorine gas or mixtures that contain chlorine</td></tr>
<tr><td>h</td><td>Tank construction materials that are resistant to the contained materials</td></tr>
<tr><td>i</td><td>Reliable leak detection systems and display of tank's level, with an alarm to prevent overfills</td></tr>
<tr><td>j</td><td>Store reactive materials in double-walled tanks or tanks placed in chemical-resistant bunds of the same capacity and use a storage area that is impermeable and resistant to the material stored</td></tr>
<tr><td>k</td><td>Design storage areas so that
- any leaks from tanks and delivery systems are intercepted and contained in bunds that have a capacity capable of containing at least the volume of the largest storage tank within the bund;
- delivery points are within the bund to collect any spilled material</td></tr>
<tr><td>l</td><td>Use inert gas blanketing for the storage of materials that react with air</td></tr>
<tr><td>m</td><td>Collect and treat emissions from storage with an abatement system designed to treat the compounds stored. Collect and treat before discharge any water that washes dust away.</td></tr>
<tr><td>n</td><td>Regular cleaning of the storage area and, when needed, moistening with water</td></tr>
<tr><td>o</td><td>Place the longitudinal axis of the heap parallel to the prevailing wind direction in the case of outdoor storage</td></tr>
<tr><td>p</td><td>Protective planting, windbreak fences or upwind mounts to lower the wind velocity in the case of outdoor storage</td></tr>
<tr><td>q</td><td>One heap instead of several where feasible in the case of outdoor storage</td></tr>
<tr><td>r</td><td>Use oil and solid interceptors for the drainage of open outdoor storage areas. Use of concreted areas that have kerbs or other containment devices for the storage of material that can release oil, such as swarf</td></tr>
</table></td><td>Raw materials that are prone to forming dust are stored in enclosed buildings and/or within suitable sealed packaging such as UN-approved drums or flexible IBCs, in compliance with techniques A and C. Bulkier materials such as slags and refractory wastes are stored in covered storage bays as described in technique B.

Site surfaces are water-sprayed in key locations to dampen surface dust in dry weather conditions. A road sweeper operates to remove surface dust from operational and trafficked areas. Water misting sprays can also be employed at specific worksites or during handling of dusty materials in storage sheds, in accordance with technique E.

Transfer points where dusty raw materials are loaded into furnaces are enclosed using the “Dalek” chargers, which are equipped with extraction, as described in technique F.

Contaminated waste water associated with vehicles running through storage areas and transporting metallic raw materials are treated prior to discharge via the site’s effluent treatment plant (technique M). Local air extraction is in place in some areas.

Techniques G-L are not relevant to the installation.

Techniques O-R are not relevant. There is no external storage of stockpiles or heaps at BRM.</td><td></td><td></td></tr>
<tr><td>BATc 8</td><td>In order to prevent diffuse emissions from the handling and transport of raw materials, BAT is to use a combination of the techniques given below.</td><td>BRM’s processes are comparatively small scale, so material drops and movement by conveyor is not relevant at the installation. However, techniques D, E, F, G, N, O and Q are relevant and are in use at the site.</td><td>None</td><td></td></tr>
</table>

<table>
<tr><th>Guidance/BATc reference</th><th>Requirement</th><th>Current compliance status</th><th>Compliance gaps</th><th>RAG</th></tr>
<tr><td></td><td>
<table>
<tr><th></th><th>Technique</th></tr>
<tr><td>a</td><td>Enclosed conveyors or pneumatic systems to transfer and handle dust-forming concentrates and fluxes and fine-grained material</td></tr>
<tr><td>b</td><td>Covered conveyors to handle non-dust-forming solid materials</td></tr>
<tr><td>c</td><td>Extraction of dust from delivery points, silo vents, pneumatic transfer systems and conveyor transfer points, and connection to a filtration system (for dust-forming materials)</td></tr>
<tr><td>d</td><td>Closed bags or drums to handle materials with dispersible or water-soluble components</td></tr>
<tr><td>e</td><td>Suitable containers to handle pelletised materials</td></tr>
<tr><td>f</td><td>Sprinkling to moisten the materials at handling points</td></tr>
<tr><td>g</td><td>Minimise transport distances</td></tr>
<tr><td>h</td><td>Reduce the drop height of conveyor belts, mechanical shovels or grabs</td></tr>
<tr><td>i</td><td>Adjust the speed of open belt conveyors (< 3.5 m/s)</td></tr>
<tr><td>j</td><td>Minimise the speed of descent or free fall height of the materials</td></tr>
<tr><td>k</td><td>Place transfer conveyors and pipelines in safe, open areas above ground so that leaks can be detected quickly and damage from vehicles and other equipment can be prevented. If buried pipelines are used for non-hazardous materials, document and mark their course and adopt safe excavation systems</td></tr>
<tr><td>l</td><td>Automatic resealing of delivery connections for handling liquid and liquefied gas</td></tr>
<tr><td>m</td><td>Back-vent displaced gases to the delivery vehicle to reduce emissions of VOC</td></tr>
<tr><td>n</td><td>Wash wheels and chassis of vehicles used to deliver or handle dusty materials</td></tr>
<tr><td>o</td><td>Use planned campaigns for road sweeping</td></tr>
<tr><td>p</td><td>Segregate incompatible materials (e.g. oxidising agents and organic materials)</td></tr>
<tr><td>q</td><td>Minimise material transfers between processes</td></tr>
</table>
</td><td></td><td></td><td></td></tr>
<tr><td>BATc 9</td><td>In order to prevent or, where this is not practicable, to reduce diffuse emissions from metal production, BAT is to optimise the efficiency of off-gas collection and treatment by using a combination of the techniques given below.
<table>
<tr><th></th><th>Technique</th><th>Applicability</th></tr>
<tr><td>a</td><td>Thermal or mechanical pretreatment of secondary raw material to minimise organic contamination of the furnace feed</td><td>Generally applicable</td></tr>
<tr><td>b</td><td>Use a closed furnace with a properly designed dedusting system or seal the furnace and other process units with an adequate vent system</td><td>The applicability may be restricted by safety constraints (e.g. type/design of the furnace, risk of explosion)</td></tr>
<tr><td>c</td><td>Use a secondary hood for furnace operations such as charging and tapping</td><td>The applicability may be restricted by safety constraints (e.g. type/design of the furnace, risk of explosion)</td></tr>
<tr><td>d</td><td>Dust or fume collection where dusty material transfers take place (e.g. furnace charging and tapping points, covered launders)</td><td>Generally applicable</td></tr>
<tr><td>e</td><td>Optimise the design and operation of hooding and ductwork to capture fumes arising from the feed port and from hot metal, matte or slag tapping and transfers in covered launders</td><td>For existing plants, the applicability may be limited by space and plant configuration restrictions</td></tr>
<tr><td>f</td><td>Furnace/reactor enclosures such as 'house-in-house' or 'doghouse' for tapping and charging operations</td><td>For existing plants, the applicability may be limited by space and plant configuration restrictions</td></tr>
<tr><td>g</td><td>Optimise the off-gas flow from the furnace through computerised fluid dynamics studies and tracers</td><td>Generally applicable</td></tr>
<tr><td>h</td><td>Charging systems for semi-closed furnaces to add raw materials in small amounts</td><td>Generally applicable</td></tr>
<tr><td>i</td><td>Treat the collected emissions in an adequate abatement system</td><td>Generally applicable</td></tr>
</table>
</td><td>Prior to submission to refining kettles, secondary raw materials are treated in a rotary furnace to remove organic contaminants. However, the focus is on reducing organic contamination through quality control within the supply chain (technique A)

Rotary furnaces and kettles are served by primary and secondary extraction systems equipped with bag filter houses (techniques B, I). The rotary furnaces have additional “hygiene extraction” (technique C) and enclosed chargers (D).</td><td>Off-gas flow optimisation (technique G) can be investigated.</td><td></td></tr>
<tr><td>BATc 10</td><td>BAT is to monitor the stack emissions to air with at least the frequency given in the BREF below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.</td><td>Monitoring is defined in the permit and complies with the defined frequencies. Monitoring methods are as defined in the permit and testing is undertaken by MCERTS-certified teams.</td><td>None</td><td></td></tr>
<tr><td>BATc 11</td><td>In order to reduce mercury emissions to air (other than those that are routed to the sulphuric acid plant) from a pyrometallurgical process, BAT is to use one or both of the techniques given below.</td><td>Only raw materials that are effectively free from mercury content are accepted for production processes at BRM</td><td>None</td><td></td></tr>
</table>

Guidance/BATc reference	Requirement	Current compliance status	Compliance gaps	RAG
	• Use raw materials with a low mercury content, including by cooperating with providers in order to remove mercury from secondary materials • Use of adsorbents (e.g. activated carbon, selenium) in combination with dust filtration			
BATc 12	In order to reduce emissions of SO_2 from off-gases with a high SO_2 content and to avoid the generation of waste from the flue-gas cleaning system, BAT is to recover sulphur by producing sulphuric acid or liquid SO_2.	Imported lead bullion is largely sulphur free. Secondary raw materials imported to the new process may contain sulphur, which will be monitored during waste pre-acceptance and acceptance testing. Emissions monitoring for sulphur dioxide is undertaken; should sulphur recovery be deemed viable then this will be evaluated in the future. Risk assessment does not indicate that high SO_2 levels will be present in the furnace off-gases at BRM. Past monitoring at the main stack, which processes internally arising materials similar to those applied for, has not identified SO_2 greater than 0.5 mg/m3 in the past five years.	None.	
BATc 13	In order to prevent NO_X emissions to air from a pyrometallurgical process, BAT is to use one of the techniques given below. • Low-NO_X burners • Oxy-fuel burners • Flue-gas recirculation in the case of oxy-fuel burners	Low-NO_X burners are in use on the BRM furnaces and kettles.	None	
BATc 14	In order to prevent or reduce the generation of waste water, BAT is to use one or a combination of the techniques given below. Generally applicable techniques • Measure the amount of fresh water used and the amount of waste water discharged • Reuse waste water from cleaning operations (including anode and cathode rinse water) and spills in the same process • Reuse surface run-off water May be applicable • Reuse weak acid streams generated in a wet ESP and wet scrubbers • Reuse waste water from slag granulation • Use a closed circuit cooling system • Reuse treated water from the waste water treatment plant	Water consumption is measured through the company's water management plans and metering network. Discharged waste water is also measured. A closed circuit cooling system is in use, but waste water is generally not reused due to the level of heavy metals in the effluent.	None	
BATc 15	In order to prevent the contamination of water and to reduce emissions to water, BAT is to segregate uncontaminated waste water streams from waste water streams requiring treatment.	All surface water from the site is routed to the effluent treatment plant, as road surfaces and roofs have been tested and found to cause heavy metal contamination of the surface water stream. A survey and sampling exercise was undertaken in 2023/4 to evaluate opportunities	None	

Guidance/BATc reference	Requirement	Current compliance status	Compliance gaps	RAG
		to further segregate uncontaminated waste streams, but none were identified. Uncontaminated water from the peripheral vegetated areas of the site is routed via a surface water drainage ditch and is not mixed with contaminated drainage. Foul water from offices is discharged to sewer.		
BATc 16	BAT is to use ISO 5667 for water sampling and to monitor the emissions to water at the point where the emission leaves the installation at least once per month and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality. The monitoring frequency may be adapted if the data series clearly demonstrate sufficient stability of the emissions	The installation samples each batch of treated effluent prior to its release into the environment. Testing is undertaken by an in-house metallurgical laboratory using an approved method in accordance with the specified standards.	None	
BATc 17	In order to reduce emissions to water, BAT is to treat the leakages from the storage of liquids and the waste water from non-ferrous metals production, including from the washing stage in the Waelz kiln process, and to remove metals and sulphates by using a combination of the techniques given in the BREF	The metallurgical processes at BRM do not use water other than for non-contact cooling in a closed circuit system. Liquids are stored on enclosed or covered bunds to prevent spillages entering site drains. Bulk fuel is stored in double-skilled tanks, within proximity to oil interceptors. Surface water at the site, which includes water that has been in contact with heavy metals, is treated in the site's effluent plant that employs chemical precipitation of metals using pH correction, polymer additions and a lamella clarifier, prior to a sand filter.	None	
BATc 18	In order to reduce noise emissions, BAT is to use one or a combination of the techniques given below. • Use embankments to screen the source of noise • Enclose noisy plants or components in sound-absorbing structures • Use anti-vibration supports and interconnections for equipment • Orientation of noise-emitting machinery • Change the frequency of the sound	The site's noisiest equipment is contained within buildings that provide noise screening. The other primary noise sources are vehicle movements and material handling. The site is located in an industrial setting and has not been the subject of complaints. Offloading areas that will receive secondary raw materials are located in areas that are either enclosed or surrounded by other buildings that will provide screening.	None	
BATc 19	In order to reduce odour emissions, BAT is to use one or a combination of the techniques given below. • Appropriate storage and handling of odorous materials • Minimise the use of odorous materials • Careful design, operation and maintenance of any equipment that could generate odour emissions	The site does not generally receive odorous materials. However, wet dross has the potential to give rise to odour. These materials are stored in appropriate packaging or within closed buildings, which will provide odour containment. The prevailing wind	None	

<table>
<tr><th>Guidance/BATc reference</th><th>Requirement</th><th>Current compliance status</th><th>Compliance gaps</th><th>RAG</th></tr>
<tr><td></td><td>• Generally applicable
• Afterburner or filtration techniques, including biofilters</td><td>direction at the site is from the southwest; blowing away from residential receptors.</td><td></td><td></td></tr>
<tr><td>BATc 90</td><td>In order to prevent or reduce diffuse emissions from preparation (such as metering, mixing, blending, crushing, cutting, screening) of primary and secondary materials (excluding batteries), BAT is to use one or a combination of the techniques given below.

<table><tr><th></th><th>Technique</th><th>Applicability</th></tr><tr><td>a</td><td>Enclosed conveyer or pneumatic transfer system for dusty material</td><td>Generally applicable</td></tr><tr><td>b</td><td>Enclosed equipment. When dusty materials are used the emissions are collected and sent to an abatement system</td><td>Only applicable for feed blends prepared with a dosing bin or loss-in-weight system</td></tr><tr><td>c</td><td>Mixing of raw materials carried out in an enclosed building</td><td>Only applicable for dusty materials. For existing plants, application may be difficult due to the space required</td></tr><tr><td>d</td><td>Dust suppression systems such as water sprays</td><td>Only applicable for mixing carried out outdoors</td></tr><tr><td>e</td><td>Pelletisation of raw materials</td><td>Applicable only when the process and the furnace can use pelletised raw materials</td></tr></table></td><td>None of the listed activities are undertaken. Secondary raw materials used in the process are purchased in a form suitable for charging without preparation.

Materials are transported to the furnace within packaging or enclosed bins. The site does not manage volumes requiring conveyor systems.

No compliance issues noted.</td><td>None.</td><td></td></tr>
<tr><td>BATc 91 and BATc 134</td><td>In order to prevent or reduce diffuse emissions from material pretreatment (such as drying, dismantling, sintering, briquetting, pelletising and battery crushing, screening and classifying) in primary lead and secondary lead and/or tin production, BAT is to use one or both of the techniques given below:

• Enclosed conveyor or pneumatic transfer system for dusty material
• Enclosed equipment. When dusty materials are used the emissions are collected and sent to an abatement system.</td><td>The pre-treatment activities described are not routinely undertaken on third-party wastes at the installation.

Were they to be undertaken, such activities would be conducted indoors with appropriate local exhaust ventilation and abatement, such as within the existing dust plant.</td><td>None.</td><td></td></tr>
<tr><td>BATc 92 and BAT 135</td><td>In order to prevent or reduce diffuse emissions from charging, smelting and tapping operations in lead and/or tin production, and from pre-decoppering operations in primary lead production, BAT is to use an appropriate combination of the techniques given below

<table><tr><th></th><th>Technique</th><th>Applicability</th></tr><tr><td>a</td><td>Encapsulated charging system with an air extraction system</td><td>Generally applicable</td></tr><tr><td>b</td><td>Sealed or enclosed furnaces with door sealing (1) for processes with a discontinuous feed and output</td><td>Generally applicable</td></tr><tr><td>c</td><td>Operate furnace and gas routes under negative pressure and at a sufficient gas extraction rate to prevent pressurisation</td><td>Generally applicable</td></tr><tr><td>d</td><td>Capture hood/enclosures at charging and tapping points</td><td>Generally applicable</td></tr><tr><td>e</td><td>Enclosed building</td><td>Generally applicable</td></tr><tr><td>f</td><td>Complete hood coverage with an air extraction system</td><td>In existing plants or major upgrades of existing plants, application may be difficult due to the space requirements</td></tr><tr><td>g</td><td>Maintain furnace sealing</td><td>Generally applicable</td></tr><tr><td>h</td><td>Maintain the temperature in the furnace at the lowest required level</td><td>Generally applicable</td></tr><tr><td>i</td><td>Apply a hood at the tapping point, ladles and drossing area with an air extraction system</td><td>Generally applicable</td></tr><tr><td>j</td><td>Pretreatment of dusty raw material, such as pelletisation</td><td>Applicable only when the process and the furnace can use pelletised raw materials</td></tr><tr><td>k</td><td>Apply a doghouse for ladles during tapping</td><td>Generally applicable</td></tr><tr><td>l</td><td>An air extraction system for charging and tapping area connected to a filtration system</td><td>Generally applicable</td></tr><tr><td colspan="3">(1) Descriptions of the techniques are given in Section 11.10.</td></tr></table></td><td>Techniques A-F are employed at the rotary furnaces into which secondary raw materials are charged. Techniques G-H are standard operating procedures at the installation.

Charging and tapping areas are provided with extraction attached to bag filters.</td><td>None</td><td></td></tr>
</table>

Guidance/BATc reference	Requirement	Current compliance status	Compliance gaps	RAG
BATc 93 and BATc 139	In order to prevent or reduce diffuse emissions from remelting, refining and casting in primary and secondary lead and/or tin production, BAT is to use a combination of the techniques given below. a. Hood on the crucible furnace or kettle with an air extraction system b. Lids to close the kettle during the refining reactions and addition of chemicals c. Hood with air extraction system at launders and tapping points d. Temperature control of the melt e. Closed mechanical skimmers for removal of dusty dross/residues	All of the techniques described within the BAT conclusion are in use at the installation.	None	
BATc 94	In order to reduce dust and metal emissions to air from raw material preparation (such as reception, handling, storage, metering, mixing, blending, drying, crushing, cutting and screening) in primary and secondary lead and/or tin production, BAT is to use a bag filter. BAT-AEL 5mg/Nm^3.	The byproducts containing dusty secondary raw materials sheds are not fitted with extraction systems. However, activities in this area are limited to reception, handling and storage. Higher risk processes are not carried out in these buildings. The adjacent dust plant, which processes in-house revert, extracts to a cartridge filter system. Containment is provided through the closure of doors and use of local water misting systems when required.	Should it be proposed to undertake raw material preparation in the byproducts shed, the installation of an extraction system with suitable bag filter or equally effective technique should be evaluated.	
BATc 95	In order to reduce dust and metal emissions to air from battery preparation (crushing, screening and classifying), BAT is to use a bag filter or a wet scrubber.	Not applicable to the installation	NA	
BATc 96	In order to reduce dust and metal emissions to air (other than those that are routed to the sulphuric acid or liquid SO_2 plant) from charging, smelting and tapping in primary and secondary lead and/or tin production, BAT is to use a bag filter.	Bag filters are in use on the relevant ventilation systems, and emissions are below the specified BAT-AELs.	None	
BATc 97	In order to reduce dust and metal emissions to air from remelting, refining and casting in primary and secondary lead and/or tin production, BAT is to maintain the temperature of the melt bath at the lowest possible level according to the process stage in combination with a bag filter	The refinery building is equipped with a bag filter. The temperature of molten metal is kept at the lowest possible level having regard to process requirements. Emissions are below the specified BAT-AELs.	None	
BATc 98	In order to reduce emissions of organic compounds to air from the raw material drying and smelting process in secondary lead and/or tin production, BAT is to use one or a combination of the techniques given below. a. Select and feed the raw materials according to the furnace and the abatement techniques used b. Optimise combustion conditions to reduce the emissions of organic compounds	See response to BATc 3. Raw material selection is driven by quality requirements and organic contaminants are to be minimised. All furnaces have bag filtration systems attached, meeting BAT requirements. Combustion within the rotary furnaces are monitored to ensure effective process control. VOCs are already monitored on the relevant stacks and have never exceeded 10 mg/Nm^3, so are well below the BAT-AEL.	None	

<table>
<tr><th>Guidance/BATc reference</th><th>Requirement</th><th>Current compliance status</th><th>Compliance gaps</th><th>RAG</th></tr>
<tr><td>BATc 99</td><td>In order to reduce PCDD/F emissions to air from the smelting of secondary lead and/or tin raw materials, BAT is to use one or a combination of the techniques given below.
<table><tr><th></th><th>Technique</th></tr><tr><td>a</td><td>Select and feed the raw materials according to the furnace and the abatement techniques used (1)</td></tr><tr><td>b</td><td>Use charging systems, for a semi-closed furnace, to give small additions of raw material (1)</td></tr><tr><td>c</td><td>Internal burner system (1) for melting furnaces</td></tr><tr><td>d</td><td>Afterburner or regenerative thermal oxidiser (1)</td></tr><tr><td>e</td><td>Avoid exhaust systems with a high dust build-up at temperatures > 250 °C (1)</td></tr><tr><td>f</td><td>Rapid quenching (1)</td></tr><tr><td>g</td><td>Injection of adsorption agent in combination with efficient dust collection system (1)</td></tr><tr><td>h</td><td>Use of efficient dust collection system</td></tr><tr><td>i</td><td>Use of oxygen injection in the upper zone of the furnace</td></tr><tr><td>j</td><td>Optimise combustion conditions to reduce the emissions of organic compounds (1)</td></tr><tr><td colspan="2">(1) Descriptions of the techniques are given in Section 11.10.</td></tr></table></td><td>Techniques A, C, E, H and J are implemented at the installation. There are no process stacks exhausting at temperatures greater than 250°C. Other techniques listed are implemented as required.</td><td>Continue to monitor dioxin emissions from the rotary stacks and implement additional listed controls should these be seen to increase with the acceptance of additional secondary raw materials from third-parties.</td><td></td></tr>
<tr><td>BATc 100</td><td>In order to prevent or reduce SO_2 emissions to air (other than those that are routed to the sulphuric acid or liquid SO_2 plant) from charging, smelting and tapping in primary and secondary lead and/or tin production, BAT is to use one or a combination of the techniques given below.
<table><tr><th></th><th>Technique</th><th>Applicability</th></tr><tr><td>a</td><td>Alkaline leaching of raw materials that contain sulphur in the form of sulphate</td><td>Generally applicable</td></tr><tr><td>b</td><td>Dry or semi-dry scrubber (1)</td><td>Generally applicable</td></tr><tr><td>c</td><td>Wet scrubber (1)</td><td>Applicability may be limited in the following cases:
- very high off-gas flow rates (due to the significant amounts of waste and waste water generated)
- in arid areas (due to the large volume of water necessary and the need for waste water treatment)</td></tr><tr><td>d</td><td>Fixation of sulphur in the smelt phase</td><td>Only applicable for secondary lead production</td></tr><tr><td colspan="3">(1) Descriptions of the techniques are given in Section 11.10.</td></tr></table>
BAT 100(a): Alkali salt solution is used to remove sulphates from secondary materials prior to smelting.
BAT 100(d): The fixation of sulphur in the smelt phase is achieved by adding iron and soda (Na_2CO_3) in the smelters which react with the sulphur contained in the raw materials to form Na_2S-FeS slag</td><td>Sulphate-bearing materials are not pre-treated using alkaline leaching, though these materials are not currently submitted to the process. Relatively low levels of sulphate (circa 2%) are present in the rotary furnace slag, and in normal operation only trace levels of SO2 are detected during air emissions monitoring. This indicates a general absence of sulphur compounds in the process feedstock

None of the prescribed processes are undertaken as they have not been necessary to control SO_2 emissions.</td><td>None, but continue to monitor SO_2 emissions from the rotary stacks and implement additional listed controls should these be seen to increase above acceptable levels with the acceptance of additional secondary raw materials from third-parties.</td><td></td></tr>
<tr><td>BATc 101</td><td>101. In order to prevent the contamination of soil and groundwater from battery storage, crushing, screening and classifying operations, BAT is to use an acid-resistant floor surface and a system for the collection of acid spillages.</td><td>Not applicable to the installation.</td><td>NA</td><td></td></tr>
<tr><td>BATc 102</td><td>. In order to prevent the generation of waste water from the alkaline leaching process, BAT is to reuse the water from the sodium sulphate crystallisation of the alkali salt solution.</td><td>Not applicable to the installation.</td><td>NA</td><td></td></tr>
<tr><td>BATc 103</td><td>In order to reduce emissions to water from battery preparation when the acid mist is sent to the waste water treatment plant, BAT is to operate an adequately designed waste water treatment plant to abate the pollutants contained in this stream.</td><td>Not applicable to the installation.</td><td>NA</td><td></td></tr>
<tr><td>BATc 104</td><td>In order to reduce the quantities of waste sent for disposal from primary lead production, BAT is to organise operations on site so as to facilitate process residues reuse or, failing that, process residues recycling, including by using one or a combination of the techniques given below.</td><td>Techniques A, C, D and E are relevant to the installation and are implemented within the process. Slags are sent for metal recovery unless they are unsuitable for this purpose.

Technique B is not relevant to the installation.</td><td>None</td><td></td></tr>
</table>

Guidance/BATc reference	Requirement	Current compliance status	Compliance gaps	RAG
	<table><tr><th></th><th>Technique</th><th>Applicability</th></tr><tr><td>a</td><td>Reuse of the dust from the dust removal system in the lead production process</td><td>Generally applicable</td></tr><tr><td>b</td><td>Se and Te recovery from wet or dry gas cleaning dust/sludge</td><td>The applicability can be limited by the quantity of mercury present</td></tr><tr><td>c</td><td>Ag, Au, Bi, Sb and Cu recovery from the refining dross</td><td>Generally applicable</td></tr><tr><td>d</td><td>Recovery of metals from the waste water treatment sludge</td><td>Direct smelting of the waste water treatment plant sludge might be limited by the presence elements such as As, Tl and Cd</td></tr><tr><td>e</td><td>Addition of flux materials that make the slag more suitable for external use</td><td>Generally applicable</td></tr></table>			
BATc 105	In order to allow the recovery of the polypropylene and polyethylene content of the lead battery, BAT is to separate it from the batteries prior to smelting.	Not applicable to the installation.	NA	
BATc 106	In order to reuse or recover the sulphuric acid collected from the battery recovery process, BAT is to organise operations on site so as to facilitate its internal or external reuse or recycling, including one or a combination of the techniques given.	Not applicable to the installation.	NA	
BATc 107	In order to reduce the quantities of waste sent for disposal from secondary lead and/or tin production, BAT is to organise operations on site so as to facilitate process residues reuse or, failing that, process residues recycling, including by using one or a combination of the techniques given below. <table><tr><th></th><th>Technique</th></tr><tr><td>a</td><td>Reuse the residues in the smelting process to recover lead and other metals</td></tr><tr><td>b</td><td>Treat the residues and the wastes in dedicated plants for material recovery</td></tr><tr><td>c</td><td>Treat the residues and the wastes so that they can be used for other applications</td></tr></table>	The installation actively re-uses its process residues and wastes through, including undertaking appropriate pre-treatment to enable its recovery.	None	
BATc 136 and BATc 137	Not applicable at the installation	Not applicable at the installation	NA	
	EPR 2.03 How to Comply			
1.1 (1)	You should address the following in your management system: • storage and use of liquefied gases such as oxygen, chlorine and LPG • loss of electrical supplies to control systems and to pollution abatement systems (this may lead to uncontrolled discharges to air and water) • flooding, whether caused by rainfall or due to fire fighting activities.	The company's management system is an integrated Health, Safety, Environmental and Energy Management system that is certified to the relevant ISO standards and includes control measures relating to hazardous substance storage and emergency scenarios such as power loss. Relevant storage tanks are maintained by the competent contracted suppliers as part of their supply and service agreements. The site is an upper tier COMAH installation due to the storage of lead oxide compounds that could result in damage to the environment in the event of a flood scenario. This scenario has therefore been modelled and controls put in place to mitigate the risk of pollution resulting from a tidal flooding event. Physical and procedural systems are in place to isolate site drains from unsolicited discharges in emergency situations.		
1.2	You should where appropriate:			

<table>
<tr><th>Guidance/BATc reference</th><th>Requirement</th><th>Current compliance status</th><th>Compliance gaps</th><th>RAG</th></tr>
<tr><td></td><td>1. Produce steam and electricity from the heat raised in waste heat boilers.
2. Use the heat of reaction to smelt or roast concentrates or melt scrap metals in a converter.
3. Use hot process gases to dry feed materials.
4. Pre-heat furnace charge using the energy content of furnace gases or hot gases from another source.
5. Use recuperative burners for the pre-heating of combustion air.
6. Use CO produced as a fuel gas.
7. Consider the use of oxygen as it is recognised to have advantages in many cases and reduces the overall gas volume, allows autogenic operation and can allow smaller abatement plant.
8. Ensure process optimisation to minimise hot metal transfers.</td><td></td><td></td><td></td></tr>
<tr><td>1.3</td><td>You should where appropriate:
1. Store materials such as drosses, which may dissolve or react with water, under cover.
2. Apply the following options:
<table>
<tr><th>Residue source</th><th>Associated metals</th><th>Residue</th><th>Options</th></tr>
<tr><td>Raw materials handling, etc.</td><td>All</td><td>Dust, sweepings</td><td>Feed for the main process</td></tr>
<tr><td>Smelting furnace</td><td>All</td><td>Slag</td><td>Construction material after slag treatment. Abrasive industry. Parts of slag may be used as refractory material, e.g. slag from the production of chromium metal</td></tr>
<tr><td>Refining furnaces</td><td>Pb</td><td>Skimmings</td><td>Recovery of other valuable metals</td></tr>
<tr><td>Melting furnace</td><td>All</td><td>Skimmings</td><td>Return to process after treatment</td></tr>
<tr><td>Furnace linings</td><td>All</td><td>Refractory</td><td>Crush, for possible recovery of metallic inclusions. May require treatment to minimise potential hazards before final disposal.</td></tr>
<tr><td>Dry abatement systems</td><td>Most</td><td>Filter dust</td><td>Return to process, recovery of other metals, disposal</td></tr>
<tr><td>Waste water treatment sludge</td><td>Most</td><td>WTP sludge</td><td>Safe disposal or re-use</td></tr>
</table></td><td>Drosses are stored within enclosed or covered sheds protected by flood gates. Drummed drosses received from third-parties are stored in their original transport packaging, pending use within the rotary furnaces.

All revert materials arising from the process are prepared for metal recovery through the various site processes. Skimmings from the lead refinery are further processed within the silver refinery.

Refractories are subject to metal recovery unless it is no longer viable to extract additional metal, in which case these are disposed of to a suitable category of landfill site.

Filter dusts are treated within the dust plant to produce a secondary raw material for metal recovery within the rotary furnaces.

Water treatment sludge is pelletised and also submitted for metal recovery within the rotary furnaces.</td><td>None</td><td></td></tr>
<tr><td>2.3 (1)</td><td>You should where appropriate:

1. Only use kettles for cleaning lead. For existing plant only, where scrap containing organic contaminants may be present, e.g. in cases where it cannot easily be segregated at source or at a</td><td>Lead bullion is melted through the ISA refinery kettles. On occasion, scrap may be melted that has been received on wooden pallets and fragments of wood may enter the process as it is unsafe to remove it. However, such events</td><td>None.</td><td></td></tr>
</table>

Guidance/BATc reference	Requirement	Current compliance status	Compliance gaps	RAG
	treatment site, it may be melted in kettles. The gas extraction system and after-burner should be capable of extracting all of the gases from the melting pot during peak production of gases from the combustion of any material present, in particular during charging and drossing off. For a new plant, scrap containing organic contaminants should be melted in alternative processes. 2. Effective purchasing and sorting procedures should ensure that unsatisfactory material is not charged to the melter. Where materials with organic contaminants such as pitch are to be processed, then the furnace design should permit adequate combustion of evolved gases and smoke. 3. Good temperature controls with a failsafe system to prevent overheating should be used.	are short-term in nature and distant from receptors. The ISA refinery is equipped with secondary ventilation and an associated bag filter plant. All other secondary material that contains contaminants is pre-treated in rotary furnaces. BRM's quality standards for purchased secondary raw materials seek to minimise the presence of non-metallic contaminants. All such imported raw materials are subject to acceptance testing. Temperature control systems are fitted to all thermal processes. As well as automatic shutoffs these are monitored by local control rooms.		
2.3 (2)	You should where appropriate: 1. Have temperature controls with failsafe system to prevent overheating. 2. Collect and filter dust and fume from drossing operations.	Both processes are installed at BRM.	None	
3.4	You should pay particular attention to the following: • movement and storage of scrap • location and sound insulation of large fans and air filtration systems • rolling mills • casting installations, especially billet casters • internal transport • electric arc furnaces.	The site has operated at the Northfleet location since the 1930s, is located within an industrial setting, and has not historically attracted noise complaints. At BRM fans, vehicles and material movements are considered to be the primary sources of noise. The site is surrounded by an earth bund to the west and southwest and large warehouses to the east. These provide noise screening. Downwind, to the northeast, is the Thames Estuary. The site's maintenance programme includes preventative maintenance to reduce the risk of noise from, for example, imbalanced fans, and improvements including variable speed drives reduce the risk of nuisance resulting from resonance associated with constant fan speeds. Scrap is not handled in bulk, but rather is moved in appropriate containers and is not dropped from height.	None.	