Environment Agency

Review of an Environmental Permit for an Installation subject to Chapter II of the Industrial Emissions Directive under the Environmental Permitting (England & Wales) Regulations 2016

Decision document recording our decision-making process following review of a permit

The Permit number is: EPR/BM4945IW
The Operator is: Britannia Refined Metals Limited
The Installation is: Britannia Refined Metals Limited
This Variation Notice number is: EPR/BM4945IW/V005

What this document is about

Article 21(3) of the Industrial Emissions Directive (IED) requires the Environment Agency to review conditions in permits that it has issued and to ensure that the permit delivers compliance with relevant standards, within four years of the publication by the European Commission of updated decisions on BAT Conclusions.

We have reviewed the permit for this installation against the revised BAT Conclusions for the non-ferrous metals industries sector published on 30th June 2016 in the Official Journal of the European Union. Where appropriate, we also considered other relevant BAT Conclusions published prior to this date but not previously included in a permit review for the Installation. In this decision document, we set out the reasoning for the consolidated variation notice that we have issued.

It explains how we have reviewed and considered the techniques used by the Operator in the operation and control of the plant and activities of the installation. This review has been undertaken with reference to the decision made by the European Commission establishing best available techniques (BAT) conclusions (BATc) for the non-ferrous metals industries as detailed in the Official Journal of the European Union (L174) following a European Union, implementing decision (EU) 2016/1032 of 13th June 2016. It is our record of our decision-making process and shows how we have taken into account all relevant factors in reaching our position.

As well as considering the review of the operating techniques used by the Operator for the operation of the plant and activities of the installation, the consolidated variation notice takes into account and brings together in a single document all previous variations that relate to the original permit issue.

Where this has not already been done, it also modernises the entire permit to reflect the conditions contained in our current generic permit template.

The introduction of new template conditions makes the Permit consistent with our current general approach and with other permits issued to installations in this sector. Although the wording of some conditions has changed, while others have been deleted because of the new regulatory approach, it does not reduce the level of environmental protection achieved by the Permit in any way. In this document we therefore address only our determination of substantive issues relating to the new BAT Conclusions and any changes to the operation of the installation.

We try to explain our decision as accurately, comprehensively and plainly as possible. Achieving all three objectives is not always easy, and we would welcome any feedback as to how we might improve our decision documents in future.

How this document is structured

1. Our proposed decision

2. How we reached our decision

3. The legal framework

4. Annex 1- Review of operating techniques within the Installation against BAT Conclusions

5. Annex 2a - Review and assessment of derogation request(s) made by the operator in relation to BAT Conclusions which include an Associated Emission Level (BAT-AEL) value

6. Annex 2b - Consultation responses

7. Annex 3 - Improvement Conditions

8. Annex 4 - Review and assessment of changes that are not part of the BAT Conclusions derived permit review

9. Annex 5 – Priority Compliance Issues & Detailed assessment of Regulation 60 Notice responses where future action likely

1 Our decision

We have decided to issue the Variation Notice to the Operator. This will allow it to continue to operate the Installation, subject to the conditions in the Consolidated Variation Notice that updates the whole permit.

We consider that, in reaching our decision, we have taken into account all relevant considerations and legal requirements and that the varied permit will ensure that a high level of protection is provided for the environment and human health.

The Consolidated Variation Notice contains many conditions taken from our standard Environmental Permit template including the relevant annexes. We developed these conditions in consultation with industry, having regard to the legal requirements of the Environmental Permitting Regulations and other relevant legislation. This document does not therefore include an explanation for these standard conditions. Where they are included in the Notice, we have considered the techniques identified by the operator for the operation of their installation, and have accepted that the details are sufficient and satisfactory to make those standard conditions appropriate. This document does, however, provide an explanation of our use of "tailor-made" or installation-specific conditions, or where our Permit template provides two or more options.

2 How we reached our decision

2.1 Requesting information to demonstrate compliance with BAT Conclusion techniques

We issued a Notice under regulation 60(1) of the Environmental Permitting (England and Wales) Regulations 2010 (a Regulation 60 Notice) on 16th December 2016 requiring the Operator to provide information to demonstrate where the operation of their installation currently meets, or how it will subsequently meet, the revised standards described in the relevant BAT Conclusions document.

The Notice required that where the revised standards are not currently met, the operator should provide information that

- Describes the techniques that will be implemented before 30th June 2020, which will then ensure that operations meet the revised standard, or
- justifies why standards will not be met by 30th June 2020, and confirmation of the date when the operation of those processes will cease within the installation or an explanation of why the revised BAT standard is not applicable to those processes, or
- justifies why an alternative technique will achieve the same level of environmental protection equivalent to the revised standard described in the BAT Conclusions.

Where the Operator proposed that they were not intending to meet a BAT standard that also included a BAT Associated Emission Level (BAT AEL) described in the BAT Conclusions Document, the Regulation 60 Notice required that the Operator make a formal request for derogation from compliance with that AEL (as provisioned by Article 15(4) of IED). In this circumstance, the Notice identified that any such request for derogation must be supported and justified by sufficient technical and commercial information that would enable us to determine acceptability of the derogation request.

The Regulation 60 Notice response from the Operator was received on 13th March 2017.

We considered it was in the correct form and contained sufficient information for us to begin our determination of the permit review but not that it necessarily contained all the information we would need to complete that determination.

The Operator made no claim for commercial confidentiality. We have not received any information in relation to the Regulation 60 Notice response that appears to be confidential in relation to any party.

2.2 Review of our own information in respect to the capability of the installation to meet revised standards included in the BAT Conclusions document

Based on our records and previous experience in the regulation of the installation we consider that the operator will be able to comply with the techniques and standards described in the BAT Conclusions. For the majority of the BAT Conclusions the operator has demonstrated that they currently operate in compliance with the requirements of the BAT Conclusions other than for those techniques and requirements described in BAT Conclusion *BAT 5, BAT 6, BAT 7, BAT 8, BAT 10 and BAT 92.* In relation to these BAT Conclusions, we do not agree with the operator in respect to their current stated capability as recorded in their regulation 60 Notice response. We are however satisfied that they intend to be compliant before 30th June 2020 (the "compliance date"). We have therefore included Improvement Conditions IC1, IC2, IC3, IC4 and IC5 in the Consolidated Variation Notice to ensure that the requirements of the BAT Conclusions are delivered before 30th June 2020.

2.3 Requests for Further Information during determination

Although we were able to consider the Regulation 60 Notice response generally satisfactory at receipt, we did in fact need more information in order to complete our permit review assessment, and issued a further information request in the form of a Regulation 61 Notice on 6th November 2017. A copy of the further information request was placed on our public register.

In addition to the responses to our further information request, we received additional information and/or clarification from the operator during the determination as follows:

- Response to our email dated 12/12/2017, and the 20/12/2017 received 27/12/2017 regarding the BAT conclusion for precious metals (BAT134 - BAT149) and providing details in regards to site process emissions to air.
- Response to our email dated 22/02/2018, received 09/03/18, regarding site processes, and providing further details in regards to emissions to air, and an updated site plan showing emission points.

We made a copy of this information available to the public in the same way as the response to our formal notices.

2.4 Surface Water Pollution Risk Assessment

As part of our delivery of the Water Framework Directive (WFD) requirements, we need to identify and assess the impact of all sources of hazardous pollutants to surface waters from regulated industry. We use the term 'hazardous pollutants' to collectively describe substances covered by the EQSD[1] (priority hazardous substances, priority substances and "other pollutants"). It also applies to the specific pollutants listed in the 2015 Directions[2], and substances which have operational (non-statutory) Environmental Quality Standards (EQS).

For all installations with discharges to surface water and/or sewer we required the operator, via our Regulation 60 Notice, to undertake a surface water pollution risk assessment, in two stages, as follows:

a) Provide emissions data for the following hazardous pollutants: silver, arsenic, cadmium, cobalt, chromium (total), chromium (VI), copper, mercury, nickel, lead and zinc. The BAT Conclusions for the Non-Ferrous Metals Industries specify BAT-AELs associated with the direct discharge of these substances to surface water. We therefore considered that these substances potentially posed the highest risk from industry and listed them in our Regulation 60 Notice. In addition, operators were required to identify and assess any other hazardous pollutants that may be present in their effluent. A full list of hazardous pollutants is included in our surface water pollution risk assessment guidance, which we 'signposted' operators to via the Regulation 60 Notice.

b) Undertake a risk assessment using the above emissions data to determine whether any hazardous pollutants were liable to cause pollution of the downstream receiving waters. The WFD requires Member States to prior regulate, all substances in a discharge which

[1] Environmental Quality Standards Directive (EQSD) (2008/105/EC, as amended by 2013/39/EU)
[2] The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015

are “liable to cause pollution”. Previously discharges from the Non-Ferrous Metals Industries were controlled on a “liable to contain” approach set by the Dangerous Substances Directive through either numeric limits, or descriptive conditions. Under the “liable to cause pollution” approach we would only consider applying numeric emission limits to those pollutants calculated to have the potential to cause pollution.

The risk assessment methodology uses a number of sequential screening steps to determine if a substance warrants detailed modelling and hence any emission limits being required, namely:

- Screen out insignificant emissions that do not warrant further investigation;
- Determine if significant load test is failed (for priority hazardous substances only);
- Decide if detailed modelling is needed;
- Assess emissions against relevant standards and set permit limits where considered necessary.

The methodology provides for undertaking assessments of both direct and indirect discharges to surface water, ‘indirect’ meaning that the effluent is discharged to foul sewer from the installation and is treated at a sewage treatment works (STW) prior to discharge to surface water. Treatment at the STW will remove a proportion of a discharged substance from the final effluent discharged to the environment. This removal needs to be taken into account when calculating the concentration of a hazardous pollutant which will be discharged to a receiving water via the sewage works. This is achieved by applying STRFs (sewage treatment reduction factors) within the screening steps.

Our intention was to use the non-ferrous metals permit review to regulate any discharge of hazardous pollutants to surface waters from this installation using the “liable to cause pollution” approach. However the operator has not provided satisfactory responses to questions 5 and 6 on our Regulation 60 Notice to enable us to undertake this aspect of the review within the agreed project timeline. We have therefore carried over this requirement into the Consolidated Variation Notice.

We have included Improvement Condition IC5 requiring the operator to submit a surface water pollution risk assessment in accordance with our guidance using representative emissions data.

The operator will be required to submit their risk assessment within 12 months of the effective date of our notice.

2.5 Condition of Soil and Groundwater

Articles 16 and 22 of the Industrial Emissions Directive (IED) require that a quantified baseline is established for the level of contamination of soil and

groundwater with hazardous substances, in order that a comparison can be made on final cessation of activities.

We have used the non-ferrous metals permit review to regulate against the above IED requirements. Our Regulation 60 Notice required operators, where the activity of the installation involved the use, production or release of a relevant hazardous substance (as defined in Article 3(18) of the Industrial Emissions Directive), to carry out a risk assessment considering the possibility of soil and groundwater contamination at the installation with such substances. Where any risk of such contamination was established we requested that the operator either:

- prepare and submit a baseline report containing information necessary to determine the current state of soil and groundwater contamination; or

- provide a summary report referring to information previously submitted where they were satisfied that such information represented the current state of soil and groundwater contamination

so as to enable a quantified comparison to be made with the state of soil and groundwater contamination upon definitive cessation the activity.

Where operators concluded that there were no risks of soil or groundwater contamination (due to there not being any release of hazardous substances), they were required to provide a copy of the risk assessment.

Details of how we have considered the operator's response is provided in Annex 4.

3 The legal framework

The Consolidated Variation Notice will be issued under Regulations 18 and 20 of the EPR The Environmental Permitting regime is a legal vehicle which delivers most of the relevant legal requirements for activities falling within its scope. In particular, the regulated facility is:

- an *installation* as described by the IED;
- subject to aspects of other relevant legislation which also have to be addressed.

We consider that, in issuing the Consolidated Variation Notice, it will ensure that the operation of the Installation complies with all relevant legal requirements and that a high level of protection will be delivered for the environment and human health.

We explain how we have addressed specific statutory requirements more fully in the rest of this document.

We have set emission limit values (ELV's) in line with the BAT Conclusions, unless a tighter, i.e. more stringent, limit was previously imposed and these limits have been carried forward. For emissions to each relevant environmental receptor (i.e. air, or surface water), the emission limits and monitoring requirements have been incorporated into the Consolidated Variation Notice via two tables in Schedule 3 – Emissions and monitoring, as follows:

Emissions to air

- Table S3.1a, the requirements of which are effective from the date of issue of the notice, and which contains the existing ELVs and monitoring requirements; and

- Table S3.1b, the requirements of which will take effect from 30th June 2020, and which contains amended ELV's where a BAT-AEL is specified in the BAT Conclusions, and any associated updated monitoring requirements.

Annex 1

Review of operating techniques within the Installation against BAT Conclusions

BAT Conclusions for the non-ferrous metals industries, were published by the European Commission on 30th June 2016. There are 184 BAT Conclusions. This annex provides a record of decisions made in relation to each relevant BAT Conclusion applicable to the installation.

This annex should be read in conjunction with the Consolidated Variation Notice.

The overall status of compliance with the BAT conclusion is indicated in the table as:

NA Not Applicable
CC Currently Compliant
FC Compliant in the future (within 4 years of publication of BAT conclusions)
NC Not Compliant

Table 1: Decision checklist for relevant BAT Conclusions		
Summary of BAT Conclusion requirement for Non-Ferrous Metals Industries	**Status** **NA / CC / FC / NC**	**Assessment of the installation capability to demonstrate compliance with the BAT Conclusion requirement** **Type of process: Lead and/or Tin Production, and Precious Metals Production**
BAT Conclusions that are not applicable to this installation	**NA**	**General BAT Conclusions for Non-Ferrous Metals Industries: 11, 12, 15-17** BAT Conclusions for copper production: 20-54 inclusive BAT Conclusions for alumina production: 55-57 inclusive BAT Conclusions for anode production: 58-63 inclusive BAT Conclusions for primary aluminium production: 64-73 inclusive BAT Conclusions for secondary aluminium production: 74-86 inclusive BAT Conclusions for salt slag recycling process: 87-89 inclusive **BAT Conclusions for lead and/or tin production: 90, 91, 94, 95, 100-106** BAT Conclusions for primary zinc production: 108-120 inclusive BAT Conclusions for secondary zinc production, 121-130 inclusive BAT Conclusions for cadmium production: 131-133 inclusive **BAT Conclusions for precious metals production: 134, 136, 137, 138, 141-146, 148, 149** BAT Conclusions for ferro-alloys production: 150-162 inclusive BAT Conclusions for nickel and/or cobalt production: 163-176 inclusive BAT Conclusions for carbon and/or graphite production: 177-184 inclusive

Table 1: Decision checklist for relevant BAT Conclusions		
Summary of BAT Conclusion requirement for Non-Ferrous Metals Industries	**Status** **NA / CC / FC / NC**	**Assessment of the installation capability to demonstrate compliance with the BAT Conclusion requirement** **Type of process: Lead and/or Tin Production, and Precious Metals Production**
BAT Conclusions where we accept the operator's Reg 60 notice response that they are currently compliant and no further explanation is required.	**CC**	**General BAT Conclusions for Non-Ferrous Metals Industries: 1-4, 9, 13, 14, 18, 19** **BAT Conclusions for lead and/or tin production: 93, 96, 97, 98, 99, 107** **BAT Conclusions for precious metals production: 135, 139, 140, 147**
BAT Conclusions where improvements will be undertaken on site within the 4 year period in order to achieve compliance with the narrative and/or BAT-AEL prior to the 4 year deadline	**FC**	**General BAT Conclusions for Non-Ferrous Metals Industries: 5-8, 10** **BAT Conclusions for lead and/or tin production: 92**
BAT Conclusions where the Operator has responded that they are not compliant and have not submitted any plans to become compliant	**NC**	**None.**

Key Issues

Where relevant and appropriate, we have incorporated the techniques described by the Operator in their Regulation 60 / 61 Notice responses as specific operating techniques required by the permit, through their inclusion in Table S1.2 of the Consolidated Variation Notice.

BAT-AELs and monitoring requirements for lead and/or tin production

The following text outlines how we have retained, adjusted or removed monitoring requirements within Table S3.1b (which shall apply from the compliance date of 30th June 2020) in line with the BAT conclusions and the BAT-AELs for the Non-ferrous metals industry. The relevant emission points from the lead production process are A2, A7, A8, A12, and A13.

The existing continuous monitoring requirements and ELVs for Particulate Matter have been removed from the permit. When previously added to the permit the monitoring requirement had been intended for quantitative measurement, but subsequent issues with the monitoring equipment and stack arrangements on site have resulted in the operator and the Environment Agency using the monitoring results as qualitative measurements only, and therefore it has been deemed that these would be more relevant to be included in the site process controls instead of the permit itself.

BAT Conclusion 10

BAT 10 sets out the minimum monitoring requirements for the NFM sector, stating that BAT is to monitor stack emissions to air with at least the frequency given and in accordance with EN standards. Furthermore, it says that 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.

A potential issue is that BAT 10 specifies that continuous monitoring is BAT for a number of parameters, but this is then qualified by footnote (1) to the monitoring table, which states:

"For sources of high emissions, BAT is continuous measurement or, where continuous measurement is not applicable, more frequent periodic monitoring."

'High emissions' are not defined in the BAT Conclusions / BREF, however the implication is that this term links to higher environmental impacts / risk. Continuous monitoring is typically used for controlling higher environmental risks, when the feedback from such monitoring is required for process controls (e.g. abatement, such as de-NOx and acid-gas scrubbing) and where the absence of such monitoring could result in a lack of sufficient control and significant impacts; or when periodic monitoring does not give sufficiently representative results.

Our view is that rather than referring to ‘high emissions’, we will consider what levels of emissions can BAT for abatement and process controls achieve, and having determined that, we will consider the following questions:

- Can periodic monitoring provide representative results?
- Can the installation keep within the ELVs under normal conditions without the need for process controls through continuous monitoring?
- Are there surrogate parameters available that can be used to reliably infer the emissions and at an acceptable level of uncertainty, in case there is a breakdown in the abatement equipment, or under abnormal operations?

If the answer is ‘yes’ to all of the above three questions, our view is that periodic monitoring could be deemed to provide a sufficient level of control and demonstration of compliance. However, if the answer is ‘no’ to one or more of the above questions - especially the first and second question, then we would consider continuous monitoring to be more appropriate for the site.

Monitoring requirements can also be influenced by environmental risk, for example, if the risks were very low, we could opt for a combination of surrogate parameters and/or more frequent periodic monitoring, rather than continuous monitoring. We will also take this into consideration when making our judgement.

We have been unable to fully consider the implications for the operator as part of this review and will require the operator to provide further information to enable us to determine with respect to monitoring frequency, what is BAT for the site, and therefore to agree the appropriate monitoring provision to be applied at the site from 30 June 2020. Our pragmatic approach to the monitoring aspects of the permit review is therefore:

1. To ensure that the existing permit has been updated to reflect current monitoring standards, in accordance with our M2 monitoring guidance. These standards are contained within Table S3.1a.

2. The inclusion of an Improvement Condition (IC4) in the permit requiring that the operator provides evidence to justify the level of monitoring to be employed, including where relevant, the frequency of periodic monitoring. That evidence will allow us to address the questions above, and facilitate agreement of the appropriate monitoring provision that will apply from 30 June 2020 onwards.

3. To carry over the existing periodic monitoring requirements in Table S3.1b pending completion of IC4, which must be submitted to the Environment Agency within 12 months of the date of issue of this variation.

In addition to the above requirements we have included periodic monitoring requirements for a number of metals (Arsenic, Antinomy, Cadmium, Copper, Silver, Tin, Zinc) within the permit. This is a requirement of BAT 10 as these metals are inherently part of the Britannia Refined Metals Ltd process. These monitoring requirements apply to emission points A2, A7 and A8, in Table S3.1b of the permit.

BAT Conclusion 13
We have incorporated a monitoring requirement for NOx emissions in accordance with the BAT Conclusions. There is no BAT-AEL applicable to emissions of NOx from pyrometallurgical processes in lead production. Monitoring of NOx shall apply to the following emission points from combustion processes: A7, A12 and A13 (as shown in Table S3.1b of the permit.).

In regards to the A7 emission point the existing ELV of 200mg/m^3 has been removed in line with the BAT Conclusions.

BAT Conclusion 96
We have amended the current ELV for Particulate Matter (extractive sampling) of 10 mg/m^3 to 4 mg/m^3 in accordance with the BAT requirements and BAT-AEL. This ELV applies to emissions from the charging, smelting/melting, tapping (discharging) in the lead production process. It therefore applies to the following emission points: A2, A7, and A8 (as shown in Table S3.1b of the permit.)

In addition we have amended the current ELV for Lead from 2 mg/m^3 to 1mg/m^3 in accordance with the BAT requirements and BAT-AEL. This ELV applies to emissions from the charging, smelting/melting, tapping (discharging) in the lead production process. It therefore applies to the following emission points: A2, A7, and A8 (as shown in Table S3.1b of the permit.)

BAT Conclusions 97
We have amended the current ELV for Particulate Matter (extractive sampling) of 10 mg/m^3 to 4 mg/m^3 in accordance with the BAT requirements and BAT-AEL. This ELV applies to emissions from the remelting, refining and casting in lead production. It therefore applies to the following emission points: A2, and A8.

In addition we have amended the current ELV for Lead from 2 mg/m^3 to 1mg/m^3 in accordance with the BAT requirements and BAT-AEL. This ELV applies to emissions from the charging, smelting/melting, tapping (discharging) in the lead production process. It therefore applies to the following emission point: A2, and A8 (as shown in Table S3.1b of the permit.)

BAT Conclusion 98
We have incorporated an ELV for TVOC of 40mg/m^3 in accordance with the BAT requirements and BAT-AEL. This ELV applies to emissions from the

smelting processes in lead production. It therefore applies to the following emission points: A2 and A8 (as shown in Table S3.1b of the permit.).

We have amended an ELV for TVOC of 50mg/m^3 in accordance with the BAT requirements and BAT-AEL. The new ELV is 40mg/m^3 and this ELV applies to emissions from the smelting/melting processes in lead production. It therefore applies to the following emission point: A7 (as shown in Table S3.1b of the permit.).

The terminology in Table S3.1 has been amended to reflect the acronym used for the substance TVOC, within the BAT Conclusions.

BAT Conclusion 99
We have retained the ELV for PCDD/F of 0.1ng/m^3 in accordance with the BAT requirements and BAT-AEL. This ELV applies to emissions from the smelting/melting processes in lead production. It therefore applies to the following emission point: A7 (as shown in Table S3.1b of the permit.).

We have incorporated an ELV for PCDD/F of 0.1ng/m^3 in accordance with the BAT requirements and BAT-AEL. This ELV applies to emissions from the smelting/melting processes in lead production. It therefore applies to the following emission points A2 and A8 (as shown in Table S3.1b of the permit.). The terminology in Table S3.1 has been amended to reflect the acronym used for the substance, PCDD/F, within the BAT Conclusions.

BAT-AELs and monitoring requirements for precious metals (silver production).

The following text outlines how we have retained, adjusted or removed monitoring requirements within Table S3.1b (which shall apply from the compliance date of 30th June 2020) in line with the BAT conclusions and the BAT-AELs outlined within the Non-ferrous metals BAT Conclusions. The relevant emission points from the silver production process are A1, A4, A5 and A6

BAT Conclusion 10
We have taken the same approach as that described in the lead and/or tin production section above. In addition we have included periodic monitoring requirements for a number of metals (Arsenic, Antinomy, Cadmium, Copper, Silver, Tin, Zinc) within the permit. This is a requirement of BAT 10 as these metals are inherently part of the Britannia Refined Metals Ltd process. These monitoring requirements apply to emission points A1, A4, A5 and A6 in Table S3.1b of the permit.)

BAT Conclusion 13
We have incorporated monitoring requirement for NOx emissions in accordance with the BAT requirements. There is no BAT-AEL for NOx in the BAT Conclusions. BAT 13 requires the operator to monitor NOx only and this requirement shall apply to the following emission points that release

emissions from combustion processes: A4, A5 and A6 (as shown in Table S3.1b of the permit).

BAT Conclusion 140

We have amended the current ELV for Particulate Matter (extractive sampling) of 10 mg/m^3 to 5 mg/m^3 in accordance with the BAT Conclusions and BAT-AEL. This ELV applies to emissions from sieving, mixing, melting, smelting, incineration, calcining, drying and refining processes in silver production. It therefore applies to the following emission points: A1, A4, A5 and A6 (as shown in Table S3.1b of the permit.)

Annex 2a

Assessment, determination and decision where an application(s) for Derogation from BAT Conclusions with associated emission levels (AEL) has been requested.

The IED enables a competent authority to allow derogations from BAT AELs stated in BAT Conclusions under specific circumstances as detailed under Article 15(4):

‘By way of derogation from paragraph 3, and without prejudice to Article 18, the competent authority may, in specific cases, set less strict emission limit values. Such a derogation may apply only where an assessment shows that the achievement of emission levels associated with the best available techniques as described in BAT Conclusions would lead to disproportionately higher costs compared to the environmental benefits due to:

(a) the geographical location or the local environmental conditions of the installation concerned; or

(b) the technical characteristics of the installation concerned.

The competent authority shall document in an annex to the permit conditions the reasons for the application of the first subparagraph including the result of the assessment and the justification for the conditions imposed. ‘

The Operator did not request derogation from compliance with any AEL included within the BAT Conclusions as part of their Regulation 60 Notice response.

Annex 2b

Advertising and Consultation on the draft decision

This section is not applicable as no derogations from BAT-AEL's have been considered, nor is the installation a site of high public interest.

Annex 3

Improvement Conditions

Based on the information in the Operator's Regulation 60 / 61 Notice responses and our own records of the capability and performance of the installation at this site, we consider that we need to set improvement conditions so that the outcome of the techniques detailed in the BAT Conclusions are achieved by the installation. These improvement conditions are set out below - justifications for them is provided at the relevant section of the decision document.

Table S1.3 Improvement programme requirements		
Reference	**Improvement Condition**	**Completion date**
IC1	The operator shall submit for approval by Environment Agency, a report that clearly demonstrates how the 'Narrative BAT' set out in BAT 5 and 92 of the Non-ferrous metals BAT Conclusions is achieved. The report shall describe the methodology implemented on site to achieve BAT. In the report the operator shall give consideration to providing extractive ventilation during charging, melting/smelting, drossing and tapping (discharging) of the pre-melting ISA kettles.	Interim progress report by 30th June 2019 Final report by 31st March 2020
IC2	The operator shall submit for approval by Environment Agency, a report that clearly demonstrates how the 'Narrative BAT' set out in BAT 7 and 8 of the Non-ferrous metals BAT Conclusions is achieved. The report shall describe the methodology implemented on site to achieve BAT. In the report the operator shall give consideration to the following site operations • Storing the ISA lead blocks in covered storage to prevent dust formation (crust formed by weathering) on their surface. • Storing intermediate materials (eg. silver plant slag, and fine process drosses) in sealed containers ready for charging into the relevant furnaces.	Interim progress report by 30th June 2019 Final report by 31st March 2020
IC3	The operator shall submit for approval by Environment Agency, a Diffuse Emission Action Plan that clearly meets the requirements of the 'Narrative BAT' set out in BAT 6 of the Non-ferrous metals BAT Conclusions. The operator shall also confirm how the action plan will be implemented into the sites EMS, and utilised to set targets to reduce the sites diffuse emissions.	Interim progress report by 30th June 2019 Final report by 31st March 2020
IC4	The operator shall undertake a review of periodic monitoring for emissions to air of Particulate Matter, Metals, and TVOC from emission point A2, A7 and A8, and Particulate Matter and Metals only from emission points A1, A4, A5 andA6, The review will be made with reference to BAT 10 of the BAT Conclusions for the Non-Ferrous Metals Industries (Commission	Within 12 months of effective date of notice V005

Table S1.3 Improvement programme requirements		
Reference	**Improvement Condition**	**Completion date**
	Implementing Decision EU2016/1032) and shall justify, with appropriate evidence, the frequency of monitoring to be employed at the installation from 30 June 2020. The evidence required under this condition shall include analysis and interpretation of monitoring results for each substance, and performance against the relevant BAT-AEL. Consideration should be given to inter alia the nature of the raw materials, fluxing agents, refining chemicals used; operational stability; and process monitoring associated with operation of abatement plant. The quantity of monitoring data considered must be justified and be sufficient so as to demonstrate that the results are statistically representative of emissions during normal operations, covering the concentration range and mass emission rate of substances emitted at all stages of the process. A report on the above review shall be submitted to the Environment Agency to facilitate agreement in writing of the appropriate monitoring provision at the installation.	
IC5	The operator shall submit a surface water pollution risk assessment to the Environment Agency for approval, which shall assess the impact of discharges of hazardous pollutants to surface water **and/or sewer** from the installation. The risk assessment shall include, but not be limited to the following: a) representative emissions data for the following hazardous pollutants: silver, arsenic, cadmium, cobalt, chromium (total), chromium (VI), copper, mercury, nickel, lead, zinc; and any other relevant substances discharged from the installation. Any emissions monitoring required should be carried out using the methods and standards described in Environment Agency M18 guidance; and a risk assessment carried out in accordance with the screening procedures in Environment Agency guidance "Surface water pollution risk assessment for your environmental permit", using the representative emissions data obtained in (a) above.	Within 12 months of effective date of notice V005

Annex 4

Review and assessment of changes that are not part of the BAT Conclusions derived permit review.

Surface Water Pollution Risk Assessment

In response to our Regulation 60 Notice the operator provided a H1 Risk Assessment and monitoring results for W1 emission point. This shows that they discharge hazardous pollutants to the River Thames. Our assessment of their document has revealed the following shortfalls in the assessment undertaken by the operator:

- **Question 5:** In regards to W1 emission point the report provides emissions data for the following hazardous pollutants: silver, arsenic, cadmium, copper, mercury, nickel, lead, and zinc. The operator has therefore not considered chromium (total), chromium (VI) or cobalt, or justified their omission. In addition the operator has not considered discharges via W2 emission point.

- **Question 6:** In response to question 6 on our Regulation 60 Notice the operator provided a completed H1 Risk Assessment. However as this did not consider the complete suite of metals or all the permitted emission points it could not be fully assessed.

Our intention was to use the non-ferrous metals permit review to regulate any discharge of hazardous pollutants to surface waters from this installation using the “liable to cause pollution” approach. However as outlined above the operator has not provided satisfactory responses to questions 5 and 6 on our Regulation 60 Notice to enable us to undertake this aspect of the review within the agreed project timeline. We have therefore carried over this requirement into the Consolidated Variation Notice.

We have included Improvement Condition IC5 requiring the operator to submit a surface water pollution risk assessment in accordance with our guidance using representative emissions data.

The operator will be required to submit their risk assessment within 12 months of the effective date of our notice.

Condition of Soil and Groundwater

In response to Question 7 on our Regulation 60 Notice the operator has submitted a Ground Contamination Overview document. This report brings together conclusions from the existing Site Protection and Monitoring Program and considers the likely emissions of hazardous substances to soil and groundwater from the site.

The Ground Contamination Overview details the historical uses of the land and revisits previously submitted baseline reports and results from

groundwater and soil monitoring results. The main hazardous substances in the groundwater and soil on-site are metals.

The Site Protection and Monitoring Programme (2016) Groundwater Monitoring report carried out by ERM concludes that '*As no sources of on-going contamination can be identified on-site the conclusion remains that the concentrations of metals detected in groundwater are likely to reflect the presence of historically buried industrial waste materials.'*

All information required has been provided, and therefore no further action are required

Point source emissions to water.

The Environment Agency also took this opportunity to update the point source emissions to water (W3 and W4) as referenced in table S3.2 in the current permit. Emission Points W3 (Local flood defence) and W4 (culvert) are not linked to the site or its processes, and water from the site is not discharged via these emission points. As both of these emission points do not belong to the permitted site they have been removed from table S3.2 of this permit.

Annex 5
Priority Compliance Issues & detailed assessment of Regulation 60 Notice responses where future action likely

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
	BAT 1-19: General requirements					
1	In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the features given	1.1	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 1. The operator has confirmed that their EMS is compliant with ISO 14001 and meets the requirements of the BAT conclusion. The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	None.
2	In order to use energy efficiently, BAT is to use a combination of the techniques given	1.2	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 2. The operators' response confirms that Britannia Refined Metals Limited employs a combination of the following techniques: • **BAT 2a:** Energy efficiency management system (eg.ISO 50001).	None.

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					• **BAT 2h:** Use oxygen enriched air or pure oxygen to reduce energy consumption by allowing autogenous smelting or the complete combustion of carbonaceous material. • **BAT 2n:** Use high efficiency electric motors equipped with variable-frequency drive, for equipment such as fans. • **BAT 2o:** Use control systems that automatically activate the air extraction rate depending on actual emissions. Based on the information above the Environment Agency are satisfied that the operator meets the requirements of this BAT Conclusion.	
3	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	1.3	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 3.	None.

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
					The response confirms that Britannia Refined Metals Limited employs a combination of the following techniques: • **BAT 3a:** Inspect and select input materials according to the process and the abatement techniques applied • **BAT 3b:** Good mixing of the feed materials to achieve optimum conversion efficiency and reduce emissions • **BAT 3c:** Feed weighing and metering systems. • **BAT 3e:** on-line monitoring of furnace temperatures and gas flow. • **BAT 3f:** 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 (eg.O^2, CO and VOC) • **BAT j:** Temperature monitoring and control at melting and smelting furnaces to prevent the generation	

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
					of metal and metal oxide fumes through overheating. During a site visit on 14th November 2017 the computerised Process Control System was observed. This contains both the technical control techniques listed above but also was a centralised collection of Standard Operating Procedures. These are 'how to' guides for both normal usage and for when systems were not operating correctly as identified by the system. Based on the information above the Environment Agency are satisfied that the operate meets the requirements of this BAT Conclusion.	
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 (see BAT 1)	3.1	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT4. The operator has confirmed that they operate a preventative maintenance system for all of its plant. This includes the air abatement systems.	None.

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
					The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	
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	3.2	CC	FC	The operator has stated in their response that they are currently compliant with BAT 5 due to their provision of LEVs and abatement systems. Although the Environment Agency recognises that certain steps in the process are covered by LEVs and abatement systems the operator has not demonstrated that they collect and treat diffuse emissions as near to the source as possible. • **House Keeping:** Transfer and handling points for dusty materials (eg. silver plant slag, and fine process drosses) are stored in internal bays. However debris can be seen around the entrances to these storage locations, creating a source of diffuse emissions. • **LEV and Abatement Systems:** Due to the design of the lid extraction for the premelting kettles,	IC1 to be signed off during ongoing compliance actions.

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
					charging, drossing and tapping stages are not covered by extraction, and is a source of potential diffuse releases. • **Surface Water Discharge:** The site surface water run-off is contaminated with metals and is treated by an effluent treatment plant prior to discharge. This demonstrates that the current diffuse dust collection is not effective as metal dusts are able to settle around the external areas of the site. It could also indicate that the external storage of raw materials could be a source of diffuse dust, which is not being collected until it enters the site drainage system. Based on the above the Environment Agency does not agree that the site is currently compliant with the requirements of BAT 5. The Environment Agency have therefore added Improvement Condition 1 (IC1) to the permit to ensure the operator reviews	

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
					their sources of diffuse emissions and reports to the Environment Agency how they are meeting BAT 5. The operator has reviewed the improvement condition and has confirmed that they will be compliant with the BAT requirements by 30th June 2020. The Environment Agency therefore considers the site to be Future Compliant and is satisfied that the operator will be compliant by the compliance date.	
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 (see BAT 1), that incorporates both of the following measures: (a) identify the most relevant diffuse dust emission sources (using e.g. EN 15445);	3.2	CC	FC	The operator has stated in their response that they are currently compliant with BAT 6. The operator has not demonstrated that they operate a Diffuse Emissions Action Plan that meets the requirements of BAT 6 The Environment Agency have therefore added Improvement Condition 3 (IC3) to the permit to ensure the operator produces a diffuse emissions action plan.	IC2 to be signed off during ongoing compliance actions.

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
	(b) define and implement appropriate actions and techniques to prevent or reduce diffuse emissions over a given time frame.				The operator has reviewed the improvement condition and has confirmed that they will be compliant with the BAT requirements by 30th June 2020. The Environment Agency considers the site to be Future Compliant and is satisfied that the operator will be compliant by the compliance date.	
7	In order to prevent diffuse emissions from the storage of raw materials, BAT is to use a combination of the techniques given	3.2	CC	FC	The operator has confirmed in their response that they are currently compliant with BAT 7. The response confirms that Britannia Refined Metals Limited employs a combination of the following techniques: • **BAT 7a:** Enclosed buildings or silos for storing dust-forming materials such as concentrates, fluxes, and fine materials. • **BAT 7b:** Covered storage of non-dust-forming materials such as fluxes, solid fuels, bulk materials and coke and secondary materials that contain water-soluble organic compounds.	None

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc

					• **BAT 7c:** Sealed packaging of dust forming materials or secondary materials that contain water-soluble organic compounds.
					• **BAT 7d:** Covered bays for sorting material which has been pelletised or agglomerated.
					• **BAT 7e:** Use water sprays and fog sprays with or without additives such as Latex for dust forming materials.
					• **BAT 7k:** 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.
					• **BAT 7m:** Collect and treat emissions from storage with an abatement system designed to	

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
					treat the compounds stored. Collect and treat before discharge any water that washes dust away. • **BAT 7n:** Regular cleaning and the storage area and , when needed, moistening with water. The Environment Agency does not agree with the operator's current assessment of compliance as listed in their responses. The site currently store the incoming lead bullion blocks in an uncovered storage area, which results in dust formation (crust formation by weathering) on their surface. Due to its brittle nature this is a source of diffuse emissions which for example could be minimised by the materials being stored under cover as per BAT 7b. In addition the storage of intermediate materials (eg. Silver plant slag, and fine process drosses) are stored in enclosed storage bays, but loose material can be found, in tyre tracks on the road and spread across the floor around these storage areas. This again is a source of diffuse emissions which could be minimised by	

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
					more appropriate use of the listed techniques, for example, BAT 7a, 7c and 7n. Even though the operator uses a number of listed BAT techniques the Environment Agency do not consider that the remaining techniques are an appropriate combination based on the handling and storage of dust forming / fine materials outlined above. To ensure compliance by the compliance date an improvement condition (IC2) has been included with in the permit. The operator has reviewed the improvement condition and has confirmed that they will be compliant with the BAT requirements by 30th June 2020. The Environment Agency are confident that the operator will be compliant by the compliance date.	
8	In order to prevent diffuse emissions from the handling and transport of raw	3.2	CC	FC	The operator has confirmed in their response that they are currently compliant with BAT 8.	

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
	materials, BAT is to use a combination of the techniques given				The response confirms that Britannia Refined Metals Limited employs a combination of the following techniques: • **BAT 8c:** Extraction of dust forming delivery points, silo vents, pneumatic transfer systems and conveyor transfer points, and connection to a filtration systems (for dust forming materials) • **BAT 8e:** Suitable containers to handle pelletised materials. • **BAT 8n:** Wash wheels and chassis of vehicles used to deliver or handle dusty materials. • **BAT 8o:** Use of planned campaigns for road sweeping. • **BAT 8q:** Minimise material transfers between processes. The Environment Agency does not agree with the operator's current assessment of compliance as listed in their responses. The site currently store the incoming lead bullion blocks in an uncovered storage	

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
					area, which results in dust formation (crust formation by weathering) on their surface. Due to its brittle nature this crust is then released during the handling and transport of the blocks. Due to the storage location of the blocks they also need to be moved numerous times which makes the problem worse. In addition the storage of intermediate materials (eg. Silver plant slag, and fine process drosses) are stored in enclosed storage bays, but loose material can be found, in tyre tracks on the road and spread across the floor around these storage areas. This again is a source of diffuse materials. Even though the operator uses a number of listed BAT techniques the Environment Agency do not consider that the remaining techniques are an appropriate combination based on the handling and storage of dust forming / fine materials outlined above.	

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
					To ensure compliance by the compliance date an improvement condition (IC2) has been included with in the permit. The operator has reviewed the improvement condition and has confirmed that they will be compliant with the BAT requirements by 30th June 2020. The Environment Agency are satisfied that the operator will be compliant by the compliance date.	
9	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	3.2	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 9. The operators' response confirms that Britannia Refined Metals Limited employs a combination of the following techniques: • **BAT 9b:** Use a closed furnace with a properly designed de-dusting system or seal furnace and other process units with an adequate vent system.	None.

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
					• **BAT 9c:** Use a secondary hood for furnace operations such as charging and tapping. • **BAT 9d:** Dust and fume collection where dusty material transfers take place (eg. Furnace charging and tapping point points covered launders) • **BAT 9e:** Optimise the design and operation of hooding and ductwork to capture fumes arising from the feed port and from the hot metal, matte or slag tapping and transfers in covered launders. • **BAT 9h:** Charging systems for semi-closed furnaces to add raw materials in small amounts. • **BAT 9i:** Treat the collected emission in an adequate abatement system. The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	
10	BAT is to monitor the stack emissions to air with at least the given frequency and in accordance with EN standards.	3.1 3.5	CC	FC	The operator has confirmed in their response that they are currently compliant with BAT 10.	IC2 to be signed off during ongoing compliance actions

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
	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 operator has confirmed that they will be able to meet the monitoring requirements (substance, frequency, and standard) as outlined in the BAT conclusions. The Environment Agency requires further information from the operator in order to determine the appropriate level of monitoring provision to be employed at the site from 30th June 2020. We have included Improvement Condition IC04 in order to obtain this information and to subsequently agree with the operator the BAT requirements for the site. We describe this aspect of our review in more detail within the Key Issues section of this decision document. The Environment Agency is unable to agree that the operator is currently compliant with the monitoring requirements of BAT 10, but we are satisfied that pending completion of IC04, the operator will be compliant by 30th June 2020.	

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
					The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	
11	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. BAT-AEL for Hg	NA	NA	NA	The operator has confirmed that there is no mercury in their raw materials therefore this BAT is not applicable.	None.
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	NA	NA	NA	The operator has confirmed in their response that the lead bullion they receive on site is free from sulphur and therefore cannot form sulphur dioxide. The sulphur dioxide extraction occurs at source at the smelter in Australia. As sulphur or sulphur containing raw materials are not being added to the process the Environment Agency has determined that this BAT conclusion is not applicable.	None.
13	In order to prevent NOx emissions to air from a pyrometallurgical process, BAT is to use one of the techniques given	3.1	CC	CC	The operator has confirmed in their response that they are compliant with BAT 13.	None.

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					The response confirms that Britannia Refined Metals Limited employs a combination of the following techniques: • **BAT 13a:** All kettles utilise Low NOx burners in all kettle settings (BAT 13a) • **BAT 13b**: All rotary furnaces use oxygen-enriched burners. The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	
14	In order to prevent or reduce the generation of waste water, BAT is to use one or a combination of the techniques given	3.1	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 14. The response confirms that Britannia Refined Metals Limited employs a following technique across the site: • **BAT 14a:** Measure the fresh water used and the amount of waste water discharged. The operators also confirm that they utilise the following techniques where appropriate. • **BAT 14e:** Re-use surface run-off.	

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator NA / CC / FC / NC	Compliance assessment conclusion NA / CC / FC / NC	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
					• **BAT 14f:** Closed circuit cooling system. The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	
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	NA	NA	NA	The Environment Agency has determined that this BAT Conclusion is not applicable for this installation as there is no on-site treatment of wastewater.	None.
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	NA	NA	NA	The Environment Agency has determined that this BAT Conclusion is not applicable for this installation as there is no discharge of process wastewater from the installation. The site do not use any water in their lead production/silver production processes.	None.

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	demonstrate sufficient stability of the emissions					
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	NA	NA	NA	The Environment Agency has determined that this BAT Conclusion is not applicable for this installation as there is no on-site treatment of waste water from the process. The site do not use any water in their lead production/silver production processes.	None.
18	In order to reduce noise emissions, BAT is to use one or a combination of the techniques given	3.4	CC	CC	The operator has confirmed in their response that there is no noise that extends beyond the site boundary. It was witnessed during an Environment Agency site visit on the 14th November 2017 that the operator was operating in line with: • BAT 18b – The main noisy plant are located within buildings. The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	None.

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19	In order to reduce odour emissions, BAT is to use one or a combination of the techniques given	3.3	CC	CC	The operator has confirmed in their response that there is no odour that extends beyond the site boundary. It was witnessed during an Environment Agency site visit on the 14th November 2017 that the operator was operating in line with: • BAT 19a – Appropriate storage of potentially odorous materials • BAT 19b – limited use of odorous substances. Dross is the only 'potential' odorous material that is used in the process. When wet dross can be a source of odour. At BRM the process drosses are collected and stored under cover before being processed on site. The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	None.
	BAT 90-107: Lead and/or tin production					

BATc Number	Compliance Issue Priority BAT indicated in **Bold Text**	Relevant permit condition	Compliance stated by Operator **NA / CC / FC / NC**	Compliance assessment conclusion **NA / CC / FC / NC**	Summary of Permitting Officer assessment against BATc techniques	Compliance Action to implement BATc
90	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	NA	NA	NA	The Environment Agency have decided that this BAT conclusion is not applicable to Britannia Refined Metals Limited. This decision has been made as the raw materials that are used by Britannia Refined Metals Limited are delivered as solid 4 tonne blocks or ingots of varying sizes of lead metal. These do need preparation or pre-treatment	None.
91	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	NA	NA	NA	The Environment Agency have decided that this BAT conclusion is not applicable to Britannia Refined Metals Limited. This decision has been made as the raw materials that are used by Britannia Refined Metals Limited are delivered as solid 4 tonne blocks or ingots of varying sizes of lead metal. These do not need preparation or pre-treatment	
92	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,	3.2	CC	FC	The operator has confirmed in their response that they are currently compliant with BAT 92.	

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	BAT is to use an appropriate combination of the techniques given				The operators' response confirms that Britannia Refined Metals Limited employs the following techniques across the site: • **BAT 92b:** sealed or enclosed furnaces with door sealing for processes with a discontinuous feed and output. • **BAT 92d:** Capture hood/enclosures at charging and tapping points. • **BAT 92e:** Enclosed buildings • **BAT 92g:** Maintain furnace sealing • **BAT 92h:** Maintain the temperature of the furnaces at the lowest required level. • **BAT 92i:** An air extraction system for charging and tapping area connected to filtration system. The Environment Agency recognises that the above list of techniques are accurate and appropriate for the rotary furnaces on site (such as the Sb rotary) that are part of the lead production process. The Environment Agency does not however consider the LEV extraction lids used on the ISA premelting kettles to be consistent with the BAT techniques listed above - this	

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					is because the lids have to be removed from the kettle during the charging, melting, drossing and tapping stages. The Environment Agency therefore does not consider the operator has demonstrated an appropriate combination of techniques for the ISA melting kettles and have incorporated an improvement condition (IC 1) requiring the operator to demonstrate how they have applied BAT to this aspect of their operation by the compliance date. The operator has reviewed the improvement condition and has confirmed that they will be compliant with the BAT requirements by 30th June 2020.	
93	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	3.2	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 93. The operators' response confirms that Britannia Refined Metals Limited employs a following technique across the site:	None.

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					• **BAT 93a:** Hood on the crucible furnace or kettle with an air extraction system. • **BAT 93b:** Lids to close the kettle during the refining reaction and addition of chemicals • **BAT 93d:** Temperature control the melt. The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	
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/or and tin production, BAT is to use a bag filter BAT-AEL for Dust	NA	NA	NA	The Environment Agency have decided that this BAT conclusion is not applicable to Britannia Refined Metals Limited. This decision has been made as the raw materials that are used by Britannia Refined Metals Limited are delivered as solid 4 tonne blocks or ingots of varying sizes of lead metal. These are non-dusting and need no preparation or pre-treatment	None.
95	In order to reduce dust and metal emissions to air from battery preparation (crushing, screening and	NA	NA	NA	The Environment Agency has determined that this BAT Conclusion is not applicable to this site as they do not process batteries.	None.

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	classifying), BAT is to use a bag filter or a wet scrubber BAT-AEL for Dust					
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 BAT-AELs for Dust and Pb	3.1	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 96. The response confirms that Britannia Refined Metals Limited's that emissions from the melting of the lead is collected and treated by actair / bag filter plant prior to discharge to air. The current air emission results are less than or equal to the BAT-AELs indicated by BAT 96 which are: • **Particulates:** 4mg/m3 • **Lead**: less than 1mg/m3. The operator has confirmed that they will monitor the following parameters as required by BAT 10 and BAT 96: • **Antimony:** no BAT-AEL • **Arsenic:** no BAT-AEL • **Cadmium:** no BAT-AEL • **Copper:** no BAT-AEL • **Silver:** no BAT-AEL	None.

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					• **Zinc:** no BAT-AEL The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	
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 use the techniques given BAT-AELs for Dust and Pb	**3.1**	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 97. The response confirms that Britannia Refined Metals Limited employs the following technique across the site: • **BAT 97a:** For pyrometallurgical processes: maintain the temperature of the melt bath at the lowest possible level according to the process stage in combination with a bag filter. During a site visit on 14th November 2017 the computerised Process Control System was observed. A demonstration was given that displayed 'live' temperature monitoring of the kettles and furnaces. This was observed in the control rooms and plant offices. It was also confirmed during the site	None.

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					visit that during 'melting' all kettles were fitted with lids with extraction systems which feed either the main bag plant or an Actair. The operators' response also confirms that Britannia Refined Metals Limited's current air emission results are less than or equal to the BAT-AELs indicated by BAT 97 which are: • **Particulates:** 4mg/m3 • **Lead**: less than 1mg/m3. The operator has confirmed that they will monitor the following parameters as required by BAT 10 and BAT 97: • **Antimony:** no BAT-AEL • **Arsenic:** no BAT-AEL • **Cadmium:** no BAT-AEL • **Copper:** no BAT-AEL • **Silver:** no BAT-AEL • **Zinc:** no BAT-AEL The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	

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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 BAT-AEL for TVOC	3.1	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 98. The response confirms that Britannia Refined Metals Limited's current TVOC air emission results are less than or equal to the BAT-AEL indicated by BAT 98 which is: • **TVOC:** 10-40mg/m3 Britannia Refined Metals Limited confirmed that their results have been within the 10-40 mg/Nm^3) range for the last 5 years. The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	
99	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 BAT-AEL for PCDD/F	3.1	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 99. The operators' response confirms that Britannia Refined Metals Limited employs the following techniques across the site: • **BAT 99h:** Use efficient dust collection systems	None.

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					• **BAT 99j:** Optimise combustion conditions to reduce the emissions of organic compounds. The operator has also confirmed that they will be able to meet the BAT-AEL for PCDD/F of 0.1ng I-TEQ/Nm^3 The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	
100	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 BAT-AEL for SO 2	NA	NA	NA	The operator has confirmed in their response that the lead bullion they receive on site is free from sulphur and therefore cannot form sulphur dioxide. The sulphur dioxide extraction occurs at source at the smelter in Australia. As sulphur or sulphur containing raw materials are not being added to the process the Environment Agency has determined that this BAT conclusion is not applicable.	None.
101	In order to prevent the contamination of soil and groundwater from battery storage, crushing, screening and	NA	NA	NA	The operator has confirmed that they do not process batteries. Therefore this BAT Conclusion in not applicable.	None.

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	classifying operations, BAT is to use an acid-resistant floor surface and a system for the collection of acid spillages					
102	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	NA	NA	NA	Our understanding is that alkaline leaching uses an alkali salt solution to remove sulphates from secondary materials prior to smelting. Typically, this is a treatment used for treating materials such as battery acid paste. The operator has confirmed that they do not process batteries, or secondary raw materials such as battery acid paste. The operator has also confirmed that their raw materials (Mount ISA crude lead) have already had the sulphur content removed from them during primary smelting. Therefore we consider this BAT Conclusion not applicable to the process undertaken at the Britannia Refined Metals site.	None.
103	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	NA	NA	NA	The operator has confirmed that they do not process batteries. Therefore this BAT Conclusion in not applicable.	None.

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	treatment plant to abate the pollutants contained in this stream					
104	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	NA	NA	NA	The operator does not undertake any primary production on site.	None.
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	NA	NA	NA	The operator has confirmed that they do not process batteries. Therefore this BAT Conclusion in not applicable.	None.
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	NA	NA	NA	The operator has confirmed that they do not process batteries. Therefore this BAT Conclusion in not applicable.	None.
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	1.4	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 107.	

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	facilitate process residues reuse or, failing that, process residues recycling, including by using one or a combination of the techniques given				The response confirms that Britannia Refined Metals Limited employs the following techniques across the site: • **BAT 107a:** Reuse the residues in the smelting process to recover lead and other metals • **BAT 107c:** Treat the residues and the wastes so that they can be used for other applications The operator has confirmed that across the site material is reused to recover lead. However there are a few materials which have low lead concentrations which makes their recovery processes inefficient. These materials are sent to specialist recovery facilities. The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	
	BAT 134-149: Precious metals production					
134	In order to reduce diffuse emissions to air from a pretreatment operation (such as crushing, sieving and mixing), BAT	NA	NA	NA	The operator has confirmed that the raw materials do not undergo any pre-treatment activities.	None.

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	is to use one or a combination of the techniques given					
135	In order to reduce diffuse emissions to air from smelting and melting (both Doré and non-Doré operations), BAT is to use all of the techniques given	3.2	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 135. The operators' response confirms that Britannia Refined Metals Limited employs the following techniques to reduce diffuse emissions to air from smelting and melting process: • BAT 135a&b: Furnace operations in the silver (Ag) processing area are undertaken in fully enclosed buildings and furnaces are where possible operated under negative pressure. • BAT 135c: processing is undertaken with LEVs and dust extraction which discharges to air via the bag filter. The operator does not operate electrically interlocked system connecting the furnace to the dust abatement system (BAT 135d). Instead the extraction and filtration systems are continuously operational 365 days a year. With robust procedural processes in	None.

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					place to ensure the extraction system is operational prior to operating the furnaces. • The work specification requires all operators to ensure that the extraction is running prior to operating a furnace. • In the case of the Ag rotary the work instruction states for the Ag rotary pre-start checks: “Ensure all baghouse sections are online and stable” because the Ag Rotary Furnace should not be operated unless all three baghouse cells are available. This can also be checked on any network computer by accessing the PCME software. Extraction in the bag house is driven by a single fan. In case of technical faults with this fan, a secondary fan of identical specification is present in the bag house. This can temporarily be used to drive extraction in the event of technical issues with the main fan.	

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					The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	
136	In order to reduce diffuse emissions to air from leaching and gold electrolysis, BAT is to use one or a combination of the techniques given	NA	NA	NA	The Operator has confirmed that this BAT Conclusion is not applicable as they do not undertake gold electrolysis or leaching on site. The Environment Agency agrees that this BAT conclusion is not applicable for Britannia Refined Metals Limited.	None.
137	In order to reduce diffuse emissions from a hydrometallurgical operation, BAT is to use all of the techniques given	NA	NA	NA	The Operator has confirmed that this BAT Conclusion is not applicable to their site as they do not undertake hydrometallurgical processes. The Environment Agency agrees that this BAT conclusion is not applicable to Britannia Refined Metals Limited.	None.
138	In order to reduce diffuse emissions to air from incineration, calcining and drying, BAT is to use all of the techniques given	NA	NA	NA	The Operator has confirmed that this BAT Conclusion is not applicable to their site as they do not undertake incineration, calcining and drying processes. The Environment Agency agrees that this BAT conclusion is not applicable to Britannia Refined Metals Limited.	None.

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139	In order to reduce diffuse emissions to air from the melting of final metal products during refining, BAT is to use both of the techniques given	3.2	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 139. The operators' response confirms that Britannia Refined Metals Limited employs the following techniques to reduce diffuse emissions to air from the melting of final metal products during refining: • BAT 139a: Enclosed furnace with negative pressure. • BAT 139b: Appropriate housing, enclosures and capture hoods with efficient extraction/ventilation. The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	
140	In order to reduce dust and metal emissions to air from all dusty operations, such as crushing, sieving, mixing, melting, smelting, incineration, calcining, drying and refining, BAT is to use one of the techniques given BAT-AEL for Dust	**3.1**	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 140. The operators' response confirms that Britannia Refined Metals Limited employs the following techniques to reduce metal emissions to air from dusty operations:	None.

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					• BAT 140a: bag filters are used widely across the site fed from LEV systems and dust collectors. The operators have also confirmed that they are not a producer of a Doré metal (BAT: 140b) and therefore we consider this technique not applicable to their process. We are satisfied that they are currently meeting the BAT-AEL of 5mg/m^3 based on their historical monitoring. The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	
141	In order to reduce NO X emissions to air from a hydrometallurgical operation involving dissolving/leaching with nitric acid, BAT is to use one or both of the techniques given BAT AEL for NO X	NA	NA	NA	The Operator has confirmed that this BAT Conclusion is not applicable to their site as they do not undertake hydrometallurgical processes. The Environment Agency agrees that this BAT conclusion is not applicable to Britannia Refined Metals Limited.	None.
142	In order to reduce SO 2 emissions to air (other than those that are routed to the sulphuric acid plant) from a melting	NA	NA	NA	The Operator has confirmed that this BAT Conclusion is not applicable to their site as do not produce a dore metal. In addition	None.

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	and smelting operation for the production of Doré metal, including the associated incineration, calcining and drying operations, BAT is to use one or a combination of the techniques given BAT-AEL for SO 2				Britannia Refined Metal's silver process doesn't contain sulphur. The Environment Agency agrees that this BAT conclusion is not applicable to Britannia Refined Metals Limited.	
143	In order to reduce SO 2 emissions to air from a hydrometallurgical operation, including the associated incineration, calcining and drying operations, BAT is to use a wet scrubber BAT-AEL for SO 2	NA	NA	NA	The Operator has confirmed that this BAT Conclusion is not applicable to their site as they do not undertake hydrometallurgical processes. The Environment Agency agrees that this BAT conclusion is not applicable to Britannia Refined Metals Limited.	None.
144	In order to reduce HCl and Cl 2 emissions to air from a hydrometallurgical operation, including the associated incineration, calcining and drying operations, BAT is to use an alkaline scrubber BAT-AELs for HCl and Cl 2	NA	NA	NA	The Operator has confirmed that this BAT Conclusion is not applicable to their site as they do not undertake hydrometallurgical processes. The Environment Agency agrees that this BAT conclusion is not applicable to Britannia Refined Metals Limited.	None.
145	In order to reduce NH 3 emissions to air from a hydrometallurgical operation using ammonia or ammonium chloride, BAT is to use a wet scrubber with sulphuric acid BAT-AEL for NH 3	NA	NA	NA	The Operator has confirmed that this BAT Conclusion is not applicable to their site as they do not undertake hydrometallurgical processes.	None.

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					The Environment Agency agrees that this BAT conclusion is not applicable to Britannia Refined Metals Limited.	
146	In order to reduce PCDD/F emissions to air from a drying operation where the raw materials contain organic compounds, halogens or other PCDD/F precursors, from an incineration operation, and from a calcining operation, BAT is to use one or a combination of the techniques given BAT-AEL for PCDD/F	NA	NA	NA	The Operator has confirmed that this BAT Conclusion is not applicable to their site as they do not undertake incineration, calcining and drying processes. The Environment Agency agrees that this BAT conclusion is not applicable to Britannia Refined Metals Limited.	None.
147	In order to prevent soil and groundwater contamination, BAT is to use a combination of the techniques given	3.2	CC	CC	The operators' response confirms that Britannia Refined Metals Limited employs the following techniques in order to prevent soil and ground water contamination. • BAT 147a The use of a sealed drainage system • BAT 147b double skinned oil tanks and within bunds. The Environment Agency is satisfied that the operator meets the requirements of this BAT Conclusion.	None.

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148	In order to prevent the generation of waste water, BAT is to use one or both of the techniques given	NA	NA	NA	The Operator has confirmed that this BAT Conclusion is not applicable to their site as they do not undertake hydrometallurgical processes, wet scrubbing or leaching. The Environment Agency agrees that this BAT conclusion is not applicable to Britannia Refined Metals Limited.	None.
149	In order to reduce the quantities of waste sent for disposal, 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	NA	NA	NA	The Operator has confirmed that this BAT Conclusion is not applicable to their site as they do not undertake wet processes (BAT 149b-h). In addition they do not operate a Dore process (BAT 149a). The Environment Agency agrees that this BAT conclusion is not applicable to Britannia Refined Metals Limited.	None.