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/BJ9878IQ
The Operator is: JBR Recovery Limited
The Installation is: West Bromwich Silver Refinery
This Variation Notice number is: EPR/BJ9878IQ/V013

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. It also provides a justification for the inclusion of any specific conditions in the permit that are in addition to those included in our generic permit template.

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.

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

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9. Annex 5 – Priority Compliance Issues & Detailed assessment of Regulation 60 Notice responses where future action is 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 31/03/17.

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 Conclusions 10, 100 and 142. In relation to these BAT Conclusions, we agree with the operator in respect to their current stated capability as recorded in their Regulation 60 Notice response. We have therefore included Improvement Conditions IC 26 and IC 27 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 11/04/18. A copy of the further information request was placed on our public register.

Further information was supplied on 25/06/18 concerning

- updated site layout plan with air emission points clearly labelled;
- proposed EWC waste codes for waste acceptance on site; and
- updated operating techniques concerning
    - briquetting of photographic film
    - installing an exhaust cooling plant after rotary furnace but prior to bag plant to protect the bag plant
    - pre-treating of printed circuit boards prior to processing in the smelter.

The information was place on our public register in the usual manner.

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.

[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

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 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.

We have used 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. The site is surfaced in concrete and bunded. Water is collected on site via sumps and recirculated, topped up as necessary from mains water. The permit does not authorise any discharge from the process to surface water or to sewer, and the operator confirmed on a site visit of 09/05/18 that there are no discharges from the site. No further assessment was considered necessary.

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.

Our intention was to use the non-ferrous metals permit review to regulate any discharge of hazardous substances to soil and groundwater. However the operator has not provided a satisfactory response to question 7 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 IC 28 requiring the operator to submit a risk assessment considering the possibility of soil and groundwater contamination where the activity involves the use, production or release of a relevant hazardous substance.

A follow-up Improvement Condition (IC 29) has also been included which requires the operator, if having established that there is a risk to soil and groundwater, to submit a baseline report compliant with Article 22 of the IED, containing information necessary to determine the current state of soil and groundwater contamination. This shall enable a quantified comparison to be made with the state of soil and groundwater contamination upon definitive cessation of activity.

The operator will be required to submit their IC 28 response within 3 months of the effective date of our notice, and their IC 29 response (if deemed necessary) within 12 months of the effective date.

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 (ELVs) 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 ELVs 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 demo the BAT Conclusion requirement Type of process: Lead Production, Precious Meta**
BAT Conclusions that are not applicable to this installation	**NA**	**General BAT Conclusions for Non-Ferrous Metals 16 and 17** BAT Conclusions for copper production: 20-54 inclus BAT Conclusions for alumina production: 55-57 inclu BAT Conclusions for anode production: 58-63 inclusi BAT Conclusions for primary aluminium production: 6 BAT Conclusions for secondary aluminium productio BAT Conclusions for salt slag recycling process: 87-8 **BAT Conclusions for lead and/or tin production: 9 104, 105 and 106** BAT Conclusions for primary zinc production: 108-12 BAT Conclusions for secondary zinc production, 121 BAT Conclusions for cadmium production: 131-133 i **BAT Conclusions for precious metals production 145** BAT Conclusions for ferro-alloys production: 150-162 BAT Conclusions for nickel and/or cobalt production: BAT Conclusions for carbon and/or graphite producti
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 6, 7, 8, 9, 13, 14, 18 and 19** **BAT Conclusions for lead and/or tin production: 9 99, 107 and 108** **BAT Conclusions for precious metals production 146, 147, 148 and 149**
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** **BAT Conclusions for lead and/or tin production: 1** **BAT Conclusions for precious metals production**
BAT Conclusions where the Operator has responded that they are not compliant and have not submitted any plans to become compliant	**NC**	**General BAT Conclusions for Non-Ferrous Metals** **BAT Conclusions for lead and/or tin production: I** **BAT Conclusions for precious metals production**

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 precious metals and lead production

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 or periodic 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-NO_x 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 or more frequent periodic 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 30th 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 (IC 27) 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 30th June 2020 onwards.
3. To carry over the existing periodic monitoring requirements in Table S3.1b pending completion of IC 27, which must be submitted to the Environment Agency within 12 months of the date of issue of this variation.

BAT 10 Continuous monitoring of particulate matter

With regard to the continuous monitoring of particulate emissions to air, whereas the BAT Conclusions specify method BS EN 13284-2, our view is that monitoring should be carried out following the principles of method BS EN 14181. Our M2 guidance on the ‘Monitoring of stack emissions to air’ states that BS EN 13284-2 is for calibration of particulate CEMS (continuous emissions monitoring systems) and is applicable to large combustion plant (LCP) and waste incineration installations (EFW) under the IED. It goes on to say that for other processes the ongoing quality assurance should follow the principles of BS EN 14181 (i.e. applying QAL2/AST and QAL3) but that a reduced number of parallel measurements may be acceptable. Therefore as

this installation is not an LCP or EFW we consider that monitoring following the principles of BS EN 14181 is more appropriate.

BAT 10 and BAT Conclusion 13 (general BAT conclusions)
As NOx levels have always been low (<10% of the permit limit), the existing limits were removed for emission points A1 and A2. However, we have included a requirement to monitor NO_x emissions in line with the BAT conclusions. This BAT does not have an AEL.

Table S3.1b of the consolidated variation notice has been updated accordingly.

BAT 10 and BAT Conclusion 94 (lead) and 140 (precious metals)
We have included an ELV for Particulate Matter of 5 mg/Nm^3 which is in accordance with the upper BAT-AEL value. This replaces the current ELV limit of 10 mg/Nm^3 for emission points A1, A3, A4, A7 and A10. Table S3.1b of the consolidated variation notice has been updated accordingly.

BAT 10 and BAT Conclusion 96 (lead)
We have included an ELV for Particulate Matter of 4 mg/Nm^3 which is in accordance with the upper BAT-AEL value. This replaces the current ELV limit of 5 mg/Nm^3 for emission point A2.

We have also included an ELV for lead of 1 mg/Nm^3 which is in accordance with the upper BAT-AEL value. This replaces the current ELV limit of 1.1 mg/Nm^3 for lead.

We have also included annual monitoring requirements for antimony, arsenic, cadmium, copper and lead, as required by the BAT conclusion. In line with the BAT requirements these do not have emission limits values.

This applies to emission point A2.

Table S3.1b of the consolidated variation notice has been updated accordingly.

BAT 10 and BAT Conclusion 97 (lead)
We have included an ELV for Particulate Matter of 4 mg/Nm^3 which is in accordance with the upper BAT-AEL value. This replaces the current ELV limit of 10 mg/Nm^3 for emission point A3.

We have also included annual monitoring requirements for antimony, arsenic, cadmium, copper and lead, as required by the BAT conclusion. In line with the BAT requirements these do not have emission limits values.

This applies to emission point 3.

Table S3.1b of the consolidated variation notice has been updated accordingly.

BAT 10 and BAT Conclusion 98 (lead)
We have retained the ELV for TVOC of 11 mg/Nm^3 which is in accordance with the range given for the BAT-AEL (10 – 40 mg/Nm^3). This applies to emission point A2. Table S3.1b of the consolidated variation notice has been updated accordingly.

BAT 10 and BAT Conclusion 100 and BAT conclusion 142 (precious metals)
We have included an improvement condition IC 26 regarding BAT 100 and BAT 142. Both of these BAT conclusions relate to the control of sulphur dioxide emissions, but have different BAT AEL ranges according to the abatement method used.

For BAT 100, providing a wet scrubber is not applicable, the range can be up to 500 mg/Nm^3. If a wet scrubber if used then the upper range is 350 mg/Nm^3.

For BAT 142, the upper range is 480 mg/Nm^3. We have therefore included the two limits on the permit; which one applies being dependent on the abatement method chosen. This will depend on the outcome of this improvement notice.

This applies to emission point A2.

Table S3.1b of the consolidated variation notice has been updated accordingly.

BAT 10 and BAT Conclusion 146 (precious metals) and BAT Conclusion 99 (lead)
We have retained the ELV for dioxins and furans (PCDD/F) of 0.1 ng I-TEQ/Nm^3 which is in accordance with the upper BAT-AEL value. This applies to emission points A1 and A2. The monitoring frequency of twice a year is more stringent than that prescribed in the BAT Conclusions (once per year) and has been retained. The terminology has been amended to reflect the acronym used for PCDD/F within the BAT Conclusions. Table S3.1b of the consolidated variation notice has been updated accordingly.

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. ‘

A summary of any derogation granted is also recorded in the Consolidated Variation Notice in accordance with the requirement of IED Article 15(4) as described above.

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-AELs 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.

We also consider that we need to set improvement conditions relating to changes in the permit not arising from the review of compliance with BAT conclusions. The justifications for these are provided in section 2.5 of this decision document.

There is one improvement condition on the existing permit which is not considered complete, (referred to as 9.2.25 in permit EPR/BJ9878IQ/V012), which has been renumbered IC 25 as shown in the table below. It requires the operator to submit a report on the commissioning of the RTO. This improvement condition has been carried forward in the consolidated permit.

If the consolidated permit contains existing improvement conditions that are not yet complete or the opportunity has been taken to delete completed improvement conditions then the numbering in the table below will not be consecutive as these are only the improvement conditions arising from this permit variation.

Table S1.3 Improvement programme requirements		
Reference	**Improvement Condition**	**Completion date**
IC 25 (referred to as 9.2.25 in Table 9.1.12 Improvement Programme, EPR/BJ9878 IQ/V012)	The Operator shall submit a written report to the Environment Agency on the commissioning of the RTO. The report shall summarise the environmental performance of the plant as installed against the design parameters set out in the Application. The report shall also include a review of the performance of the RTO against the conditions of this permit and details of procedures developed during commissioning for achieving and demonstrating compliance with permit conditions and confirm that the Environmental Management System (EMS) has been updated accordingly.	Within 4 months of the completion of commissioning.
IC 26	The operator shall submit, for approval by Environment Agency, a report setting out progress to achieving the BAT conclusion AELs where BAT is currently not achieved, but will be achieved before 30th June 2020. The report shall include, but not be limited to, the following: 1) Current performance against the BATc AEL. 2) Methodology for reaching the AELs	Progress reports by December 2019. Final report by 31st March 2020.

Table S1.3 Improvement programme requirements		
Reference	**Improvement Condition**	**Completion date**
	3) Associated targets / timelines for reaching compliance by 30th June 2020 4) Any alterations to the initial plan – for progress reports The report shall address the following BAT Conclusions: **100** and **142** concerning sulphur dioxide emissions. It will include a justification of the BAT technique/s used to achieve the BAT AEL. This will inform the decision making process as to which BAT AEL applies post 30th June 2020. [It is noted that for BAT 100 the BAT AEL range is 50 – 350 mg/Nm3 unless wet scrubbers aren't applicable, in which case the upper end of the range is 500 mg/Nm3].	
IC 27	The operator shall undertake a review of periodic monitoring for emissions to air of: • sulphur dioxide at emission point A2 • particulate matter at emission points A1, A2, A3, A4, A5, A7 and A10 • TVOC at emission points A1 and A2 The review will be made with reference to BAT 10 of the BAT Conclusions for the Non-Ferrous Metals Industries (Commission 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.	Within 12 months of effective date of notice V013
IC 28	The operator shall submit to the Environment Agency for approval a risk assessment considering the possibility of soil and groundwater contamination at the installation where the activity involves the use, production or release of a relevant hazardous substance (as defined in Article 3(18) of the Industrial Emissions Directive). The risk assessment shall clearly establish with	Within 3 months of effective date of notice V013

Table S1.3 Improvement programme requirements		
Reference	**Improvement Condition**	**Completion date**
	appropriate evidence whether or not there is a risk of contamination of soil and groundwater.	
IC 29	Where the risk assessment carried out under IC 28 above establishes a risk to soil and groundwater the operator shall: a) prepare and submit a baseline report compliant with Article 22 of the Industrial Emissions Directive (IED) containing information necessary to determine the current state of soil and groundwater contamination; or b) provide a summary report referring to information previously submitted where the operator is satisfied that such information represents 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 of activity.	Within 12 months of effective date of notice V013

Annex 4

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

Pre-operational measures

Pre-operational measures for future development referenced in Table 1.1.2 of permit V012 as PO1, PO2 and PO3 relating to commissioning of the regenerative thermal oxidiser have been removed, as they have been completed.

Listed activities

The listed activities have not changed but the silver refining process and lead refining process descriptions have been clarified; the production of non ferrous metals production pathway (Section 2.2 A(1)(a) activities) have been amended to reflect the activities as a continuous process from raw material input until silver or lead product production.

The annual limit as outlined in tables S1.1 and S2.2 for the amount of Printed Circuit Boards that can be accepted on site has been increased to from 500 Tonnes to 1000 Tonnes. The maximum quantity of permitted waste for the site remains at 13000 Tonnes.

Operating techniques

The opportunity has been taken to update the operating techniques to include some of the changes in operation at the site. Table S2.3.1 has been updated accordingly. The changes relate to:

- briquetting the photographic film prior to the blast furnace, to use as a fuel as well as a secondary raw material (photographic film has a high calorific value). This would reduce coke usage, and hence reduce use of a fossil fuel and sulphur dioxide emissions to atmosphere
- installing an air forced cooling facility prior to the rotary bag plant. This will improve environmental protection as it will protect the bag plant from very hot exhaust gases
- pre-treating PCBs prior to processing in the blast furnace. This will be an environmental improvement, as the smelting will only be processing the non ferrous metals, with the majority of other PCB components removed prior to smelting.

Removal of silver monitoring requirements (emission points A4, A5, A7 and A10)

Monitoring results have previously been reviewed at the site. As a result of this review, the operator requested in a formal letter (07/06/13) that the

requirement to monitor silver be removed from the following emission points, with the following justifications:

A4 – Sampling department

Silver monitoring results has always been well below permit limits. Throughput of material is very small. Silver is a small percentage of the material sampled. Silver emissions are directly related to particulate emissions which have always been below permit limits and will still be monitored. Silver metal balance is also monitored throughout the processes.

A7 – Blast furnace blender

The blender dry bag filter plant is fitted with a differential pressure alarm that will alert staff to a problem with the bag. Silver is a small percentage of the material content being blended. Silver emissions are directly related to particulate emissions which have always been below permit limits and will still be monitored. Silver metal balance is also monitored throughout the processes.

A5 and A10 – refinery cells

Silver emissions are directly related to particulate emissions which have always been below permit limits and will still be monitored. Silver metal balance is also monitored throughout the processes.

The Environment Agency has accepted this request, and the opportunity taken to update the permit accordingly.

Annex 5

Priority Compliance Issues & detailed assessment of Regulation 60 Notice responses where future action is 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	CC	CC	The operator indicates in their response that they are currently compliant with BAT 1. They operate an Environmental Management System (EMS) that complies with the requirements of BAT 1. It is an accredited system certified to ISO14001. 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 states in their response they are currently compliant with BAT 2. They use a combination of techniques to achieve compliance: d - regenerative thermal oxidiser for the blast furnace emissions abatement e - preheating of the blast furnace charge, coke and combustion air from the smelting process	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
					i - drying wet sampling materials at low temperature The operator also monitors energy usage and performance. They are not in a Climate Change Levy agreement. The Environment Agency is satisfied the operator is currently compliant with 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	FC	CC	The operator indicates in their response that they will be compliant with BAT 3 by May 2020. JBR Recovery Limited's process control measures include work manuals, inspection and selection of materials relevant to the process, mixing / blending feed materials for optimum smelting, monitoring of incineration and smelting temperatures, furnace pressure and gas flow. JBR state; "all of the materials that are processed through our plant go through an analysis to ascertain what is in the material. This is then balanced through the plant if there is a requirement to do so. This relates to the efficiency of the plant rather than any environmental impacts, all of our plants are covered by bag filters. We also have continuous monitoring on key plant and	Confirm by inspection

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
					scientific testing on a 6 monthly basis. A charge schedule is issued to the operators everyday so they are aware of what is required to be charged into the plants". Currently JBR employ the following techniques: a - inspection and selection of materials relevant to the process and abatement techniques applied b – good mixing of the feed materials to achieve optimum conversion efficiency and reduce emissions and rejects e - monitoring of incineration and smelting temperatures, furnace pressure and gas flow. The Environment Agency is satisfied that the operator the operator has process control systems in place and techniques being employed to be able to consider them currently compliant with this BAT conclusion. The Environment Agency also note that JBR intend to further work they to further improve process controls. This includes working with blast furnace consultants to improve its efficiency through: the use of weigh hoppers for more consistent	

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, and reducing the amount of coke required for smelting etc. JBR are currently awaiting the consultant's report for the process control recommendations which shall be added to the action plan in the new consolidated permit.	
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)	1	CC	CC	The operator indicates in their response that they are currently compliant with BAT 4. They have a maintenance management system in place which is part of their EMS system. It includes abatement systems, bag filters, ducting etc. The Environment Agency are satisfied they are currently compliant with this BAT conclusion.	None
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	CC	The operator indicates they are currently compliant with BAT 5. Diffuse emissions from dusty operations are collected in either bins or water tanks within the bag plants where the dust is generated. LEVs are in operation, and air emissions abated.	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 the operator is currently compliant with this BAT conclusion.	
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); (b) define and implement appropriate actions and techniques to prevent or reduce diffuse emissions over a given time frame.	1	CC	CC	The operator indicates in their response that they are currently compliant with BAT 6. The operator has an Environmental Aspects and Impacts register incorporated as part of their EMS. Dusty emissions are identified and actions implemented, for example adding water sprays in blast furnace fork lift truck routes. The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	None
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	CC	The operator indicates in their response that they are currently compliant with BAT 7. Control measures for preventing diffuse emissions from storage of raw materials are documented in the Environmental Aspects and Impacts register.	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
					They employ a combination of techniques to achieve compliance: a – enclosed buildings or silos/bins for storing dust-forming materials such as concentrates, fluxes and fine materials (enclosed Goods In building) c – sealed packaging of dust-forming materials or secondary materials that contain water soluble organic compounds (sealed drums for dust) e – use water sprays and fog sprays with or without additives such as latex for dust-forming materials (water sprays for dust suppression) m – 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 (the site is bunded and sump material is regularly pumped out, the collected sludge processed through our blast furnace for the silver content) n – regular cleaning of the storage area and, when needed, moistening with water (regular cleaning of storage areas).	

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 is currently compliant with this BAT conclusion.	
8	In order to prevent diffuse emissions from the handling and transport of raw materials, BAT is to use a combination of the techniques given	3.2	CC	CC	The operator indicates in their response that they are currently compliant with BAT 8. The Environmental Aspects and Impacts register documents the control measures in place for preventing diffuse emissions from transporting and handling of raw materials. The operator employs a combination of techniques to achieve compliance: c – extraction of dust from delivery points, silo vents, pneumatic transfer systems and conveyor transfer points, and connection to a filtration system (blending of materials in an enclosed blender with extraction) d – closed bags or drums to handle materials with dispersible or water-soluble components (transport dusts in covered bins) f – sprinkling to moisten the materials at handling points (damping materials prior to feeding onto the blast furnace conveyors) n – wash wheels and chassis of vehicles used to deliver or handle dusty materials	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
					(washing wheels and chassis of delivery vehicles that deliver photographic sludge) The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	
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 indicates in their response that they are currently compliant with BAT 9. Control measures for preventing diffuse emissions from metal production are documented in the Environmental Aspects and Impacts register. The operator employs a combination of techniques to achieve compliance: d – dust or fume collection where dusty material transfers take place (i.e. furnace charging and tapping points) (metal production (blast and cupel furnace) have fitted extraction for dust and fume capture). i – treat the collected emissions in an adequate abatement system (the collected emissions are ducted to bag filter plants for treatment) The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	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
10	BAT is to monitor the stack emissions to air with at least the given frequency 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	3	CC	FC	The operator indicates in their response that they are currently compliant with BAT 10. However, 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 30 June 2020. We have included Improvement Condition IC 27 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 IC2, the operator will be compliant by 30 June 2020.	Confirm future compliance via Improvement Condition IC 27.
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.	NA	NA	NA	The operator states in their response that BAT 11 is not applicable to their installation. The operator confirmed in at a site visit (09/05/18) that no raw materials containing mercury are accepted at the site.	NA

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-AEL for Hg				The Environment Agency is satisfied this BAT conclusion does not apply.	
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 indicated in their Reg 60 response that they would be future compliant with BAT 12 (which is applicable to plants producing silver or lead). During our site visit of 09/05/18 the operator stated that BAT 12 was not applicable to their installation because they do not use sulphur or sulphurous compounds in their feedstock, and that it would not be practical to apply this narrative BAT to their process. However, the operator does use coke (which contains sulphur) as a fuel in the blast furnace for the smelting process, and this does result in sulphur dioxide emissions in the off-gas from the smelter (emission point A2). BAT Conclusions 100 and 142 are also concerned with the reduction of sulphur dioxide emissions to air, and contain BAT-AELs. The operator has stated that they will be compliant with these BAT conclusions by the compliance date of 30/06/20. In considering the operator to be 'future compliant' with these BATs (see later sections), we have included Improvement	NA

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
					Condition 26 in the varied permit which requires the operator to report the following: 1. current performance against the BATc AEL 2. methodology for reaching the AELs 3. associated targets / timelines for reaching compliance by 30th June 2020 4. any alterations to the initial plan in order to achieve the BAT-AEL sulphur dioxide limit by the compliance date. The operator has also stated that they shall investigate reducing the production of sulphurous compounds from the smelting process through the use of low sulphur fuels, including the potential use of briquetted photographic film. The Environment Agency therefore considers that in meeting both the narrative and BAT-AEL elements of BAT 100 and BAT 142 respectively, in combination with the use of lower sulphur / alternative fuels, an equivalent level of environmental protection will be provided to that which would be achieved via the installation of a dedicated	

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
					sulphur recovery plant, as required under BAT 12. We are therefore satisfied that BAT 12 should not apply to the installation.	
13	In order to prevent NOx emissions to air from a pyrometallurgical process, BAT is to use one of the techniques given	3	CC	CC	The operator states in their response that they are currently compliant with BAT 13. They employ one of the techniques given: b – oxy-fuel burners There is no BAT-AEL associated with this BAT conclusion. The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	None
14	In order to prevent or reduce the generation of waste water, BAT is to use one or a combination of the techniques given	1.3	CC	CC	The operator indicates in their response that they are currently compliant with BAT 14. They state, “main water use on site is for dust suppression through water sprays and jet washing for cleaning. This water is continuously recycled.” They therefore use one of the listed techniques to achieve compliance: b – reuse waste water from cleaning operations and spills in the same process.	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 the operator is currently compliant with 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	1.3	NA	NA	The operator indicates in their response that BAT 15 is not applicable. The Environment Agency has determined that this BAT Conclusion is not applicable for this installation as there is no on-site treatment of wastewater.	NA
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	NA	NA	NA	The Environment Agency has determined that this BAT Conclusion is not applicable; there are no emissions to surface water or sewer. The site is concreted, bunded and all site water is collected in sumps and recirculated.	NA
17	In order to reduce emissions to water, BAT is to treat the leakages from the	NA	NA	NA	The Environment Agency has determined that this BAT Conclusion is not applicable	NA

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
	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				for installations which only discharge wastewater to sewer or have waste water taken off-site for treatment. The BAT-AELs for BAT 17 relate to direct emissions to receiving waters (as opposed to indirect emissions made via the foul sewer). It is our view that the intention of BAT 17 is to ensure that surface waters are appropriately protected, through the prevention of direct discharges which may otherwise have been made without (or with minimal) treatment.	
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 indicates in their response that they are currently compliant with BAT 18. They have a maintenance management system in plant that ensures plant is kept running with minimal noise. The majority of activities take place within an enclosed building (technique b) and the whole site is enclosed by walling (technique a). The Environment Agency is satisfied that the operator is currently compliant with this BAT conclusion.	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
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 indicates in their response that they are currently compliant with BAT 19. They use technique a – appropriate storage and handling of odorous materials to achieve compliance. They state "odour management procedures in place for receipt and handling of our most odorous materials – photographic sludge. Receipts and handling only during night shift hours and odour neutralising sprays installed around receiving bunker." The extant permit (V012) also has an improvement condition to review the odour management plan by 20/05/17 which has been completed. The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	None
	BAT 90-107: Lead and/or tin production					
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	3	CC	CC	The operator states in their response that they are currently compliant with BAT 90. They employ one of the techniques given to achieve BAT:	None

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	batteries), BAT is to use one or a combination of the techniques given				b – enclosed equipment. Emissions are collected and sent to an abatement system. The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	
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 operator states in their response that BAT 91 is not applicable to their operation as they do not do any material pretreatment with regard to lead activities. The Environment Agency is satisfied this BAT conclusion is not applicable.	NA
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, BAT is to use an appropriate combination of the techniques given	3	CC	CC	The operator states in their response that they are currently compliant with BAT 92. They use an appropriate combination of techniques given. For example, collection of diffuse emissions using Local Exhaust Ventilation systems (technique d), which is then extracted via an air extraction system going to an abatement system (technique l). The operation takes place in an enclosed building (technique e). The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	None

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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	CC	CC	The operator states in their response that they are currently compliant with BAT 93. They employ a combination of techniques given to achieve compliance: a – hood on the furnace with an air extraction system d – temperature control of the melt (confirmed at site visit of 09/05/18). The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	None
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	3	CC	CC	The operator stated in their response that this is not required however, it was confirmed at a site visit (09/05/18) that the operator answered BAT 94 and BAT 95 the wrong way round. Hence, the operator states in their response that they are currently compliant with BAT 94. They use a bag filter and will comply with the associated BAT-AEL for particulate matter (5 mg/Nm^3). The relevant emission points are: A1, A2 The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	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
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 BAT-AEL for Dust	NA	NA	NA	BAT 95 is not applicable as the operator does not accept and crush batteries.	NA
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	CC	CC	The operator states in their response that they are currently compliant with BAT 96. They use a bag filter and can comply with the BAT-AEL for particulate matter (4 mg/Nm^3) and lead (1 mg/Nm^3). The relevant emission point is: A2 The operator has confirmed during a site visit (09/05/18) 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	None

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					The Environment Agency is satisfied the operator is currently compliant with 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	CC	CC	The operator states in their response that they are currently compliant with BAT 97. They use technique a (control temperature of the melt in conjunction with a bag filter) and can comply with the BAT-AEL for particulate matter (4 mg/Nm^3) and lead (1 mg/Nm^3). The relevant emission point is: A3 The operator has confirmed during a site visit (09/05/18) 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 The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	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
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	CC	CC	The operator states in their response that they are currently compliant with BAT 98. They use technique c – regenerative thermal oxidiser to achieve compliance and can comply with the BAT-AEL for TVOC (40 mg/Nm^3). The relevant emission point is: A2 The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	None
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	CC	CC	The operator states in their response that they are currently compliant with BAT 99. They use technique d – regenerative thermal oxidiser to achieve compliance and can comply with the BAT-AEL for PCDD/F (0.1ng I-TEQ). The relevant emission point is: A3 The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	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
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	3	FC	FC	BAT Conclusions 100 and 142 both relate to the control of SO_2 emissions. The operator indicated in their response to BAT 142 that they will be future compliant with the BAT conclusion. Their comments on BAT 142 also apply to BAT 100, as the same furnace is used to smelt silver and lead. For BAT 100 the BAT-AEL range is 50-350mg/Nm^3, unless when wet scrubbers are not in use, when the upper limit is 500 mg/Nm^3. The BAT-AEL for BAT 142 is 480 mg/Nm^3 at the upper end of the range. See Key Issues section for further information. The Environment Agency is therefore satisfied that pending completion of IC1 the operator will be compliant with this BAT conclusion by 30 June 2020.	Confirm compliance via improvement condition (IC 26)
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	NA	NA	NA	The operator states in their response that BAT 101 is not applicable to their site. They do not store, crush or screen batteries. The Environment Agency agrees this BAT conclusion is not applicable to the installation.	NA

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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	The operator states in their response that BAT 102 is not applicable to their site. They do not have an alkaline leaching process. The Environment Agency agrees this BAT conclusion is not applicable to the installation.	NA
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 treatment plant to abate the pollutants contained in this stream	NA	NA	NA	The operator states in their response that BAT 103 is not applicable to their site. They do not prepare batteries. The Environment Agency agrees this BAT conclusion is not applicable to the installation.	NA
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 states in their response that BAT 104 is not applicable to their site. They do not undertake primary lead production.The Environment Agency agrees this BAT conclusion is not applicable to the installation.	NA
105	In order to allow the recovery of the polypropylene and polyethylene content of the lead battery, BAT is to	NA	NA	NA	The operator states in their response that BAT 105 is not applicable to their site. They do not process batteries.	NA

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
	separate it from the batteries prior to smelting				The Environment Agency agrees this BAT conclusion is not applicable to the installation.	
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 states in their response that BAT 106 is not applicable to their site. They do not process batteries. The Environment Agency agrees this BAT conclusion is not applicable to the installation.	NA
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	1.3	CC	CC	The operator confirmed in their response to BAT 149 that blast furnace slag is reprocessed through the blast furnace to recover all possible precious metal content. Also all process dusts, dust collected in on-site sumps are processed through the blast furnace to recover precious metal. This response is also relevant for BAT 107. The operator uses technique a - reuse the residues in the smelting process to recover lead and other metals. The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	None
	BAT 134-149: Precious metals 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
134	In order to reduce diffuse emissions to air from a pretreatment operation (such as crushing, sieving and mixing), BAT is to use one or a combination of the techniques given	3	CC	CC	The operator indicates in their response that they are currently compliant with BAT 134. They employ a combination of techniques to achieve compliance: a – enclose pretreatment areas and transfer systems for dusty materials b – connect pretreatment and handling operations to dust collector or extractors via hoods and a ductwork system for dusty materials (diffuse emissions to air from blending ash/sweeps prior to feeding into the blast furnace is done in an enclosed blending machine. The resulting dust is re-processed through the blast furnace). The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	None
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	CC	CC	The operator indicates in their response that they are currently compliant with BAT 135.They employ all the techniques given: a – enclose buildings and / or smelting furnace areas b – perform operations under negative pressure	None

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					c- connect furnace operations to dust collectors or extractors via hoods and a ductwork system d – electrically interlock furnace equipment with their dust collector or extractor, in order to ensure that no equipment may be operated unless the dust collector and filtering system are in operation. The Environment Agency is satisfied the operator is currently compliant with 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 indicates in their response that BAT 136 is not applicable. It only applies to emissions from leaching and gold electrolysis which is not undertaken at the installation. The Environment Agency is satisfied this BAT conclusion does not apply.	NA
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 indicates in their response that BAT 137 is not applicable. They do not undertake a hydrometallurgical process. As this BAT conclusion only applies to a hydrometallurgical process the Environment Agency is satisfied this BAT conclusion does not apply.	NA

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138	In order to reduce diffuse emissions to air from incineration, calcining and drying, BAT is to use all of the techniques given	3	CC	CC	The operator indicates in their response that they are currently compliant with BAT 138. They use technique a – connect all calcining furnaces, incinerators and drying ovens to a ductwork system extracting process exhaust gases (diffuse air emissions from incineration are captured by extraction and dusted to a designated bag filter plant. The resulting dust is held in sealed bins for processing in the blast furnace). They do not have a scrubber plant on this system so techniques b and c are not applicable. The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	None
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	CC	CC	The operator indicates in their response they are currently compliant with BAT 139. They employ the two techniques to achieve compliance – enclosed furnace and appropriate housing, enclosures and capture hoods with efficient extraction (confirmed at site visit of 09/05/18). The operator makes the point “the final metal pour is London Bullion Market Association certified silver (minimum 99.9%	None

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					silver) so minimal diffuse emissions. Local extraction is more for operator comfort than for emissions." The Environment Agency is satisfied the operator is currently compliant with 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	FC	CC	The operator indicates in their response they will be future compliant with BAT 140. They state, "to reduce dust and metal emissions to air from all dusty operations (incineration, drying ovens, sieving, milling, blending, smelting, refining) extraction linked to bag filter plants are in place. The resulting dust is held in sealed bins for processing in the blast furnace. Current permit limit for dusts is 10mg/m^3, we shall comply with the revised limit of 2-5 mg/m^3." The relevant emission points are: A1, A2, A3 and A7 See Key Issues section for more detail. As monitoring results show the operator can currently comply with the BAT-AEL the Environment Agency is considers the operator is currently compliant with this BAT conclusion.	None

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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 states in their response that BAT 141 is not applicable. The operator does not undertake a hydrometallurgical process. The Environment Agency is satisfied this BAT conclusion is not applicable	NA
142	In order to reduce SO_2 emissions to air (other than those that are routed to the sulphuric acid plant) from a melting 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	3	FC	FC	BAT Conclusions 100 and 142 both relate to the control of SO_2 emissions. The operator indicated in their response to BAT 142 that they will be future compliant with the BAT conclusion. Their comments on BAT 142 also apply to BAT 100, as the same furnace is used to smelt silver and lead. For BAT 100 the BAT-AEL range is 50-350mg/Nm^3, unless when wet scrubbers are not in use, when the upper limit is 500 mg/Nm^3. The BAT-AEL for BAT 142 is 480 mg/Nm^3 at the upper end of the range. See Key Issues section for further information. The Environment Agency is therefore satisfied that pending completion of IC 26 the operator will be compliant with this BAT conclusion by 30 June 2020.	Confirm compliance via improvement condition (IC 26)

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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 indicates in their response that BAT 143 is not applicable. The operator does not undertake a hydrometallurgical process. As BAT 143 only applies to a hydrometallurgical process the Environment Agency is satisfied this BAT conclusion does not apply.	NA
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 indicates in their response that BAT 144 is not applicable. The operator does not undertake a hydrometallurgical process. As BAT 144 only applies to a hydrometallurgical process the Environment Agency is satisfied this BAT conclusion does not apply.	NA
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 indicates in their response that BAT 145 is not applicable. The operator does not undertake a hydrometallurgical process. As BAT 145 only applies to a hydrometallurgical process the Environment Agency is satisfied this BAT conclusion does not apply.	NA
146	In order to reduce PCDD/F emissions to air from a drying operation where the raw materials contain organic	3	CC	CC	The operator states in their response that they are currently compliant with BAT 146.	None

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	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				They state, "permit limit is 0.1ng/m^3 for emission points A1 and A2. This is complied with through the use of A1 – high temperatures of above 850^{o}C with afterburner, rapid quenching, injection of activated lime carbon prior to bag filter plant (techniques a, be and f) A2 – a Regenerative Thermal Oxidiser."(technique a). This BAT-AEL applies to emission points: A1 and A2 The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	
147	In order to prevent soil and groundwater contamination, BAT is to use a combination of the techniques given	3	CC	CC	The operator states in their response that they are currently compliant with BAT 147. They use a combination of techniques given to achieve BAT: a – use of sealed drainage systems b – adequate bunding The Environment Agency is satisfied the operator is currently compliant with 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	1.3	CC	CC	The operator states in their response that they are currently compliant with BAT 148. They use one technique given to achieve BAT: b – recycling of solutions from leaching, extraction and precipitation operations. The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	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	1.4	CC	CC	The operator indicates in their response that they are currently compliant with BAT 149. They employ a combination of techniques to achieve compliance: a – recovery of the metal content from slags, filter dust and residues (blast furnace slag is reprocessed through the blast furnace to recover all possible precious metal content. Also all process dusts, dust collected in on-site sumps are processed through the blast furnace to recover precious metal). c – recovery of silver from spent electrolyte and spent slime washing solutions (spent electrolyte from the silver refining cells is processed for silver recovery)	None

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					g – recovery of platinum group metals from platinum group metal-enriched solutions (spent electrolyte from the refinery cells slimes for platinum group metals is processed for platinum recovery). In addition the washed slag goes for re-use as aggregate. General site / canteen waste is sent to a registered treatment site to be processed for Solid Recovered Fuel and Residual Derived Fuel. The Environment Agency is satisfied that the operator is currently compliant with this BAT conclusion.	