

## **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/CP3633KN

The Operator is: Baird & Co. Limited

The Installation is: Gemini Business Park Precious Metal Refinery

This Variation Notice number is: EPR/CP3633KN/V003

#### **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 30<sup>th</sup> 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 13<sup>th</sup> 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.

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 16<sup>th</sup> 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 30<sup>th</sup> June 2020, which will then ensure that operations meet the revised standard, or
- justifies why standards will not be met by 30<sup>th</sup> 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 04/04/17.

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 1, 6 and 10. 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 and understand that they will be compliant before 30<sup>th</sup> June 2020 (the “compliance date”). We have therefore included Improvement Conditions IC1 and IC2 in the Consolidated Variation Notice to ensure that the requirements of the BAT Conclusion are delivered before 30<sup>th</sup> 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 23/03/18. A copy of the further information request was placed on our public register. The operators response was received on 06/04/18.

In addition to the response to our further information request, we received additional information/clarification from the operator providing an updated site layout plan, with air emission points clearly labelled, during the determination as follows:

- Response to our email dated 04/06/18, received 15/06/18.

### 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<sup>1</sup> (priority hazardous substances, priority substances and "other pollutants"). It also applies to the specific pollutants listed in the 2015 Directions<sup>2</sup>, 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.

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<sup>1</sup> Environmental Quality Standards Directive (EQSD) (2008/105/EC, as amended by 2013/39/EU)

<sup>2</sup> 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. Based on the written submissions provided in response to our Regulation 60 Notice the operator has confirmed that they discharge hazardous pollutants to surface water via the foul sewer. Details of how we have considered the operator’s response is provided in Annex 4.

## 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.

Based on the written submissions provided in response to our Regulation 60 Notice the operator states “as the floor within the fully enclosed high security building where all permitted activities are performed is built directly on hard standing, with no direct access to any drainage it has been determined that there is no pollution-receptor pathway present, therefore the risk of soil/water contamination is non-existent from the permitted activities”. No further assessment was deemed necessary.

### **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 air, 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 30<sup>th</sup> 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 30<sup>th</sup> 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

<b>Table 1: Decision checklist for relevant BAT Conclusions</b>		
<b>Summary of BAT Conclusion requirement for Non-Ferrous Metals Industries</b>	<b>Status NA / CC / FC / NC</b>	<b>Assessment of the installation capability to demonstrate compliance with the BAT Conclusion requirement Type of process: PRECIOUS METALS</b>
BAT Conclusions that are not applicable to this installation	<b>NA</b>	<p><b>General BAT Conclusions for Non-Ferrous Metals Industries: 11, 12, 13, 16, 17</b></p> <p>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: 90-107 inclusive            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</p> <p><b>BAT Conclusions for precious metals production: 138, 142, 145, 146</b></p> <p>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</p>

**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: PRECIOUS METALS
BAT Conclusions where we accept the operator's Reg 60 notice response that they are currently compliant and no further explanation is required.	<b>CC</b>	<b>General BAT Conclusions for Non-Ferrous Metals Industries: 2, 3, 4, 5, 7, 8, 9, 14, 15, 18 and 19</b> <b>BAT Conclusions for precious metals production: 134, 135, 136, 137, 139, 140, 141, 143, 144, 147, 148 and 149</b>
BAT Conclusions where improvements will be undertaken on site within the 4 year period in order to achieve compliance with the narrative and/or BATAEL prior to the 4 year deadline	<b>FC</b>	<b>General BAT Conclusions for Non-Ferrous Metals Industries: 1, 6 and 10</b> <b>BAT Conclusions for precious metals production: None</b>
BAT Conclusions where the Operator has responded that they are not compliant and have not submitted any plans to become compliant	<b>NC</b>	<b>General BAT Conclusions for Non-Ferrous Metals Industries: None</b> <b>BAT Conclusions for precious metals production: None</b>

## **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.

### **Consideration of Section 4.2 activities**

The operation of the installation comprises activities that are permitted under both Sections 2.2 and 4.2 of Schedule 1 of the Environmental Permitting Regulations 2016 (EPR), which relate to the non-ferrous metals (NFM) sector and the inorganic chemicals sector respectively. The Section 4.2 activities principally concern the hydrometallurgical refining of gold and silver, operations which are likely to result in emissions to air of hydrogen halides and oxides of nitrogen. Although permitted as Section 4.2 activities the processes are closely described in the NFM BREF and BAT Conclusions, however due to the way in which EPR is implemented, these activities do not fall under the non-ferrous metals section of EPR.

The driver for reviewing this permit is the publication of the NFM BAT Conclusions in June 2016 because it was considered that the Section 2.2 activity undertaken in the Melt shop was the main activity of the Installation. Under the Industrial Emissions Directive (IED) our obligation is to review a permit within 4 years of the BAT Conclusions being produced for the main activity of an installation, taking into account all new or updated BAT Conclusions applicable to the installation (IED, article 21(3)). While this is clearly a reference to activities explicitly covered by the BAT Conclusions, we also consider that this brings within scope of the BAT Conclusions any other parts of the installation that we consider appropriate whether part of the main activity or not. In this case, due to widespread use of hydrometallurgical activities within precious metals production, and due to the fact that BAT for these activities is set out in the NFM BAT Conclusions, we have taken the decision to review the Section 4.2 activities and apply BAT as set out in the NFM BAT Conclusions. We consider that the NFM BREF is the most appropriate BREF for the installation.

### **Discharge to sewer – pH emission limit**

We have removed the pH limit on the waste water emission to foul sewer. Originally the installation did not have a trade effluent consent from the sewerage undertaker (Thames Water), as the sewerage undertaker considered the discharge de-minimis. However, the discharge to sewer is now consented under a trade effluent consent (issued in June 2015) which includes a pH limit. To avoid duplication we have therefore removed the pH limit as part of the review. It should be noted that we are satisfied the operating techniques and process controls in place at the installation will provide safeguards to ensure the waste water is not discharged outside the parameters set by the sewerage undertaker.

## **Emission points to air**

The operator has separated the air emission from the Miller Process from the other gold and silver refining activities. The Miller Process room has been provided with its own extraction and abatement system and emission point. Total emissions have not changed and the emission point has only moved a few metres. The permitted emission points are now as follows (as per amended site layout plan (ref: Baird & Co. Ducting Plan) received on 15/06/18:

A1 – Stack serving Miller process

A2 – Stack serving Aqua Regia process (chemical refining of gold) and electrolytic refining of silver

A3 – Stack serving Melt shop

## **BAT-AELs and monitoring requirements for precious metal 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<sub>x</sub> 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 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 (IC02) 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 IC02, which must be submitted to the Environment Agency within 24 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 Conclusion 10 and 140**

We have included an ELV and associated monitoring requirements for Particulate Matter of  $5 \text{ mg/m}^3$ , which is in accordance with the upper BAT-AEL value. This emission limit applies to emission points A1 and A3. Therefore the ELVs for emission points A1 and A3 (Table S3.1) have been updated within the permit.

#### **BAT Conclusions 10 and 141**

We have retained the existing ELV for  $\text{NO}_x$  of  $100 \text{ mg/m}^3$ , which is within the range specified in the BAT Conclusions of  $70\text{-}150 \text{ mg/m}^3$ . This emission limit applies to emission point A2. The monitoring requirements have been updated as outlined above.

#### **BAT Conclusion 10 and 143**

We have included an ELV and associated monitoring requirements for  $\text{SO}_2$  of  $100 \text{ mg/m}^3$  which is in accordance with the upper BAT-AEL value. This emission limit applies to emission point A2. Therefore the ELV for emission point A2 (Table S3.1) has been updated within the permit.

#### **BAT Conclusion 10 and 144**

We have included an ELV and associated monitoring requirements for HCl of  $10 \text{ mg/m}^3$  and  $\text{Cl}_2$  of  $2 \text{ mg/m}^3$  which is in accordance with the upper BAT-AEL values. These emission limits apply to emission point A1. Therefore the ELVs for emission point A1 (Table S3.1) have been updated within 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 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.

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.

Reference	Improvement Condition	Completion date
IC1	<p>The operator shall submit, for approval by Environment Agency, a report setting out progress to achieving the 'Narrative' BAT where BAT is currently not achieved, but will be achieved before 30/06/20. The report shall include, but not be limited to, the following:</p> <ul style="list-style-type: none"><li>• Methodology for achieving BAT.</li><li>• Associated targets / timelines for reaching compliance by 30/06/20.</li><li>• Any alterations to the initial plan</li></ul> <p>The report shall address the following BAT Conclusions: 1, 6 and 10:</p> <ul style="list-style-type: none"><li>• <b>BAT 1</b> (to implement an environmental management system (EMS) incorporating all the features listed)</li><li>• <b>BAT 6</b> (to set up an implement an action plan on diffuse dust emissions, as part of the EMS)</li><li>• <b>BAT 10</b> (monitoring of stack emissions to air)</li></ul>	Progress reports by 1 <sup>st</sup> December 2019
IC2	<p>The operator shall undertake a review of periodic monitoring for emissions to air of particulate matter (dust), oxides of nitrogen (NO<sub>x</sub>) and sulphur dioxide (SO<sub>2</sub>) from emission points A1, A2 and A3 as</p>	Within 24 months of effective date of notice V003

Reference	Improvement Condition	Completion date
	<p>appropriate. 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.</p> <p>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 <i>inter alia</i> 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.</p> <p>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.</p>	

## Annex 4

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

Table S1.1 activities has been updated to reflect the changes to Schedule 1 of the Environmental Permitting (England and Wales) Regulations 2016. The table now reads:

<b>Table S1.1 activities</b>		
<b>Activity listed in Schedule 1 of the EP Regulations</b>	<b>Description of specified activity and WFD Annex I and II operations</b>	<b>Limits of specified activity and waste types</b>
Section 2.2(1)(c)	Producing, melting or recovering (whether by chemical means or by electrolysis or by the use of heat) cadmium or mercury or any alloy containing more than 0.05 per cent by weight of either of those metals or both in aggregate  (melting for homogenisation and sampling where raw materials contain >0.05% cadmium)	Melting of batches in melt shop furnaces, for sampling and preparation for refining.
Section 4.2A(1)(b)	Unless falling within any other Section, any manufacturing activity which is likely to result in the release into the air of any hydrogen halide (other than the manufacture of glass or the coating, plating or surface treatment of metal) or which is likely to result in the release into the air or water of any halogen or any of the compounds mentioned in paragraph (a)(vi) (other than the treatment of water).  (refining of gold by Miller process)	From receipt of unrefined metal and scrap in the Miller Process room to storage and dispatch of final product.
Section 4.2A(1)(f)	Unless falling within any other Section, any activity (other than the combustion or incineration of carbonaceous material as defined in the	From receipt of unrefined metal and scrap in the Aqua Regia Process room to storage and dispatch of final product.

<b>Table S1.1 activities</b>		
<b>Activity listed in Schedule 1 of the EP Regulations</b>	<b>Description of specified activity and WFD Annex I and II operations</b>	<b>Limits of specified activity and waste types</b>
	Interpretation of Part A(1) of Section 1.2) which is likely to result in the release into the air of any acid-forming oxide of nitrogen.  (chemical refining of gold)	
Section 4.2A(1)(f)	Unless falling within any other Section, any activity (other than the combustion or incineration of carbonaceous material as defined in the Interpretation of Part A(1) of Section 1.2) which is likely to result in the release into the air of any acid-forming oxide of nitrogen.  (electrolytic refining of silver)	From receipt of unrefined metal and scrap in the electrolytic room to storage and dispatch of final product.
<b>Directly Associated Activity</b>		
Assessment of raw materials and melting where raw materials contain <0.05% cadmium.		Assessment of raw material by melting, sampling and analysis of samples.
Treatment of spent scrubber liquors and process liquors and discharge to sewer.		Treatment by neutralisation, to adjust pH, and by addition of zinc salts, to precipitate metals, followed by discharge to foul sewer.
Storage of waste products		Storage of waste generated by production processes prior to collection for recycling or disposal elsewhere.

## **Surface Water Pollution Risk Assessment**

The operator provided monitoring data on their discharge to foul sewer. The operator releases process wastewater to foul sewer in 1m<sup>3</sup> batches, around 50 m<sup>3</sup> per year in total. The wastewater is checked prior to discharge. The wastewater goes to foul sewer and is treated at Beckton STW. Beckton STW discharges to the River Thames at Beckton via the northern outfall. The trade effluent consent from Thames Water is relatively recent (June 2015), the discharge having been considered de-minimus historically. The Environment Agency has assessed that the small batch discharges of wastewater from the installation is very unlikely to have an impact on water quality.

## Annex 5

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

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	<b>BAT 1-19: General requirements</b>					
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	FC	FC	<p>The operator has confirmed in their response that they are not currently compliant with BAT 1.</p> <p>The operator aims to implement and adhere to an appropriate EMS by 01/06/19. We have included improvement condition IC01 to ensure compliance by June 2020.</p> <p>The Environment Agency is satisfied that the operator will be future compliant with this BAT Conclusion.</p>	Confirm future compliance by IC
2	In order to use energy efficiently, BAT is to use a combination of the techniques given	1.3	CC	CC	<p>The operator has confirmed in their response that they are currently compliant with BAT 2.</p> <p>They use a combination of techniques to use energy efficiently:</p>	None

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					<p>i - dry concentrates and wet raw materials at low temperatures</p> <p>l - suitable insulation for high temperature equipment such as steam and hot water pipes</p> <p>n - use high efficiency electric motors equipped with variable-frequency drive, for equipment such as fans</p> <p>o - use control systems that automatically activate the air extraction system or adjust the extraction rate depending on actual emissions</p> <p>The operator has their own electricity substation on site, with optimized power factoring. The operator also has implemented a staged replacement of all existing lighting with low energy LED lighting.</p> <p>The Environment Agency is satisfied that the operator is currently compliant with this BAT Conclusion.</p>	
3	In order to improve overall environmental performance, BAT is to ensure stable process operation by	1.1	CC	CC	The operator has confirmed in their response that they are currently compliant with BAT 3.	None



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	using a process control system together with a combination of the techniques given				<p>The operator uses staff training, operational instructions and quality control systems to ensure stable process control. They also employ a combination of techniques:</p> <p>a - inspect and select input materials according to the process and the abatement techniques applied</p> <p>e - on-line monitoring of the furnace temperature, furnace pressure and gas flow</p> <p>f - monitor the critical process parameters of the air emission abatement plant such as gas temperature, reagent metering, pressure drop, ESP current and voltage, scrubbing liquid flow and pH and gaseous components (e.g. O<sub>2</sub>, CO, VOC)</p> <p>j - temperature monitoring and control at melting and smelting furnaces to prevent the generation of metal and metal oxide fumes through overheating.</p> <p>The Environment Agency is satisfied that the operator is currently compliant with this BAT Conclusion.</p>	
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	3	CC	CC	<p>The operator has confirmed in their response that they are currently compliant with BAT 4.</p> <p>Regular checks are made on the pH of the scrubber liquors to ensure that they will</p>	None

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	systems as part of the environmental management system (see BAT 1)				<p>operator effectively. The abatement equipment is checked before each batch of raw materials is processed.</p> <p>In addition, the establishment and implementation of an action plan on diffuse dust emissions (see BAT 6) <i>and the application of a maintenance management system which especially addresses the performance of dust abatement systems (see BAT 4)</i> are also a part of the EMS required by improvement condition IC 1 (see BAT 1).</p> <p>The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.</p>	
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	CC	CC	<p>The operator has stated in their response that they are currently compliant with BAT 5.</p> <p>Emissions to air from the furnaces are routed to a suitable abatement system to be treated prior to discharge.</p> <p>There are no direct emissions to surface water. All storage areas and process</p>	None

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					<p>vessels are provided with bunding so that leaks and spills will be contained. Activities take place inside an enclosed building which has an impermeable concrete floor with no internal drains. Raw materials are used in relatively small amounts, with acids stored in 45 litre containers. In the event of a spillage the material can be contained and cleared. Spent liquors from the air abatement system are discharged to a holding tank, where they are neutralised and tested for pH and conductivity prior to discharge to foul sewer. Spent process liquors are treated with zinc salts to precipitate metals prior to discharge to sewer.</p> <p>The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.</p>	
6	<p>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:</p>	1	CC	FC	<p>The operator states in their response that they are currently compliant with BAT 6.</p> <p>They state that no diffuse dust emissions from material is possible as the factory is in a high security, enclosed building.</p>	Compliance by IC

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	<p>(a) identify the most relevant diffuse dust emission sources (using e.g. EN 15445);</p> <p>(b) define and implement appropriate actions and techniques to prevent or reduce diffuse emissions over a given time frame.</p>				<p>However, some powders are stored on site and there is a lime slurry preparation area. Improvement condition IC01 requires the operator operates to an EMS.</p> <p><i>The establishment and implementation of an action plan on diffuse dust emissions (see BAT 6) and the application of a maintenance management system which especially addresses the performance of dust abatement systems (see BAT 4) are a part of the EMS required by improvement condition IC 01 (see BAT 1).</i></p> <p>The Environment Agency is satisfied the operator will be future compliant with this BAT conclusion.</p>	
7	In order to prevent diffuse emissions from the storage of raw materials, BAT is to use a combination of the techniques given	3	CC	CC	<p>The operator states that they are currently compliant with BAT 7.</p> <p>They employ a combination of techniques to achieve compliance:</p> <p>a - enclosed buildings or silos/bins for storing dust-forming materials such as concentrates, fluxes and fine materials</p> <p>b – covered storage of non-dust-forming materials (refining processes and storage of materials is enclosed in secure premises with no direct outside access)</p>	None

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					<p>c – sealed packaging of dust-forming materials or secondary material that contain water-soluble compounds (acids are stored in 45 litres containers)</p> <p>k- bunding (both acids and alkalis are stored and used at the site. Separate storage areas with adequate bunding are provided).</p> <p>The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.</p>	
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	CC	CC	<p>The operator states in their response that they are currently compliant with BAT 8. They employ a combination of techniques to achieve compliance:</p> <p>d - closed bags or drums to handle materials with dispersible or water-soluble components (acids are stored in 45 litre containers)</p> <p>p - segregate incompatible materials (separate storage areas, with adequate bunding , are provided to prevent incompatible materials coming into contact with one another).</p>	None

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					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	CC	CC	The operator states in their response that they are currently compliant with BAT 9. They employ a combination of techniques to achieve compliance: h - charging systems for semi-closed furnaces to add raw materials in small amounts (small batch process) i - Treat the collected emissions in an adequate abatement system (hoods and ducting over all furnaces extracted to an electrostatic precipitator). The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	None
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	FC	FC	The operator has stated in their response that they will be future compliant with BAT 10. From 30 June 2020 the operator will be required to monitor for the following additional parameters (refer to Key Issues section): <ul style="list-style-type: none"> <li>• particulate matter (emission points A2 and A3)</li> </ul>	Compliance by IC

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					<ul style="list-style-type: none"> <li>• sulphur dioxide (emission point A2)</li> <li>• hydrogen chloride (emission point A1)</li> <li>• chlorine (emission point A1)</li> </ul> <p>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 for emissions of particulate, oxides of nitrogen and sulphur dioxide from 30 June 2020. We have included improvement condition IC02 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.</p> <p>We are satisfied that pending completion of IC02, the operator will be compliant by 30 June 2020.</p>	
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	NA	NA	NA	The Environment Agency has determined that this BAT Conclusion and BAT-AEL are not applicable to this installation. This is because they relate to pyrometallurgical	None

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	use one or both of the techniques given. BAT-AEL for Hg				processes, which are typically only undertaken during primary metal production, and therefore are not applicable to precious metal production at this site.	
12	In order to reduce emissions of SO <sub>2</sub> from off-gases with a high SO <sub>2</sub> 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 <sub>2</sub>	NA	NA	NA	The operator states in their response that BAT 12 is not applicable to their silver process.  They do not use any raw materials containing sulphurous compounds or use SO <sub>2</sub> gas in any process associated with the production of silver.  The Environment Agency is satisfied that this BAT conclusion does not apply.	None
13	In order to prevent NO <sub>x</sub> emissions to air from a pyrometallurgical process, BAT is to use one of the techniques given	NA	NA	NA	The Environment Agency has determined that this BAT Conclusion is not applicable to this installation. This is because it relates to pyrometallurgical processes, which are typically only undertaken during primary metal production, and therefore are not applicable to the production of precious metals at this site.	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	CC	CC	The operator states in their response that they are currently compliant with BAT 14.  The employ a combination of techniques given:	None



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					<p>a - measure the amount of fresh water used and the amount of waste water discharged</p> <p>b - reuse waste water from cleaning operations (including anode and cathode rinse water) and spills in the same process</p> <p>f - use a closed circuit cooling system.</p> <p>The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.</p>	
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	3	CC	CC	<p>The operator states in their response that they are currently compliant with BAT 15. Waste from demineralised/RO water system is reused, while waste water from the process that is contaminated is sent to the waste treatment line.</p> <p>The Environment Agency is satisfied the operator is compliant with this BAT conclusion.</p>	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	NA	NA	NA	The Environment Agency has determined that this BAT Conclusion is not generally applicable for installations which only discharge wastewater to sewer.	None

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	<p>not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.</p> <p>The monitoring frequency may be adapted if the data series clearly demonstrate sufficient stability of the emissions</p>				<p>We do not require operators to routinely monitor discharges of wastewater to sewer where the discharge is already regulated (and monitored) by the sewerage undertaker via a trade effluent consent, unless there is a site-specific environmental need for additional monitoring, e.g. if there was a ELV on the environmental permit to protect water quality, in which case we would require monitoring to be undertaken in accordance with BAT 16.</p> <p>The above position is consistent with how we regulate other industrial sectors through the permitting process.</p> <p>Permit V002 did stipulate a pH limit prior to discharge to sewer. However, in this permit consolidation this limit has been removed because i) the sewerage undertaker's trade effluent consent stipulates pH limits, and so the duplication is unnecessary and ii) the operators process controls and operating techniques ensure the pH limits are met. See Key Issues section.</p>	

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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	<p>The Environment Agency has determined that this BAT Conclusion is not applicable for installations which only discharge wastewater to sewer.</p> <p>The BAT-AELs for BAT 17 relate to direct emissions to receiving waters (as opposed to indirect emissions made via the foul sewer).</p> <p>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.</p>	None
18	In order to reduce noise emissions, BAT is to use one or a combination of the techniques given	3	CC	CC	<p>The operator states in their response that they are currently compliant with BAT 18. They employ one technique to achieve compliance:</p> <p>c – use anti-vibration supports and interconnections for equipment.</p> <p>The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.</p>	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	CC	CC	<p>The operator states in their response that they are currently compliant with BAT 18. They employ one technique to achieve compliance:</p> <p>a - appropriate storage and handling of odorous materials</p> <p>The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.</p>	None
<b>BAT 134-149: Precious metals production</b>						
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	<p>The operator has stated in their response that they are currently compliant with BAT 134.</p> <p>They employ one technique to achieve compliance:</p> <p>a - enclose pretreatment areas and transfer systems for dusty materials (refining processes and storage of materials is enclosed in secure premises with no direct outside access).</p> <p>The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.</p>	None

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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	<p>The operator has stated in their response that they are currently compliant with BAT 135.</p> <p>They employ all techniques to achieve compliance:</p> <ul style="list-style-type: none"> <li>a - enclose buildings and/or smelting furnace areas (operation is in an enclosed building)</li> <li>b - perform operations under negative pressure (melting is performed under extraction)</li> <li>c - connect furnace operations to dust collectors or extractors via hoods and a ductwork system</li> <li>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.</li> </ul> <p>The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.</p>	
136	In order to reduce diffuse emissions to air from leaching and gold electrolysis,	3	CC	CC	The operator states in their response that they are currently compliant with BAT 136.	None

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	BAT is to use one or a combination of the techniques given				They employ one technique to achieve compliance: a - closed tanks/vessels and closed pipes for transfer of solutions The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	
137	In order to reduce diffuse emissions from a hydrometallurgical operation, BAT is to use all of the techniques given	3	CC	CC	The operator states in their response that they are currently compliant with BAT 137. They employ all of the techniques to achieve compliance: a - containment measures, such as sealed or enclosed reaction vessels, storage tanks, solvent extraction equipment and filters, vessels and tanks fitted with level control, closed pipes, sealed drainage systems, and planned maintenance programmes b - Reaction vessels and tanks connected to a common ductwork system with off-gas extraction. The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	None
138	In order to reduce diffuse emissions to air from incineration, calcining and	NA	NA	NA	The operator states in their response that BAT 138 is not applicable.	None

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	drying, BAT is to use all of the techniques given				They do not undertake incineration, calcining and drying. The Environment Agency is satisfied this BAT conclusion is not applicable.	
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 states in their response that they are currently compliant with BAT 139. They employ both of the techniques given to achieve compliance: a - enclosed furnace with negative pressure b - appropriate housing, enclosures and capture hoods with efficient extraction/ventilation. The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	None
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	CC	CC	The operator states in their response that they are currently compliant with BAT 140. They employ one technique to achieve compliance: a - bag filter (the Miller process is connected to a wet scrubbing system with a bag filter; the furnaces are under a fume extraction system that feeds through a precipitron (an electrostatic air cleaning device), and meets the BAT AEL for dust	None

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					(which applies to emission points A1 and A3). The Environment Agency is satisfied the operator is currently compliant with 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	3	CC	CC	The operator states in their response that they are currently compliant with BAT 141. They employ one technique to achieve compliance: b - scrubber with oxidation agents (e.g. oxygen, hydrogen peroxide) and reducing agents (e.g. nitric acid, urea) for those vessels in hydrometallurgical operations with the potential to generate high concentrations of NO <sub>x</sub> . The operator confirms they meet the BAT AEL for NO <sub>x</sub> , which applies to emission point A2. The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	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 and smelting operation for the production of Doré metal, including the	3	CC	NA	The operator states in their response that they are currently compliant with BAT 142. However, at a site visit (15/05/18) the operator confirmed that they do not produce	None



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	associated incineration, calcining and drying operations, BAT is to use one or a combination of the techniques given BAT-AEL for SO 2				Doré metal, therefore this BAT Conclusion is not applicable.	
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	3	CC	CC	The operator states in their response that they are currently compliant with BAT 143. They use a wet scrubber and meet the BAT AEL for SO <sub>2</sub> , which applies to emission point A2.  The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	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	3	CC	CC	The operator states in their response that they are currently compliant with BAT 144. They use an alkaline scrubber and meet the BAT AEL for HCl and Cl <sub>2</sub> , which applies to emission point A1.  The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	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	NA	NA	NA	The operator states in their response that BAT 145 is not applicable.  No process or raw materials used would generate ammonia.	None

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	BAT-AEL for NH 3				The Environment Agency is satisfied this BAT conclusion is not applicable.	
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		FC	NA	The operator states in their response that they are not currently compliant with BAT 146.  However, at a site visit (15/05/18) the operator confirmed that they do not use any raw materials that contain organic compounds, halogens or other PCDD/F precursors.  The Environment Agency therefore considers this BAT Conclusion to be not applicable.	None
147	In order to prevent soil and groundwater contamination, BAT is to use a combination of the techniques given	3	FC	CC	The operator has stated in their response that they will be future compliant with BAT 147.  However, they use a combination of techniques listed: a - Use of sealed drainage systems (within building) c - Use of impermeable and acid-resistant floors  Therefore the Environment Agency is satisfied they are currently compliant with this BAT conclusion. [It is noted that the operator aims to install double skinned	None

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					tanks or bunding in yard for storage of waste materials prior to disposal].	
148	In order to prevent the generation of waste water, BAT is to use one or both of the techniques given	1.5	CC	CC	The operator states in their response that they are currently compliant with BAT 148. They employ both techniques to achieve compliance: a - Recycling of spent/recovered scrubbing liquids and other hydrometallurgical reagents in leaching and other refining operations 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	1.5	CC	CC	The operator states in their response that they are currently compliant with BAT 149. The employ a combination of techniques to achieve compliance: c - recovery of silver from spent electrolyte and spent slime washing solutions e - recovery of gold from electrolyte, slimes and solutions from the gold leaching processes	None

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					The Environment Agency is satisfied the operator is currently compliant with this BAT conclusion.	