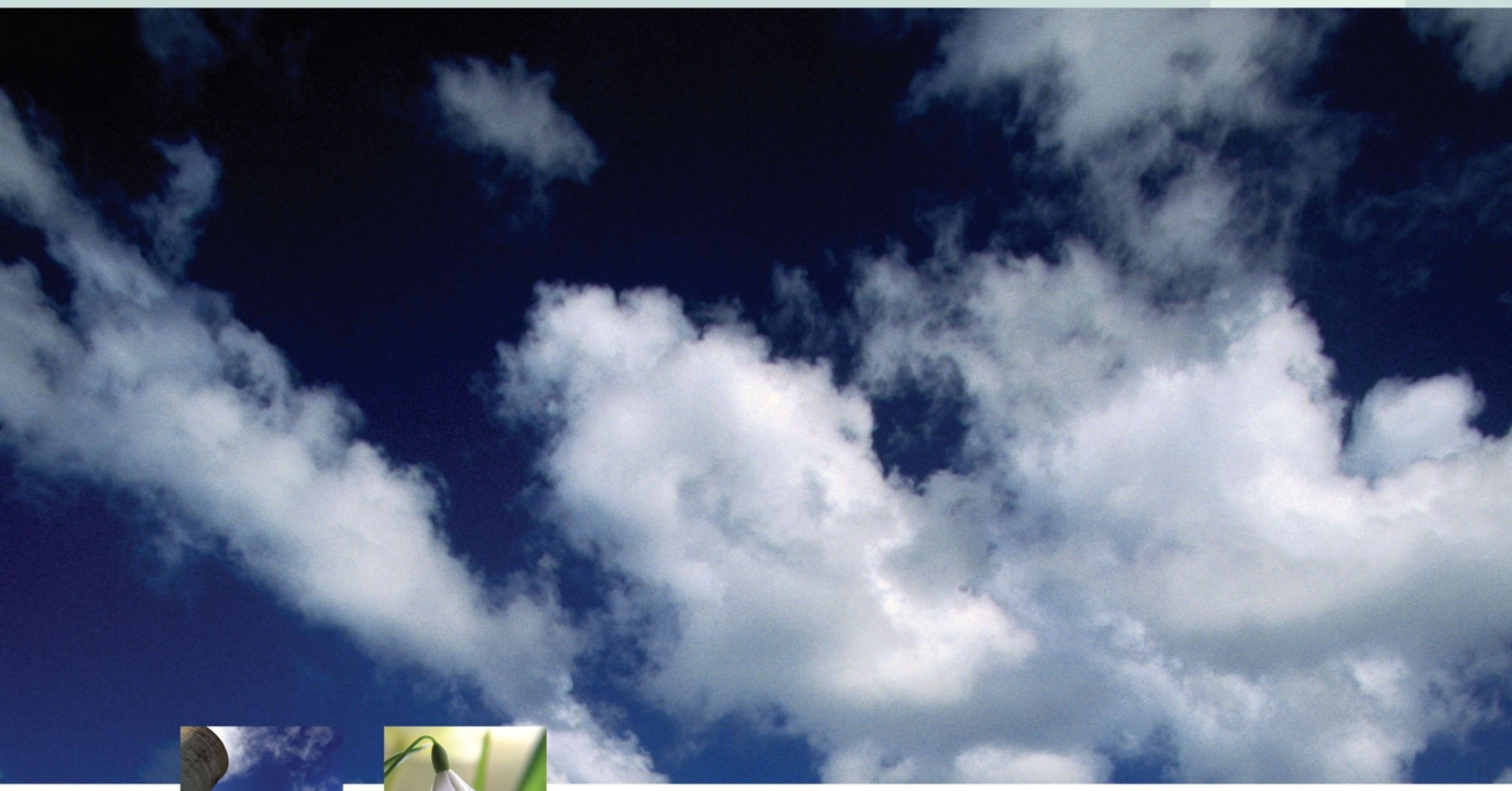

Regulation 60 Response and BAT Assessment

Real Alloy (UK) Ltd

Prepared by:
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Contents

Index of Figures

1. INTRODUCTION

1.1 Purpose

The purpose of this report is to provide a formal response to NRW's Regulation 60 Notice requiring Real Alloy (UK) Ltd to provide the following information.

1) *Confirm whether or not you currently comply with the requirements of the BAT conclusion, including and associated emission levels, providing a description of the techniques in place and how they meet the standard.*
2) *If you do not comply with the BAT conclusion, provide a BAT assessment.*
3) *Where there is a BAT Associated Emission Level (BAT AEL) specified in the BAT conclusion, with which you will not comply, you must supply sufficient technical and commercial information to demonstrate that achieving that BAT AEL would lead to costs that are disproportionately high, compared with environmental benefits.*
4) *Where the compliance with the BAT conclusions leads to the substantial refurbishment or installation of new combustion plant with an aggregate thermal input of greater than 20MWth, which generates more than 100kWth of waste heat, you must provide sufficient technical and commercial evidence to demonstrate compliance with Article 14, Paragraph 5 of Directive 2012/27/EU on Energy efficiency. This must include an assessment of the technical feasibility and costs of installing a combined heat and power (CHP) system or providing district heating and, where this assessment shows that the costs are not disproportionate to the benefits, proposals to incorporate these measures into you plant.*
5) *For all discharges to surface water from the site, you must provide emissions data following for the following hazardous pollutants:*
   - *Cadmium;*
   - *Mercury;*
   - *Nickel;*
   - *Lead;*
   - *Benzene;*
   - *Polyaromatic hydrocarbons; and*
   - *Other relevant substances.*

   The emissions monitoring for these substances must be carried using the methods and standards described within the M18 guidance on 'Monitoring of discharges to water and sewer'.
6) *With reference to the risk assessment guidance, carry out the following guidance:*
   - *Screening tests for mercury, cadmium, nickel, lead, benzene, polyaromatic hydrocarbons and any other relevant substances.*
   - *For any substance that is not screened out by the screening test, you will need to carry out modelling, as described in the risk assessment 'Surface Water Risk Assessment for your Environmental Permit'.*
7) *Where your activity involves the use, production or release of relevant hazardous substances (as defined in Article 3(18) of the Industrial Emissions Directive) carry out a risk assessment considering the soil and groundwater contamination at the installation with the substances.*

   Where any such risk of contamination is established 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 such information previously submitted where you are 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 the soil and groundwater contamination upon cessation of the activity.

All operators who operate in accordance with the NFM BREF and associated BAT conclusions have received Environmental Permitting (England & Wales) 2010 Regulation 60 Notices and are obliged to supply information in order to permit the operation to the BREF and associated BAT.

1.2 BREF Guidance

The final draft of the revised and updated Best Available Techniques (BAT) Reference Document for the Non-Ferrous Metals Industries[1] was issued in October 2014 (October 2014) and concerns certain activities specified in Sections 2.1, 2.5 and 6.8 of Annex I to Directive 2010/75/EU, namely:

- 2.1: Metal ore (including sulphide ore) roasting or sintering;
- 2.5: Processing of non-ferrous metals:
  (a) production of non-ferrous crude metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes;
  (b) melting, including the alloyage, of non-ferrous metals, including recovered products and operation of non-ferrous metal foundries, with a melting capacity exceeding 4 tonnes per day for lead and cadmium or 20 tonnes per day for all other metals;
- 6.8: Production of carbon (hard-burnt coal) or electrographite by means of incineration or graphitisation.

In particular, these BAT conclusions cover the following processes and activities:

- primary and secondary production of non-ferrous metals;
- the production of zinc oxide from fumes during the production of other metals;
- the production of nickel compounds from liquors during the production of a metal;
- the production of silicon-calcium (CaSi) and silicon (Si) in the same furnace as the production of ferro-silicon;
- the production of aluminum oxide from bauxite prior to the production of primary aluminum, where this is an integral part of the production of the metal;
- the recycling of aluminum salt slag;
- the production of carbon and/or graphite electrodes.

Real Alloy (UK) Ltd ('Real Alloy' hereafter) are permitted to operate an existing Part A(1) 'Non Ferrous Metals' Installation for their secondary aluminum recycling facility in Waunarlwydd, Swansea.

The Installation is regulated under Chapter 2 'Production and Processing of Metals', Section 2.2 'Non-Ferrous Metals' Part A(1) paragraph (b) 'Melting, including making alloys, of non-ferrous metals, including recovered products (such as refining or foundry casting) where-

> i) The plant has a melting capacity of more than 4 tonnes per day of lead or cadmium or 20 tonnes per day for all other metals.'

The site is currently permitted under the conditions established by Environmental Permit EP3935UC.

1 'Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control)' by JOINT RESEARCH CENTRE Institute for Prospective Technological Studies Sustainable Production and Consumption Unit European IPPC Bureau

2. SITE AND PROCESS DESCRIPTION

2.1 Site and Process Description

A detailed description of the process is described with the EPR Permit Application and should be referred to as required.

- The following summary description of the site and processes has been provided for reference:
- Main Activities principally comprises 2 x oxy-fuel rotary furnaces and associated control equipment;
- All equipment is SCADA / PLC controlled;
- All airborne emissions from the site are abated through a large centralised baghouse plant fitted with sodium bi-carbonate injection;
- All dry hazardous materials (fluxes, drosses, etc) are stored undercover, within sealed silo's or in dedicated storage buildings;
- The entire site is constructed on concrete hardstanding and is equipped with sealed drainage systems; and
- There are no process releases to controlled water.

The permitted activities associated with the regulation of the site are described in Table 2.1 below:

Table 2.1: Permitted Activities

Schedule 1 Activity Reference	Activity under Schedule 1 of the Regulations	Description of Specified Activity	Limits of Specified Activity
2.2 A(1)(a)	A manufacturing process involving the metallurgical recovery of non-ferrous from secondary raw materials	Recovery of aluminium	Melting of aluminium waste within 2 furnaces, removal of molten aluminium and transfer of remaining waste for recycling
Directly Associated Activity	Storage and handling of raw materials	Storage, sorting, baling and pre-treatment of scrap aluminium	Receipt of raw materials to transfer to furnaces
Directly Associated Activity	Storage and handling of solid wastes	Storage and handling of dross, slag, and bag filter dust	From separation of wastes to dispatch from installation
Directly Associated Activity	Filtration of solid wastes	Filtration of treated furnace fumes and removal of salt cake extraction fumes	Removal of solid waste from extraction system before emission to air
Directly Associated Activity	Sampling of and analysis of aluminium alloys	Melting and sampling of batch alloys	Use of 1.5 tonne rotary sampling furnace to produce batch samples for analysis

Figure 1: Rotary Kiln Furnaces Showing Hood Extraction

Figure 2: Baghouse and Abatement Extraction

Figure 3: Enclosed Storage

Figures 4: Sealed Infrastructure

Figures 5: Sealed Infrastructure

Photo 6: Silo'd Bicarbonate

3. GENERIC SECTOR BAT REQUIREMENTS

3.1 Applicable BAT Requirements

A review of the document EC L 174/34[2] has been carried out and all relevant BAT requirements have been summarised within Table 3.1.

Table 3.1: Secondary Aluminium BAT Summary

Subject Title	BAT Reference	Applicability	Comment
Environmental Management Systems	BAT 1	Yes	Requires EMS to ISO 14001 or EMAS standards
Energy Management	BAT 2	Yes	Requires either an accredited energy management system and or other sector specific energy efficiency measures to be in place
Process Control	BAT 3	Yes	Requires a high level of process control to ensure stale and efficient operation
Maintenance Management	BAT 4	Yes	All key plant and equipment is required to be maintained effectively
Diffuse Emissions (Generic)	BAT 5, BAT 6, BAT 7 and BAT 9[3]	Yes	Requires the control, reduction and prevention of diffuse emissions from the site (process and raw materials storage)
Monitoring of Emissions	BAT 10[4] [5]	Yes	Requires process emissions to be monitored in accordance to minimum stated frequency, using approved methodologies
NOx Emissions	BAT 13	Yes	In order to prevent NOx emissions to air from a pyrometallurgical process, specific combustion control techniques are required to be in place.
Emissions to Water	BAT 14 and 15	Yes	Required in order to prevent or reduce the generation of waste water and contamination

2 COMMISSION IMPLEMENTING DECISION (EU) 2016/1032 of 13 June 2016 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for the non-ferrous metals industries

3 BAT 8 does not apply to the Real Alloy processes

4 BAT 11 – Mercury emissions does not apply to the Real Alloy process

5 BAT 12 Sulphur Dioxide Emissions does not apply (only applies to plants producing copper, lead, primary zinc, silver, nickel and/or molybdenum

Water Monitoring	BAT 16[6]	Yes	Monthly sampling of water emissions to BS standards required for Al & other metals, TSS
Noise	BAT 18	Yes	Reduction of noise from plant required to mitigate environmental noise impact
Odour	BAT 19	Yes	Reduction of odour emissions through appropriate storage of materials required
Secondary Materials	BAT 74	Yes	Required to increase yield of secondary aluminium from scrap
Energy recovery	BAT 75	No	Only applies to reverberatory furnaces and non-rotating furnaces. Site can no longer supply molten metal as neighbouring Alcoa is now closed
Air Emissions	BAT 76	Yes	Required to reduce oil contamination and pollution from contaminated secondary materials
Diffuse Emissions	BAT 78[7]	Yes	Reduction of emissions from the charging and discharging of furnaces
	BAT 79	Yes	Reduces emissions from the skimming / dross handling[8]
Channelled Dust Emissions	BAT 81 & 82	Yes	Requires the use of bag filters to reduce dust emissions
Organic Compound Reduction	BAT 83	Yes	Relates to the reduction of organic compounds from the combustion of secondary sourced materials
Acid Gas Emissions	BAT 84	Yes	Relates to the reduction of HCL, HF and Cl2 from the process.
Waste	BAT 85	Yes	Relates to the reduction of the quantity of wastes produced by the site.
	BAT 86	Yes	Required to reduce the levels of salt slag produced from the process.

6 BAT 17 does not apply. No storage of water is required for process.

7 BAT 77 does not apply as pre-treatment of scrap material is not required. All material purchased to a specification

8 BAT 80 does not apply – swarf drying, crushing and separation does not take place

3.2 Environmental Management

BAT 1 States:

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 following features:

- *a) commitment of the management, including senior management;*
- *b) definition of an environmental policy that includes the continuous improvement of the installation by the management;*
- *c) planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment;*
- *d) implementation of procedures paying particular attention to:*
  - *i. structure and responsibility,*
  - *ii. recruitment, training, awareness and competence,*
  - *iii. communication,*
  - *iv. employee involvement,*
  - *v. documentation,*
  - *vi. effective process control,*
  - *vii. maintenance programmes,*
  - *viii. emergency preparedness and response,*
  - *ix. safeguarding compliance with environmental legislation;*
- *e) checking performance and taking corrective action, paying particular attention to:*
  - *i. monitoring and measurement (see also the Reference Report on Monitoring of emissions to Air and Water from IED installations-ROM),*
  - *ii. corrective and preventive action,*
  - *iii. maintenance of records,*
  - *iv. independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained;*
- *f) review of the EMS and its continuing suitability, adequacy and effectiveness by senior management;*
- *g) following the development of cleaner technologies;*
- *h) consideration for the environmental impacts from the eventual decommissioning of the installation at the stage of designing a new plant, and throughout its operating life;*
- *i) application of sectoral benchmarking on a regular basis.*

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 also a part of the EMS.

Applicability and Compliance – Real Alloy (UK) Ltd operate a formal Environmental Management System that is certified to both ISO14001 and EMAS.

Emissions management, as stipulated by BAT 4 and BAT 6, are addressed in the environmental aspects review.

Given that all of the above BAT measures form part the EMS, it is therefore considered that the requirements of BAT 1 are met.

No further actions required.

3.3 Energy Management

BAT 2 provides a comprehensive list of techniques that contribute to the overall energy efficiency of the plant.

Table 3.2 provide an overview of each of the applicable energy management measures identified by BAT 2.

Table 3.2: Energy Efficiency

Ref	Technique	Applicability	Compliance
a	Energy efficiency management system (e.g. ISO 50001)	This applies to the site. Real Alloy operate a formal Environmental Management System which includes Energy Efficiency Management as a key aspect. The company has a proactive energy targeting programme and has significantly reduced specific energy use at the site. The company also forms part of the ALFED sector Climate Change Levy Agreement, CRC and ESOS.	Yes – Compliance can be demonstrated
b	Regenerative or recuperative burners	Not applicable to rotary kilns with oxy-fuel burners	N/A
c	Heat Recovery (eg Steam, hot water. hot air)	Applicable – There is limited scope for heat recovery at the site. The company has a programme of heat recovery projects which have been committed to within the 2017 / 2018 CAPEX budget.	YES – Compliance can be demonstrated
d	Regenerative Thermal Oxidiser	Not Applicable	N/A
e	Preheat the furnace charge, combustion air or fuel using the heat recovered from hot gases from the melting stage	Applicable	Not currently carried out on site. The site is looking at feasibility of combustion air pre-heating / charge pre-heating

f	Raise the temperature of the leaching liquors using steam or hot water from waste heat recovery	Not Applicable	N/A
g	Use hot gases from the launder as preheated combustion air	Not Applicable due to the design of the launders	N/A
h	Use oxygen-enriched air or pure oxygen in the burners to reduce energy consumption by allowing autogenous smelting or the complete combustion of carbonaceous material	Applicable – Oxy Fuel burners are used	YES – Compliance can be demonstrated
i	Dry concentrates and wet raw materials at low temperatures	Not Applicable – Only applicable when drying is performed. No drying carried out on site.	N/A
j	Recover the chemical energy content of the carbon monoxide produced in an electric or shaft/blast furnace by using the exhaust gases as a fuel, after the removal of metals, in other production processes or to produce steam/hot water or electricity	Not Applicable – Only applicable to exhaust gases with a CO content > 10 vol-%. Applicability is also influenced by the composition of the exhaust gas and the unavailability of a continuous flow (i.e. batch processes)	N/A
K	Recirculate the flue-gas back through an oxy-fuel burner to recover the energy contained in the total organic carbon present	Not Applicable – Only applicable in furnaces with FGR. Real Alloy Kilns cannot be used in this way. Furnaces pressure controlled to maximise flue gas recirculation and minimise flue losses.	N/A
l	Suitable insulation for high temperature equipment such as steam and hot water pipes	Applicable – All high temperature equipment lagged and insulated as required	YES – Compliance can be demonstrated
m	Use the heat generated from the production of sulphuric acid from sulphur dioxide to preheat gas directed to the sulphuric acid plant or to generate steam and/or hot water	Not Applicable - Only applicable for non-ferrous metals plants including sulphuric acid or liquid SO_2 production	N/A

n	Use high efficiency electric motors equipped with variable-frequency drive, for equipment such as fans	Applicable – The site has replaced all motor with high efficiency units and variable speed drives where possible.	YES – Compliance can be demonstrated
o	Use control systems that automatically activate the air extraction system or adjust the extraction rate depending on actual emissions	Applicable – The plant extraction and abatement plant are all designed to be operated on variable speed systems which modulate depending on load.	YES – Compliance can be demonstrated

Table 3.3: BAT 75 Requirements

Ref	Technique	Applicability	Compliance
a	Pre-heating the furnace charge with exhaust gas.	Not applicable – This requirement only applies to non-rotating furnaces. All furnaces at site are rotating.	N/A
b	Recirculation of the gases with unburnt hydrocarbons back into the burner system.	Not applicable to rotary kilns with oxy-fuel burners.	N/A
c	Supply the liquid metal for direct moulding.	Not applicable – There are no neighbouring aluminium processing plant within a 4 hour transport.	N/A

Applicability and Compliance – Real Alloy (UK) Ltd operate a formal Environmental Management System which identifies and manages energy efficiency opportunities.

The company has embarked on a programme of energy efficiency improvements that have seen investment in new plant and equipment, variable speed drives, high efficiency motors and high efficiency lighting that is certified to both ISO14001 and EMAS.

Feasibility assessments have been carried out on further heat recovery and efficiency measures associated with flue gas energy recovery and combustion air pre-heating. CAPEX has been approved for new 'upgraded' high efficiency doors to be fitted to main furnaces.

The use of pressure controlled oxy-fuel combustion systems are recognised as being the single largest energy efficiency measure in place on site and as such it is considered that the requirements of BAT 2 are met in principle.

Further efficiency measures are considered attainable and will form part of further feasibility and assessment.

3.4 Process Control

BAT 3 provides a comprehensive list of techniques that can improve overall environmental performance and stable process operation.

Table 3.4 provides an overview of each of the applicable process control measures identified by BAT 3.

Table 3.4: BAT 3 Process Control

	Technique	Applicability	Compliance
a	Inspect and select input materials according to the process and the abatement techniques applied.	Applicable – All input feed materials are selected in accordance with heat-weigher requirements and alloy selection programmer. All alloy mixes are to customer requirements and specific alloy mixes.	YES – Compliance can be demonstrated.
b	Good mixing of the feed materials to achieve optimum conversion efficiency and reduce emissions and rejects.	Applicable – As above.	YES – Compliance can be demonstrated.
c	Feed weighing and metering systems.	Applicable – As above.	YES – Compliance can be demonstrated.
d	Processors to control material feed rate, critical process parameters and conditions including the alarm, combustion conditions and gas additions.	Applicable – All furnaces are PLC and SCADA controlled and process monitored.	YES – Compliance can be demonstrated.
e	On-line monitoring of the furnace temperature, furnace pressure and gas flow.	Applicable – As above. The furnace combustion systems are controlled on temperature and pressure.	YES – Compliance can be demonstrated.
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	The plant is fitted with CEMS equipment for particulate (major emission). All reagent is monitored and differential pressure is monitored over baghouse filters.	YES – Compliance can be demonstrated.

	pH and gaseous components (e.g. O_2, CO, VOC.		
g	Control dust and mercury in the exhaust gas before transfer to the sulphuric acid plant for plants including sulphuric acid or liquid SO_2 production.	Not Applicable.	N/A
h	On-line monitoring of vibrations to detect blockages and possible equipment failure.	Not Applicable.	N/A
i	On-line monitoring of the current, voltage and electrical contact temperatures in electrolytic processes.	Not Applicable.	N/A
j	Temperature monitoring and control at melting and smelting furnaces to prevent the generation of metal and metal oxide fumes through overheating.	Applicable – As above. The furnace combustion systems are controlled on temperature and pressure.	YES – Compliance can be demonstrated.
k	Processor to control the reagents feeding and the performance of the waste water treatment plant, through on-line monitoring of temperature, turbidity, pH, conductivity and flow.	Not Applicable.	N/A

Table 3.5: BAT 4 Maintenance Management

	Technique	Applicability	Compliance
a	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).	Applicable – Company operates schedule maintenance management system that includes all furnaces, extraction and abatement plant.	YES – Compliance can be demonstrated.

Applicability and Compliance – Real Alloy (UK) Ltd operate a high degree of process control over all activities carried out on site.

All critical plant and equipment is automated and PLC controlled. The company operates a formal preventative maintenance management system to ensure that all key plant is maintained in an operational condition and that all air emissions abatement plant is operated in accordance with regulated requirements.

It is therefore considered that the requirements of BAT 3 and BAT 4 are met. No further actions required.

3.5 Waste Water Generation and Management

There is no waste water generated by the plant. Therefore, the associated BAT requirements relating to waste water emissions (BAT 14 and BAT 16) do not apply.

All infrastructure at the site is sealed and controlled. Surface water releases from the site are controlled through the use of a three stage, oil water and sediment interceptor.

The general requirements stipulated by BAT 15 relating to the protection of the surface water are considered applicable and have been tabulated and described within Table 3.6 below.

Table 3.6: BAT 15 Segregation of Waste Water Streams

	Technique	Applicability	Compliance
A	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.	Applicable – The site has segregated the foul water and surface water systems on site and have a number of measures to protect controlled waters. The surface water system is protected through the use of material segregation, internal storage arrangements, housekeeping and 3 stage interceptors. All surface water discharges are routinely monitored and reported to NRW.	YES – Compliance can be demonstrated.

Applicability and Compliance – on the basis of the above (i.e. that there are no process emissions from the site and that diffuse emissions are prevented through segregation, housekeeping and the use of internal storage areas), the BAT requirements of BAT 15 are considered to be met.

No further action is required.

3.6 Soil and Groundwater

The Installation does not emit any emissions to ground. All aspects of the site are located above ground and upon sealed concrete infrastructure.

The site has a long industrial history and is located upon a former landfill site operated by Alcoa Manufacturing Ltd. Various intrusive site investigation surveys have been carried out on the site.

Diffuse emissions to the underlying soils and groundwater are prevented through the application of BAT 7 and are described in Table 4.2.

The site has an updated Site Condition Report and have an established baseline for the site condition. The Site Condition Report is provided within Appendix 2 of this report.

No further actions are required.

3.7 Waste

The control and reduction of wastes from the secondary non-ferrous metals sector is defined by BAT 85.

BAT 85 stipulates that operations should be organised to facilitate and maximise the recovery, recycling and reuse of process residues, through one or a combination of the techniques provided in Table 3.7 below.

Table 3.7: BAT 85 Waste

	Technique	Applicability	Compliance
a	Reuse collected dust in the process in the case of a melting furnace using salt cover or in the salt slag recovery process.	Applicable – All extracted process dusts are captured and reused and / or send off site for recovery.	YES – Compliance can be demonstrated.
b	Full recycling of the salt slag.	Applicable – All salt slag produced by the site is exported off site for further recovery and processing.	YES – Compliance can be demonstrated.
c	Apply skimmings / dross treatment to recover aluminium in the case of furnaces that do not use salt cover.	Not Applicable – All furnaces use salt cover.	N/A

Applicability and Compliance – Real Alloy (UK) Ltd recycle and recover all waste arising from their process and ensure that the highest metal recovery rates are achieved. Any materials that cannot be recycled or reprocessed internally within the process, are recovered and recycled off site by others.

The requirements of BAT 85 are therefore considered to be met. No further action is required.

3.8 Noise

The control and minimisation of environmental noise impacts is provided within BAT 18.

The adherence and compliance with the requirements of BAT 18 are provided within Table 3.8 below.

Table 3.8: BAT 18 Noise

	Technique	Applicability	Compliance
a	Use embankments to screen the source of noise.	Applicable – The site is surrounded on 3 sides by a large earthen embankment. There is significant screening afforded by the existing and surrounding buildings at the Waunarlwydd site.	YES – Compliance can be demonstrated.
b	Enclose noisy plants or components in sound-absorbing structures.	Applicable – All plant and equipment that has the potential for the creation of noise nuisance is enclosed and located within noise enclosures.	YES – Compliance can be demonstrated.
c	Use anti-vibration supports and interconnections for equipment.	Applies – All plant is designed appropriately and is fitted with AV joints and connections.	YES – Compliance can be demonstrated.
d	Orientation of noise-emitting machinery.	Applicable – All key external noise sources are located at the rear of the site are not orientated towards any sensitive receptors.	YES – Compliance can be demonstrated.
e	Change the frequency of the sound.	Not Applicable – The site does not any history of noise complaints or tonal noise issues.	YES – Compliance can be demonstrated

Applicability and Compliance – Real Alloy (UK) Ltd do not have a history of noise complaints and are not located near any sensitive noise receptors.

All noise critical plant is constructed with acoustic enclosures and/or are located in noise protected/screened areas.

The requirements of BAT 18 are therefore considered to be met. No further action is required.

3.9 Odour

Potential odour emissions from the site are limited to diffuse emissions from the handling of drosses.

The control of diffuse emissions are achieved through the adherence to the requirements of BAT 5, BAT 6, BAT7, BAT 9 and BAT 78. The compliance to these requirements are justified in Sections 4.1 below.

The site has no history of any off site odour complaints or issues. Therefore, no further action is required.

4. EMISSIONS BENCHMARKS

Considerable diffuse emissions can be caused by the secondary non-ferrous sector. The primary causes are related to the storage and processing of dusty (and inherently hazardous) materials. The primary source of emissions from the process will be related to the storage and processing of aluminum drosses and fluxes. There materials can lead to diffuse emissions of dust to air as well as the contamination of surface water systems with metal oxides, ammonia compounds and salts.

The Real Alloy site stores all potential dust creating materials within dedicated buildings (The Mudroom) equipped with extraction and abatement where necessary.

4.1 Diffuse Emissions General Requirements

The general requirements relating to the control of diffuse emissions are stipulated in BAT 5 and BAT 6 and are detailed in Table 4.1 below.

Table 4.1: BAT 5 & 6 Diffuse Emissions – General

	Technique	Applicability	Compliance
BAT 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.	Applicable – All potentially dusty materials are stored internally and where necessary fitted with extraction. Key potential diffuse emission sources are the mudroom, flux storage and bicarbonate storage. All of the above are stored internally or in dedicated silos.	YES – Compliance demonstrated.
BAT 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.	Applicable – Emission management forms a fundamental part of site EMS. No potentially dusty materials are stored externally or without extraction.	YES – Compliance demonstrated.

4.2 Storage of Raw Materials

Diffuse emissions from the storage of drosses, fluxes and sodium bi-carbonate are prevented on site through a combination of sealed internal storage, silos and process extraction.

The key requirements relating to diffuse emissions control are stipulated within BAT 7 and are detailed in Tale 4.2 below.

Table 4.2: BAT 7 Diffuse Emissions for Storage of Raw Materials

	Technique	Applicability	Compliance
a	Enclosed buildings or silos/bins for storing dust-forming materials such as concentrates, fluxes and fine materials.	Applicable – All dust forming materials are stored within the enclosed building and or with silos.	YES – Compliance can be demonstrated.
b	Covered storage of non-dust-forming materials such as concentrates, fluxes, solid fuels, bulk materials and coke and secondary materials that contain water-soluble organic compounds.	Applicable – As above.	YES – Compliance can be demonstrated.
c	Sealed packaging of dust-forming materials or secondary materials that contain water-soluble organic compounds.	Applicable – As above.	YES – Compliance can be demonstrated.
d	Covered bays for storing material which has been pelletised or agglomerated.	Applicable – As above.	YES – Compliance can be demonstrated.
e	Use water sprays and fog sprays with or without additives such as latex for dust-forming materials.	Not Applicable.	N/A
f	Dust/gas extraction devices placed at the transfer and tipping points for dust-forming materials.	Applicable – The site has extraction and abatement for all transfer, tipping and material charging points.	YES – Compliance can be demonstrated.
g	Certified pressure vessels for storing chlorine gas or mixtures that contain chlorine.	Not Applicable – No chlorine is used on site. All fluxing by solid powder flux.	N/A
h	Tank construction materials that are resistant to the contained materials.	Not Applicable – no liquids required in process.	N/A

i	Reliable leak detection systems and display of tank's level, with an alarm to prevent overfills.	Not Applicable – limited storage tanks on site.	N/A
j	Store reactive materials in double-walled tanks or tanks placed in chemical-resistant bunds of the same capacity and use a storage area that is impermeable and resistant to the material stored.	Not Applicable – No reactive and / or non-compatible materials stored or used on site.	N/A
k	Design storage areas so that — any leaks from tanks and delivery systems are intercepted and contained in bunds that have a capacity capable of containing at least the volume of the largest storage tank within the bund; — delivery points are within the bund to collect any spilled material	Applicable – All hazardous materials (fuel oils, hydraulic oils etc) are stored in bunds or with secondary containment.	YES – Compliance can be demonstrated.
l	Use inert gas blanketing for the storage of materials that react with air.	Not Applicable – No gas blanketing required	N/A
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.	Applicable – All dust forming materials stored within enclosed building and or with silos.	YES – Compliance can be demonstrated.
n	Regular cleaning of the storage area and, when needed, moistening with water.	Applicable – Site is subject to regular housekeeping inspections and cleaning as necessary. No moistening of water required.	YES – Compliance can be demonstrated.
o	Place the longitudinal axis of the heap parallel to the prevailing wind direction in the case of outdoor storage.	Applicable – All dust generating materials stored in dedicated high sided bays and protected from prevailing winds.	YES – Compliance can be demonstrated
p	Protective planting, windbreak fences or upwind mounts to lower the wind velocity in the case of outdoor storage.	Not Applicable – No external storage carried out on site.	N/A

q	One heap instead of several where feasible in the case of outdoor storage.	Not Applicable – No external storage carried out on site.	N/A
r	Use oil and solid interceptors for the drainage of open outdoor storage areas. Use of concreted areas that have kerbs or other containment devices for the storage of material that can release oil, such as swarf.	Applicable – Oil / water separators are used on site.	YES – Compliance can be demonstrated.

4.3 Handling and Transport

Diffuse emissions from the handling and transport of drosses, fluxes and sodium bi-carbonate are, in a similar manner to BAT7, needed to be controlled in order to prevent uncontrolled emissions from the site.

The key requirements relating to diffuse emissions control are stipulated within BAT 8 and are detailed Table 4.3 below.

Table 4.3: BAT 8 Diffuse Emissions for Handling and Transport of Raw Materials

	Technique	Applicability	Compliance
a	Enclosed conveyors or pneumatic systems to transfer and handle dust-forming concentrates and fluxes and fine-grained material.	Applicable – Bicarbonate applied by pneumatic transfer.	YES – Compliance can be demonstrated.
b	Covered conveyors to handle non-dust-forming solid materials.	Not Applicable – No conveyors are located on site.	N/A
c	Extraction of dust from delivery points, silo vents, pneumatic transfer systems and conveyor transfer points, and connection to a filtration system (for dust-forming materials).	Applicable – All silo vents and dust forming processes are connected to extraction.	N/A
d	Closed bags or drums to handle materials with dispersible or water-soluble components.	Applicable – Closed bags or internal storage used where possible.	YES – Compliance can be demonstrated.
e	Suitable containers to handle pelletised materials.	Not Applicable – No pelletised materials used in process.	N/A
f	Sprinkling to moisten the materials at handling points.	Not Applicable.	N/A
g	Minimise transport distances.	Applicable – The site layout has been designed to ensure that	YES – Compliance can be demonstrated.

		that transportation distances are minimised.	
h	Reduce the drop height of conveyor belts, mechanical shovels or grabs.	Not Applicable – No conveyors are used on site.	N/A
i	Adjust the speed of open belt conveyors (< 3.5 m/s).	Not Applicable – No conveyors are used on site.	N/A
j	Minimise the speed of descent or free fall height of the materials.	Not Applicable – No conveyors are used on site.	N/A
k	Place transfer conveyors and pipelines in safe, open areas above ground so that leaks can be detected quickly and damage from vehicles and other equipment can be prevented. If buried pipelines are used for non-hazardous materials, document and mark their course and adopt safe excavation systems.	Applicable – No buried pipelines are underground infrastructure is present on site.	YES – Compliance can be demonstrated.
l	Automatic resealing of delivery connections for handling liquid and liquefied gas.	Not Applicable – No liquids and LNG are used at site.	N/A
m	Back-vent displaced gases to the delivery vehicle to reduce emissions of VOC.	Not Applicable – As above.	N/A
n	Wash wheels and chassis of vehicles used to deliver or handle dusty materials.	Applicable – There are very limited internal vehicle movements associated with the site.	YES – Compliance can be demonstrated.
o	Use planned campaigns for road sweeping.	Applicable – road sweeping and housekeeping measures are in place as part of the EMS. The site does not create airborne external dust.	YES – Compliance can be demonstrated.
p	Segregate incompatible materials (e.g. oxidising agents and organic materials).	Not Applicable – There are no incompatible materials stored on site.	N/A
q	Minimise material transfers between processes.	Applicable – However, there is limited process transfer associated with the site.	YES – Compliance can be demonstrated.

4.4 Process Releases

In order to prevent or, where this is not practicable, to reduce diffuse emissions from metal production, BAT is used to optimise the efficiency of off-gas collection and treatment by using a combination of techniques. The adherence and ability for the site to comply with these requirements is provided in Table 4.4 below.

Table 4.4: BAT 9 Diffuse Emissions for Process Emissions

	Technique	Applicability	Compliance
a	Thermal or mechanical pre-treatment of secondary raw material to minimise organic contamination of the furnace feed.	Not Applicable – The site purchases all material to a specification and does not accept oily material or material with a high organic contamination. All materials arrives on site pre-treated.	N/A
b	Use a closed furnace with a properly designed dedusting system or seal the furnace and other process units with an adequate vent system.	Applicable – The site furnace systems are fitted with hood extraction connected to a large centralised baghouse filtration system.	YES – Compliance can be demonstrated.
c	Use a secondary hood for furnace operations such as charging and tapping.	Applicable – As above. Extraction systems have secondary hoods.	YES – Compliance can be demonstrated.
d	Dust or fume collection where dusty material transfers take place (e.g. furnace charging and tapping points, covered launders).	Applicable – As above. Extraction hood are not required to cover launders.	YES – Compliance can be demonstrated.
e	Optimise the design and operation of hooding and ductwork to capture fumes arising from the feed port and from hot metal, matte or slag tapping and transfers in covered launders.	Applicable – Extraction Hood design has Been optimised.	YES – Compliance can be demonstrated.
f	Furnace / reactor enclosures such as 'house-in-house' or 'doghouse' for tapping and charging operations.	Not Applicable.	N/A.
g	Optimise the off-gas flow from the furnace through computerised fluid dynamics studies and tracers.	Applies – The design of the furnaces and combustion systems are proprietary and designed to ensure optimal combustion. Assumed that CFD	YES – Compliance can be demonstrated.

		has been incorporated in to design of furnace.	
h	Charging systems for semi-closed furnaces to add raw materials in small amounts.	Not Applicable to Rotary Furnaces.	N/A
i	Treat the collected emissions in an adequate abatement system.	Applicable – All emissions from process are captured, extracted and treated by filtration plant.	YES – Compliance can be demonstrated.

In order to prevent or reduce diffuse emissions from the charging and discharging / tapping of melting furnaces, BAT 78 describes the required technique(s) below.

Table 4.5: BAT 78 Diffuse Emissions for Process Emissions

	Technique	Applicability	Compliance
a	Placing a hood on top of the furnace door and at the taphole with off-gas extraction connected to a filtration system.	Applicable – All emissions from the process are captured, extracted and treated by filtration plant.	YES – Compliance can be demonstrated.
b	Fume collection enclosure that covers both the charging and tapping zones.	Not Applicable – Only applicable for stationary drum furnaces.	N/A
c	Sealed furnace door.	Not Applicable – Cannot be applied to a rotating drum furnace.	N/A
d	Sealed charging carriage.	Not Applicable – Cannot be applied to a rotating drum furnace.	N/A
e	Boosted suction system that can be modified according to the process needed.	Not Applicable – Cannot be applied to a rotating drum furnace.	N/A

In order to reduce emissions from skimmings / dross treatment, BAT is to use one or a combination of the techniques given below.

Table 4.6: BAT 79 Diffuse Emissions from Dross Production			
	Technique	Applicability	Compliance
a	Cooling of skimmings / dross, as soon as they are skimmed from the furnace, in sealed containers under inert gas.	Applicable – All dross is raked into dedicated pans and allowed to cool within furnace extraction area. During raking, metal drained from dross and metal causes outer skin on dross. This process reduces dust formation and oxidisation. Emissions from process are captured, extracted and treated by filtration plant.	YES – Compliance can be demonstrated.
b	Prevention of wetting of the skimmings / dross.	Applicable – All dross is stored in dedicated areas (Mud Room) and protected from wetting.	YES – Compliance can be demonstrated.
c	Compaction of skimmings / dross with an air extraction and dust abatement system.	Applicable – Although no physical compaction takes place, dross is raked into dedicated dross pans. Molten metal drained from dross and metal seal / crust formed on outer layer of dross. This process reduces dust formation. Dross pans located within main hood area of extraction system.	YES – Compliance can be demonstrated.

Applicability and Compliance – Diffuse emissions from the site are limited to the transport, storage, handling and processing of dust generating materials such as aluminum dross, fluxes and reagents. Real Alloy (UK) Ltd have a high degree of control over their process and store all potentially dust creating materials inside or within dedicated silos.

The company does not have a history of offsite dust complaints or are aware of any offsite dust impacts arising from the process.

The requirements of BAT 5, BAT 6, BAT 7, BAT 9 and BAT78 are therefore considered to be met.

No further action is required.

4.5 Point Source Releases to Air

4.5.1 ELV's

Channelled Dust Emissions[9]

The principle dust emissions arising from the process are associated with the furnace processes such as charging, melting, tapping and molten metal treatment. All process emissions and dust creating storage activities are extracted and abated using a baghouse filter as defined by BAT 82 which are considered to be met.

An emissions comparison against all applicable emission limit values is provided in Table 4.7.

Table 4.7: BAT 82 Control of Dust Emissions

	Technique	Applicability	Compliance
a	Use of uncontaminated aluminium material i.e. solid material free of substances such as paint, plastic or oil (e.g. billets).	Applicable – All material is purchased in accordance with an agreed specification. Due to the nature of the process, there is an inherent need to accept secondary aluminium materials and therefore trace oils, plastics and lacquers will unavoidably be present. No materials will be accepted on site with free oils or high levels of contamination. All materials are pre-treated in advance of being delivered to site.	YES – Compliance can be demonstrated.
b	Optimise combustion conditions to reduce the emissions of dust.	Applicable – All combustion systems are optimised, controlled and maintained accordingly (See BAT 2 and BAT 3).	YES – Compliance can be demonstrated.
c	Bag filter.	Applicable – The site has a large centralised baghouse filtration system that captures and collects all process and diffuse emissions from site. The baghouse system is	YES – Compliance can be demonstrated

9 BAT 80 applied only to swarf drying and swarf related crushing and milling activities and therefore does not apply.

		fitted with sodium bicarbonate and carbon injection to control acid gas, VOC and metals emissions.	

Organic Compound Emissions

The principle Organic Compound and PCDD/F emissions from the Installation arise from the thermal treatment of contaminated secondary raw materials and from the melting furnace. The applicable BAT reference is BAT 83 which states that a baghouse should be used with a combination of at least one of the techniques given below.

Table 4.8: BAT 83 Organic Compound Emissions

	Technique	Applicability	Compliance
a	Select and feed the raw materials according to the furnace and the abatement techniques used.	Applicable – All material is purchased in accordance with an agreed specification. Due to the nature of the process, there is an inherent need to accept secondary aluminium materials and therefore trace oils, plastics and lacquers will unavoidably be present. No materials will be accepted on site with free oils or high levels of contamination. All materials are pre-treated in advance of being delivered to site.	YES – Compliance can be demonstrated.
b	Internal burner system for melting furnaces.	Applicable – The melting furnaces are all oxy-fuel systems which operate in optimised stoichiometric conditions.	YES – Compliance can be demonstrated.
c	Afterburner.	Not Applicable – No afterburner or thermal oxidisers are installed or required at the site.	N/A
d	Rapid quenching.	Applicable – All flue emissions are rapidly quenched within the extraction system (1000 degree's to 200 degree's) through the	YES – Compliance can be demonstrated.

		introduction of substantial ambient air sources.	
e	Activated carbon injection.	Applicable – The baghouse extraction system is fitted with activated carbon injection.	YES – Compliance can be demonstrated.

Acid Emissions

The principle emissions to air are HCl, Cl_2 and HF from the thermal treatment of contaminated secondary raw materials, the melting furnaces and molten metal treatment. The applicable BAT reference is BAT 84 which states that a baghouse should be used with a combination of at least one of the techniques given below.

Table 4.9: BAT 84 Acid Emissions

	Technique	Applicability	Compliance
a	Select and feed the raw materials according to the furnace and the abatement techniques used.	Applicable – All material is purchased in accordance with an agreed specification. Due to the nature of the process, there is an inherent need to accept secondary aluminium materials and therefore trace oils, plastics and lacquers will unavoidably be present. No materials will be accepted on site with free oils or high levels of contamination. All materials are pre-treated in advance of being delivered to site.	YES – Compliance can be demonstrated.
b	$Ca(OH)_2$ or sodium bicarbonate injection in combination with a bag filter.	Applicable – The baghouse is fitted with sodium bicarbonate injection.	YES – Compliance can be demonstrated.
c	Control of the refining process, adapting the quantity of refining gas	Not Applicable – The material is not refined to extend beyond that	N/A

	used to remove the contaminants present into the molten metals.	which is achieved through flux additions.	
d	Use of dilute chlorine with inert gas in the refining process	Not Applicable – chlorine gas is not used for refining and degassing. All metal cleaning is carried out using flux additions.	N/A

The applicable BAT AEL standards that relate to the emissions from the Real Alloy process are detailed with Table 4.10.

Table 4.10: BAT ELV standards (BAT 81, BAT 82, BAT 83, BAT 84)

Parameter	BAT AEL (mg/Nm^3)	Can it be met by the facility	Comment
Dust	2 - 5	Site is currently regulated with a 5mg/Nm^3 ELV.	Site currently meets BAT.
TVOC	10 -30	Site is currently regulated at 50mg/Nm^3 ELV. BAT 83 requires reduction in the ELV for the site.	The plant is able to meet this ELV. Emission Concentration of 30mg/Nm^3. Site currently can comply with this BAT Requirement.
PCDD/F	0.1	Site is currently regulated at BAT ELV of 0.1.	The plant is able to meet this BAT ELV. Site currently can comply with this BAT Requirement.
HCl	5 – 10	Site is currently regulated at BAT ELV (10mg/Nm^3).	The plant is able to meet this BAT ELV. Site currently can comply with this BAT Requirement.
Cl_2	1	Site is not regulated for this parameter – no chlorine emissions from process.	N/A

HF	1	Site is currently regulated at 2 x BAT ELV (2mg/Nm^3).	Historical emissions results indicate that the HF emission periodically exceed the permitted ELV and would struggle to consistently meet 1mg/Nm^3 ELV.
NOx and CO	Not Stated.	BAT 13 Measures (Oxy-fuel) are incorporated.	Compliance can be demonstrated.
SO_2	Not Applicable.	SO_2 only relates to Cu, Pb, Zn, Ag, Ni, Mb sectors.	Not Applicable

Appendix 1 provides 24 months compliance monitoring data for the site. The fluctuations in emissions performance of the plant are clearly shown.

4.6 Monitoring

The stated monitoring standards for each of the BAT parameters stated within BAT10 is provided below.

Table 4.11: BAT Monitoring Standards (BAT 10)

Parameter	BAT monitoring frequency	Standard	Comment
Dust	Continuous Annually	EN 13284-2 EN 13284-1	Site currently meets with these requirements.
TVOC	Not Stated	-	N/A
PCDD/F	0.1	Site is currently regulated at BAT ELV of 0.1.	Site currently meets with these requirements.
HCl	Once per Annum	EN 1911	Site currently meets with these requirements.
Cl_2	Once per Annum	Site is not regulated for this parameter – no chlorine emissions from process.	Site currently meets with these requirements.
HF	Once per Annum	ISO 15713	Site currently meets with these requirements.

NOx	Once per Annum	EN 14792	Site currently meets with these requirements.
SO_2	Once per Annum	EN 14791	Site currently meets with these requirements.

4.7 Point Source Releases to Controlled Water

There are no point source emissions to controlled waters from the process.

Therefore, no BAT references and / or ELVs apply.

4.8 Point Source Releases to Sewer

With the exception of domestic sewerage emissions, there are no point source emissions to sewer from the process.

Therefore, no BAT references and / or ELVs apply.

5. CONCLUSIONS AND SUMMARY

Real Alloy (UK) Ltd are an existing Part A(1) Non Ferrous Metals Activity that is permitted by Natural Resources Wales under the requirements of the Industrial Emissions Directive.

The site has been issued a Regulation 60 by Natural Resources Wales to confirm whether or not the site is able to comply with the requirements of the EU BAT Conclusion document (European Union document L172/34 'best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for the non-ferrous metals industries') for the Non Ferrous Metals Sector.

In order to meet with the Regulation 60 Notice, a comprehensive review of the Real Alloy process and activities has been carried out by Sol Environment Ltd against the relevant BAT reference requirements.

The review identifies that the Installation already meets the requirements of the BAT conclusions except for in the following specific areas:

- Energy Efficiency: BAT 2 requires the plant to utilise waste heat recovery to preheat combustion air and/or be used for other process heating.

  The site is currently investigating opportunities to further energy recovery from the flue gases for uses such as metal pre-heating, process drying or combustion gas pre-heating.

- Acid Gas Emissions: The site will be required to meet a much tighter HF ELV than current permitted. In order to implement the findings of the BAT conclusions document it will be required to reduce the site ELV for HF from 2mg/Nm^3 to 1mg/Nm^3.

  Although the current baghouse has been observed to comply with this limit, it is evident that the plant has historically routinely exceeds the proposed BAT ELV. The technical limitations of the baghouse plant will be investigated to further understand the upper limits of performance and whether or not and ELV of 1mg/Nm^3 can be achieved both long term and through all process operating conditions.

  24 months of air emissions data has been provided within Annex 1 of this report that supports both the compliance and periodic breach of the current HF ELV.

Both of these BAT requirements are considered achievable and will be confirmed following further technical investigation by the company.

There are no situations where the compliance with the BAT conclusions will lead to either the substantial refurbishment or the installation of new combustion plant with an aggregate thermal input of greater than 20MWth. Therefore, there is no requirement to provide commercial evidence to demonstrate compliance with Article 14, Paragraph 5 of Directive 2012/27/EU on Energy Efficiency.

A screening assessment has been carried out as required by the Regulation 60 Notice and included within Annex 2 of this report. There are no discharges to surface water from the site beyond uncontaminated 'clean' surface water.

There are no process discharges from the site and hence no emissions data relating to hazardous (toxic metals [Cd, Hg, Ni, Pb], benzene, polyaromatic hydrocarbons) pollutants. On this basis, no further risk assessment is considered necessary.

There is no use, production or release of relevant hazardous substances (as defined in Article 3(18) of the Industrial Emissions Directive) relating to the process. Therefore the requirement to carry out a risk assessment considering the soil and groundwater contamination is not considered necessary.

The site has previously provided an updated Site Condition Report and has established the baseline condition of the site. The SCR has been provided as a technical appendix (Annex 3) of this report which provides the necessary information relating to the current state of soil and groundwater contamination.

ANNEX 1: 24 Months Air Sampling Data

ANNEX 2: Surface Water Screening Assessment

Annex 3: Updated SCR