Environmental Visage

UPDATE ON IMPROVEMENT CONDITION 1 – MAY 2019
GS YUASA BATTERY MANUFACTURING UK LIMITED
EPR/BV5386IX/V004

1. Introduction

GS Yuasa Battery Manufacturing UK Limited operates a battery manufacturing plant on the Rassau Industrial Estate, South Wales. The site operations are permitted by Natural Resources Wales under Environmental Permit number EPR/BV5386IX/V004. The latest variation to this Permit, dated 13th June 2017, contained a number of improvement programme requirements, including the following:

The operator shall submit, for approval by Natural Resources Wales, a report setting out progress to achieving the BAT Conclusions and BAT-AEL's where BAT is currently not achieved, but will be achieved by the 30th June 2020. The report shall include, but not be limited to, the following:
1. Current performance against the BAT Conclusions and BAT-AEL.
2. Methodology for reaching the AELs.
3. Associated targets / timelines for reaching compliance by 30th June 2020.

The report shall address all of the relevant BAT Conclusions.

This report has been prepared by way of an update to the original submission, as requested by Natural Resources Wales in their Compliance Assessment Report reference: CAR_NRW0034966. It confirms the Operator's progress towards their plans for compliance where improvements have had to be made and confirms the on-going timelines and targets for achieving compliance with any outstanding BAT Conclusions by 30th June 2020.

2. Background

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, was published on 30th June 2016. The UK has four years from this date of publication to ensure that operators of relevant non-ferrous metals operations comply with the requirements of the BAT Conclusions document. As such, Natural Resources Wales requested in 2016 that GS Yuasa Battery Manufacturing UK Limited (then Yuasa Battery (UK) Limited) undertake an assessment against the BAT Conclusions document, to ascertain their level of compliance with the requirements, and this assessment was submitted to Natural Resources Wales in October 2016.

Since that time, the Environmental Permit for the site operations has been varied to implement the revised requirements specified by the BAT Conclusions document, and GS Yuasa Battery Manufacturing UK Limited is working within the terms of their amended Permit. Where the installation does not currently fully comply with the requirements of the BAT Conclusions document, it has a maximum of four years (to 30th June 2020) to achieve Best Available Techniques across the site. This report has been prepared to provide an update on the status of activities at the site, and a timeline for achieving full compliance with the BAT Conclusions, on or before that deadline.

The original BAT Conclusions gap analysis provided in October 2016 concluded that the installation was considered to largely be compliant with the BAT Conclusions. Where appropriate, a combination of techniques was already being applied to the operations such that, whilst not employing all of the detailed techniques for any one conclusion, the management, operation and control of the site processes ensured that overall compliance with the BAT Conclusion could be demonstrated. There were however four Conclusions with which the site was not considered to be fully compliant as follows:

- BAT is to implement an action plan on diffuse dust emissions, as part of the EMS, that identifies the most relevant diffuse dust emission sources (e.g. using EN 15445); and defines and implements appropriate actions and techniques to prevent or reduce diffuse emissions over a given time frame.
- BAT are employed to prevent diffuse emissions from the storage of raw materials.

- In order to prevent NO_x emissions to air from a pyrometallurgical process, BAT is to use one of the techniques given below:
    - Low-NO_x burners;
    - Oxy-fuel burners;
    - Flue gas re-circulation.
- ISO 5667 should be applied to water sampling and emissions to water should be monitored at the point where the emission leaves the installation at least once per month. 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. Current Performance

The Operator has prepared and maintains a BAT Conclusions Action Plan in order to track progress towards meeting the required improvements and a copy of the current version is included over-page. As can be seen from the plan, many of the proposed items have been completed, with three outstanding items and one amended item as follows:

Outstanding Items:

BC006 relating to low-NO_x burners: An investigation into the potential options for these combustion units will be commissioned, and either a BAT Assessment of the available options, or a cost benefit analysis of improvements will be made. This will be reported to Natural Resources Wales.
Due to other significant work, recent developments indicate the item should be extended further to 31/12/19 as there is currently insufficient information available to complete the BAT Assessment.

BC020 in follow-up from the diffuse dust assessment: Fit thick plastic curtains around external dust abatement systems that are not already fitted with them. (A6 and A10 are already fitted with curtains) Suitable curtain materials are still being sought for possible fitting in-house. Re-scheduled to 31/8/19.

BC021 relating to low-NO_x burners: Carry out air sampling to determine the amount of NO_x in the air around the grid casting process at F1 where a gas ring is used in cork mixing preparation.
Drager tubes are on order to carry out NOx measurements. Re-scheduled to 31/7/19.

Amended Item:

BC015 proposing to install a single sample point on the discharge drain to W1 to ensure a combined sample of the discharge to water course at the point where the emission leaves the installation: Check the drain intersection where F4 meets with the south road drain and obtain a quotation for installing a drain after SW9/10 which will become a single sample point as permit Ref W1.
The pipe system is such that it creates a problem positioning an inspection drain in a safe position inside the site boundary. This item will remain under review, however, at present, sampling will continue to be carried out only when sufficient flow is present and at the positions identified as SW 9 and SW 10 on the internal surface water drainage plan. Also, as the Lead results are below the BAT AEL of 0.5 mg/l and given the costs involved in the purchase of Lead Cell Test materials along with it being a very toxic material, it is proposed that the sampling at positions W1, be reduce to monthly.

This item was added to the Action Plan in order to ensure that samples of surface water discharges would be as representative as possible of the whole to be characterised, in line with the requirements of ISO 5667 Part 1 and BAT 16. Although it will not be possible to install a sample point in the drain after the merging of the two main surface water runs, the sample points within the individual drainage channels (SW9 and SW10) are located appropriately, and together represent the discharge to water course (W1) with no further contributions to the site release being possible after these points. The surface water drainage plan is shown in Figure 1. No further action is proposed on this point at present.

The Operator now plans to reduce the frequency of testing from surface water sample points SW9 and SW10 to a monthly rather than a daily sample. Lead results from these points are consistently below the BAT-AEL of 0.5 mg l^{-1} and given the cost and toxicity of the Lead Cell Test materials, the reduced testing is considered to be appropriate, whilst maintaining the requirement of BAT 16 for emissions to water to be monitored at the point where the emission leaves the installation at least once per month. Where a lack of flow prevents a sample being taken at the scheduled time, the drain will be checked daily and a sample will be taken as soon as there is sufficient flow in the drain.

Action Plan - BAT Conclusions and Environmental Permit Compliance

Updated 30/05/19

Ref	Date Raised	Raised by	Issue raised	Person responsible	Scheduled date of completion	Actual date of completion
BC001 (BAT006)	11/10/16	Gap Analysis	Produce a documented action plan on diffuse dust emissions to ensure the most relevant diffuse dust emission sources are identified and appropriate actions and techniques for the reduction or prevention of diffuse dust emissions are implemented. This item will involve external environmental consultants.	HSE Manager	31/12/17	22/12/17
BC002 (BAT007)	11/10/16	Gap Analysis	Purchase and use bunded pallets for all potentially polluting liquid materials stored in the raw materials warehouse.	Commodities Specialist	31/10/16	31/10/16
BC003 (BAT007)	11/10/16	Gap Analysis	Fit high level warning alarms to 3 bulk dilute sulphuric acid tanks located at factory Nos. 1, 2 a	Utilities Team Leader	31/8/17	19/8/17
BC004 (BAT007)	11/10/16	Gap Analysis	Fit high level warning alarms to 2 bulk sodium hydroxide tanks located at factory Nos. 2 and 4. 1 x sodium hydroxide tank completed in factory No.2 but factory No. 4 still awaited.	Project Leader	10/5/19	21/5/19
BC005 (BAT007)	11/10/16	Gap Analysis	Prepare and commence a formal daily record of inspections for all bulk dilute sulphuric acid and sodium hydroxide storage areas. Routine visual inspections are undertaken and a prototype of a formal written inspection has been tested. A formal document has now been set up.	Utilities Team Leader	31/7/17	6/7/17
BC006 (BAT013)	28/10/16	Gap Analysis	An investigation into the potential options for these combustion units will be commissioned, and either a BAT Assessment of the available options, or a cost benefit analysis of improvements will be made. This will be reported to Natural Resources Wales. This item will involve external environmental consultants. Due to other significant work, recent developments indicate the item should be extended further to 31/12/19 as there is currently insufficient information available to complete the BAT Assessment. (Also see BC017 below)	Utilities Team Leader	31/12/19	
BC007 (BAT013)	28/10/16	Gap Analysis	Ensure that the new Cork Preparation Heater burner now identified at Grid Casting is included into the Permit during the next variation.	HSE Manager	At Permit Variation	22/6/17
BC008 (BAT017)	15/12/16	NRW	1. Arrange sampling of surface waters in drains to try and identify the source of where the lead is coming from. 2. Arrange thorough cleaning of all site drains. 3. Repeat sampling to check if the Lead levels are reduced to below the new BAT-AEL. Sampling of surface waters from August 2017 have produced results which are all below 0.5 mg/l. Weekly sampling is continuing subject to weather conditions.	HSE Manager	31/12/17	31/12/17
BC009 (BAT016)	10/8/17	Envisage	Arrange sampling of Benzene and Polyaromatic Hydrocarbons in trade effluent. (This may be a one-off sample)	Utilities Team Leader	31/10/17	28/10/17
BC010 (BAT016)	10/8/17	Envisage	Purchase a new cool box/bag for the storage of water samples whist being collected.	Utilities Team Leader	30/9/17	20/9/17

Action Plan - BAT Conclusions and Environmental Permit Compliance

Updated 30/05/19

Ref	Date Raised	Raised by	Issue raised	Person responsible	Scheduled date of completion	Actual date of completion
BC011 (BAT016)	10/8/17	Envisage	Purchase a new refrigerator for the storage of water samples in the pump house.	Utilities Team Leader	30/9/17	20/9/17
BC012 (BAT016)	10/8/17	Envisage	Check the ALS documentation for details on chain of custody and send a pdf copy to Envisage.	HSE Manager	25/8/17	22/8/17
BC013 (BAT016)	10/8/17	Envisage	Formalise and commence quarterly road sweeping activities.	Utilities Team Leader	18/8/17	18/8/17
BC014 (BAT016)	10/8/17	Envisage	Formalise and commence bi-annual drain cleaning activities.	Utilities Team Leader	14/9/17	5/9/17
~~BC015 (BAT016)~~	~~10/8/17~~	Envisage	~~Check the drain intersection where F1 meets with the south road drain and obtain a quotation for installing a drain after SW9/10 which will become a single sample point as permit Ref W1.~~ The pipe system is such that it creates a problem positioning an inspection drain in a safe position inside the site boundary. This item will remain under review, however, at present, sampling will continue to be carried out only when sufficient flow is present and at the positions identified as SW 9 and SW 10 on the internal surface water drainage plan. Also, as the Lead results are below the BAT AEL of 0.5 mg/l and given the costs involved in the purchase of Lead Cell Test materials along with it being a very toxic material, it is proposed that the sampling at positions W1, be reduce to monthly.	~~Utilities Team Leader~~	~~01/5/19~~	N/A
BC016 (BAT016)	10/8/17	HSE Manager	Review internal sampling methods to ensure they follow ISO standards as far as is reasonably practicable. Slightly behind schedule so changed to 20/12/17.	Utilities Team Leader	20/12/17	12/12/17
BC017 (BAT013)	10/8/17	Envisage	Arrange flame temperature analysis of all appropriate burners to list all that are either at or above 1000 °C. (Also see BC006 above) Staff changes at Tremorfa has resulted in a delay. Now re-scheduled with BS Burners for 15/12/17.	Utilities Team Leader	15/12/17	7/12/17
BC018 (BAT007)	25/9/17	HSE Manager	Prepare sign templates and place an order to supplement BC003 and BC004 above. Re-scheduled to 30/9/18.	HSE Manager	30/09/18	5/10/17
BC019 (BAT006)	20/12/17	Diffuse Dust Report	Arrange Lead sampling from roof extraction points above Lead areas at F1 and F2 to determine if Lead levels are of any significance. Visual checks have been undertaken and photographs obtained on 07/05/19. Moving forward, it is intended to carry out biannual inspections around the fans to ensure no excessive amounts of dust have accumulated.	Utilities Team Leader	30/6/19	7/5/19
BC020 (BAT006)	20/12/17	Diffuse Dust Report	Fit thick plastic curtains around external dust abatement systems that are not already fitted with them. (A6 and A10 are already fitted with curtains) Suitable curtain materials are still being sought for possible fitting in-house. Re-scheduled to 31/8/19.	Utilities Team Leader	31/8/19	

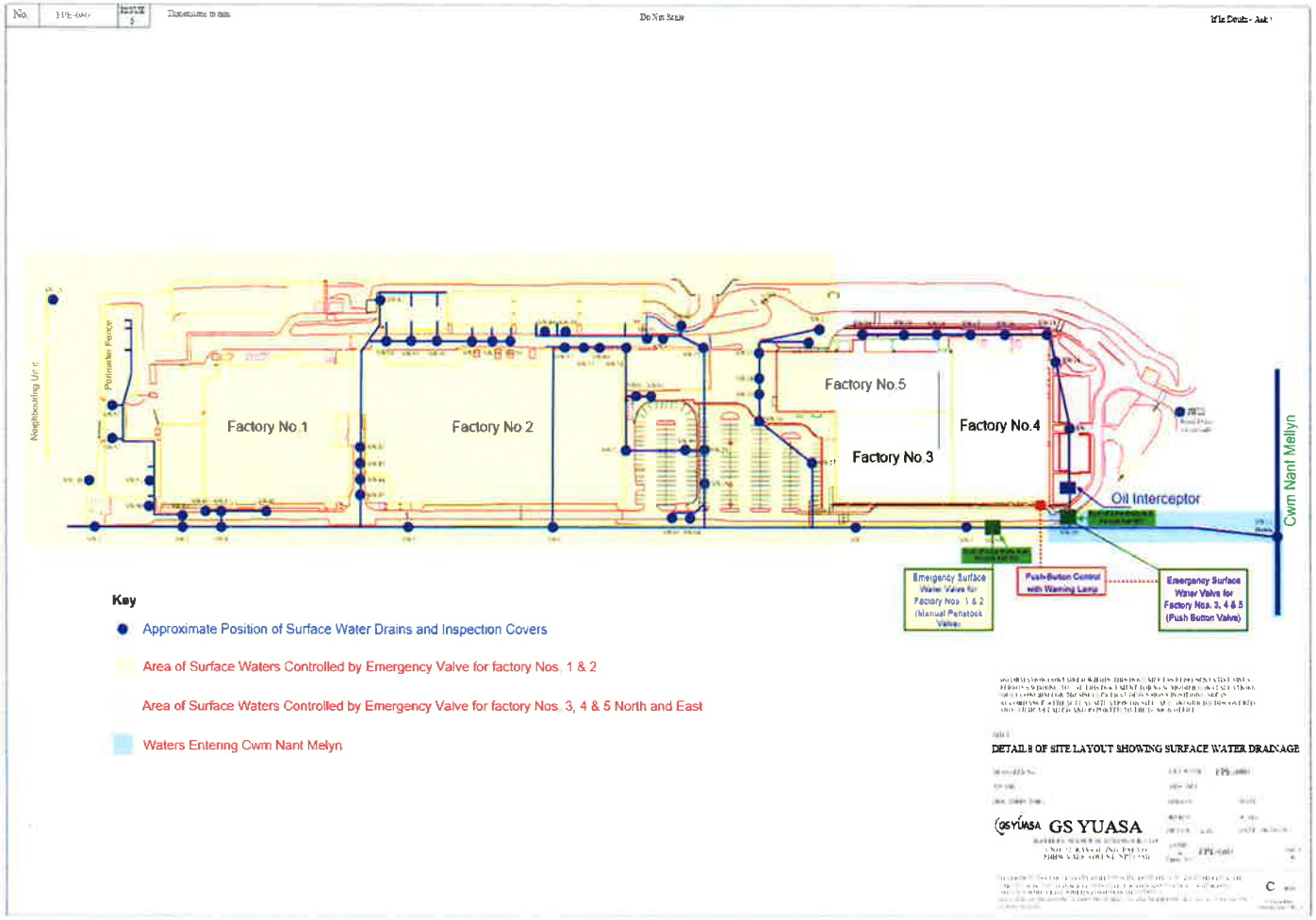
Action Plan - BAT Conclusions and Environmental Permit Compliance

Updated 30/05/19

Ref	Date Raised	Raised by	Issue raised	Person responsible	Scheduled date of completion	Actual date of completion
BC021 (BAT013)	01/06/18	Envisage	Carry out air sampling to determine the amount of NO x in the air around the grid casting process at F1 where a gas ring is used in cork mixing preparation. Drager tubes are on order to carry out NO x measurements. Re-scheduled to 31/7/19.	HSE Manager	31/7/19	

All other proposed actions have been completed and no further work is proposed at this stage. The remainder of this report will therefore focus on the outstanding items only and provides an update on current performance against these BAT-AELs, and the intended route to achieving full compliance by 30th June 2020. No information is provided here on the installation's other BAT Conclusion requirements, as these are deemed to have been met and closed out.

Figure 1 Surface Water Drainage Plan



4. Attaining Compliance with Outstanding BAT Conclusions

The BAT Conclusions Action Plan confirms that the majority of the proposed actions are complete. Where actions have not been completed this is either because it is not safe to do so and the current system can be considered to essentially meet the BAT Conclusion requirements (BC015), or further work should see the actions completed by the close of 2019. However fundamentally, the management of diffuse emissions, including dust, and sampling in accordance with ISO 5667 Part 1 and BAT 16 are now undertaken at the site.

The most challenging of the outstanding actions is the application of low-NO_x burners across the site pyrometallurgic processes. Although investigations to date have been far reaching and have considered all burners that cannot currently be classified as low-NO_x, it is noted here that the BAT-Conclusion requirement is as follows:

NO_x emissions
BAT 13. In order to prevent NO_x emissions to air from a pyrometallurgical process, BAT is to use one of the techniques given below:

- Low-NO_x burners
- Oxy-fuel burners
- Flue-gas recirculation (back through the burner to reduce the temperature of the flame) in the case of oxy-fuel burners

Within the Best Available Techniques Reference Document (BREF) for the Non-Ferrous Metals Industries – 2017, pyrometallurgy is not strictly defined. However, the Oxford Dictionaries define pyrometallurgy as "The branch of science and technology concerned with the use of high temperatures to extract and purify metals."

It is noted that other definitions can be broader, including for example The Collins English Dictionary definition of pyrometallurgy as "The branch of metallurgy involving processes performed at high temperatures, including sintering, roasting, smelting, casting, refining, alloying, and heat treatment." This would suggest that a wide range of metal treatment, including simple 'heat treatment' could be classed as pyrometallurgy.

Although the BREF does not define what it considers pyrometallurgy to involve, the Scope of the document states:
"The main operations covered are:

- raw materials storage and preparation;
- fuels storage and preparation;
- the production processes, i.e. the pyrometallurgical and hydrometallurgical processes;
- emission prevention and reduction techniques;
- products, storage and preparation." *(highlight added)*

The suggestion here is that it is only the production of non-ferrous metals that may include pyrometallurgical processes, rather than, for example, their use in producing battery plates and paste. Primary Lead pyrometallurgical processing is undertaken at temperatures in excess of 1,000°C and the BREF's general description of pyrometallurgical processes suggests that these "are normally highly heat-intensive and the process gases contain a lot of heat energy. As a consequence, regenerative burners, recuperative burners, heat exchangers and boilers are used to recover this heat. Steam or electricity can be generated for use on or off site, for example in district heating schemes or to preheat process or fuel gases".

However, production may be primary or secondary as follows (from Chapter 5 of the BREF):
"Lead and tin are produced mainly by pyrometallurgical processes, which implies the use of furnaces. Lead production can be divided into primary and secondary processes, depending on the materials treated. Primary lead smelting focuses on the conversion of lead ores and concentrates, complex secondary materials, and often some lead-acid battery scrap fractions (paste or grids) into crude lead bullion requiring further refining. Secondary lead smelting focuses mainly on recycling lead-acid battery scrap, but other residues and scrap can also be used as feed material."

The activities undertaken at GS Yuasa Battery Manufacturing UK Limited generally involve melting pots rather than furnaces, with Lead smelting and melting temperatures remaining relatively low (below 500 °C), and no heat recovery employed. Hence, if pyrometallurgical processes are considered specific to the primary or secondary metal production process employing furnaces, the only pyrometallurgical activity undertaken by the Operator is the recycling of process dross, the dedicated unit of which already incorporates a low-NO_x burner.

Investigations into the potential use of low-NO_x burners across the site combustion processes generally, have identified that obtaining information on the likely NO_x emissions from current plant is not always easy with many of the burner manufacturers no longer trading, and with some of the combustion units comprising direct fired systems which release emissions into the wider factory environment rather than extracting through a flue. Many of the systems are old, and the manufacture of small capacity low-NO_x burners is still in its infancy. Although some manufacturers are now developing small low-NO_x burners, an investigation by a burner contractor into the systems operated by GS Yuasa Battery Manufacturing UK Limited suggests that these would not be able to be retrofitted or the existing plant modified to low-NO_x processes, and thus completely new process plant will likely be required in order to include low-NO_x combustion units across the site operations.

However, and on the basis that only the dross recycling system undertakes a pyrometallurgical process, the following burners are screened out of the requirements of BAT 13, despite having been identified in the original BAT Conclusions gap analysis as not being low-NO_x.

Plant with non-low-NO_x burner(s)	Justification for exclusion
Pellet Casters	Lead melting only – not a production / smelting process
Flash Drying Ovens	Lead and paste drying only – not a production / smelting process
Cork Preparation Heater	Preparation of non-metallic ingredient for production Cork heating only
Space Heaters	Space heating only – non-production process

Although none of these systems is classed as a pyrometallurgical process and can therefore be removed from consideration under BAT 13, at the point of any future replacement or upgrade, consideration will be given to the use of low-NO_x combustion systems where technically and practically possible. It is not however deemed appropriate or required for these units to be upgraded by 30th June 2020, and as such, there is no proposal to undertake any further investigation, BAT Assessment of the available options, or a cost benefit analysis of improvements.

GS Yuasa Battery Manufacturing UK Limited request that Natural Resources Wales confirm that they agree with the conclusion above at their earliest convenience and that no further work is therefore required at this stage regarding the incorporation of low-NO_x combustion units at the site prior to 30th June 2020.

5. Summary of Further Work and Timeline

Since the preparation of their BAT Conclusions gap analysis in October 2016, GS Yuasa Battery Manufacturing UK Limited has progressed work towards achieving BAT Conclusions where BAT was not already fully demonstrated, and the majority of the required works are complete. Outstanding items are summarised below with information on planned progress and timelines:

Item	Work to date	Next steps	Timeline
BC006: Low-NO_x burners	Investigations by Operator and a number of burner contractors have identified significant difficulties in ensuring all combustion units are low-NO_x	Submission of this report asserts that only metal processing (primary or secondary extractive processes) are considered to be pyrometallurgical processes. The only pyrometallurgical process on site therefore is the dross recycling system which does already employ a low-NO_x burner and therefore there are no further requirements. Future replacement / upgrading of combustion units will look to employ low-NO_x burners as standard where this is technically and practically possible.	Item considered to be complete subject to acceptance by NRW. NRW to confirm acceptance. To be completed by 31/12/19
BC020: Control of diffuse dust	Quotations from third parties obtained.	Further costing of suitable material for fitting in-house.	To be completed by 31/08/19
BC021: Low-NOx investigation	Draeger tubes on order to undertake some work-place NO_x level testing around open flame combustion units.	Awaiting delivery of tubes prior to testing.	Testing around open flame combustion areas to be completed by 31/07/19