RESPONSE TO REGULATION 60 (1) NOTICE ISSUED BY NATURAL RESOURCES WALES TO YUASA BATTERY (UK) LIMITED DATED 25TH JULY 2016

This document presents the information requested by the Regulation 60 (1) Notice received from Natural Resources Wales, dated 25th July 2016. In summary, the Notice requires information on:

- Yuasa Battery (UK) Limited's compliance or otherwise with the BAT Conclusions specified in the Commission Implementing Decision (EU) 2016/1032 of 13 June 2016 (published 30 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;
- Consideration of whether or not the Energy Efficiency Directive may be relevant to the Yuasa Battery (UK) Limited Installation;
- Consideration of the potential for the site operations to impact on the Water Framework Directive requirements; and
- Provision of a risk assessment or a summary report referring to previously provided information in relation to the current state of soil and / or groundwater contamination at the Installation.

Each of these items will be considered in turn as raised in individual paragraphs of the Notice.

1) Confirm whether or not you currently comply with the requirements of the BAT Conclusions, including any associated emission levels.

Response:

An assessment of Commission Implementing Decision (EU) 2016/1032 has been made and is summarised below. It is noted that the BAT Conclusions considered are those which relate either in generic or specific terms to the processing of Lead (i.e. BAT Conclusion 1 – 19, and 90 – 107). No other BAT Conclusions from the document are detailed here as they relate specifically to other industries and therefore have no bearing on the Yuasa Battery (UK) Limited operation.

Overall, Yuasa Battery (UK) Limited are considered to be compliant with the BAT Conclusions. Where appropriate, a combination of techniques is applied such that, whilst not employing all of the detailed techniques for any one conclusion, the management, operation and control of the site processes ensures that overall compliance with the BAT Conclusion can be demonstrated.

BAT 1 Compliant	In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates a list of features (as identified in the BAT Conclusions document).
Yuasa Battery (UK) Limited works to an ISO 14001 certified EMS, which is being brought into line with the requirements of the 2015 Standard. The ISO 14001 certificate number is EMS 55229, and compliance with the 2015 Standard will be achieved before September 2018. The list of requirements identified in the BAT Conclusions document has been presented to both the internal and external auditors in order that the current system can be checked and assessed for compliance.	

BAT 2 Compliant	BAT is to use a combination of energy efficiency techniques as listed.
A combination of energy efficiency techniques are applied, including: • Employ RUMM (a specialist energy management company; Remote Utility Monitoring and Management) to monitor and target energy use and efficiency across the site. The site has also increased the servicing of their site ovens from annually, to quarterly and has seen more efficient combustion as a result.	

- Re-circulate hot air from the aging and curing ovens as pre-heat air (recuperative technologies).
- Use the hot air from the compressors for heating the battery wash water and heating the factory as required (heat recovery).
- Use the heat from un-insulated furnace flues to heat the factory (heat recovery).
- Insulate all steam and hot water pipes.
- Use pure Oxygen in burning torches at the assembly line in order to increase the heat of the flame, although Oxygen is not used in other combustion processes as the raw materials do not contain Sulphur or Carbon.
- Replace motors with high efficiency, variable frequency drives where applicable, although motors with a constant loading are not replaced with variable drives.

The site does not:

- Have a formal ISO 50001 Energy Efficiency Management System but does monitor and target energy use through a third party, and has also had an Energy Savings Opportunity Scheme audit report (2015) for the Yuasa Battery (UK) group operations from which it is implementing suggestions raised.
- Employ regenerative burners on any of their plant (recuperative technologies used instead where appropriate).
- Have any requirement for the use of a thermal oxidiser.
- Pre-heat the furnace charge.
- Use the waste heat from launders as Lead cools and solidifies quickly.
- Dry concentrates and wet raw materials at low temperatures, as the process demands specific temperatures (120 ^{o}C).
- Recover the chemical energy content of the carbon monoxide produced in an electric furnace. The furnaces are batch furnaces and hence this is not appropriate.
- Recirculate the flue-gas back through an oxy-fuel burner as the majority of the Lead melting furnaces at the site are heated electrically.
- Use control systems that automatically activate the air extraction system or adjust the extraction rate depending on actual emissions. Discharges are always on when furnaces and other processes are operational for health and safety reasons, although a visual indicator panel enables easy identification to ensure systems are off when the process is not operational.

None of the techniques applying to hydrometallurgical processes have been included or considered in this response as Yuasa Battery (UK) Limited do not undertake hydrometallurgical processes.

BAT 3 Compliant	Ensure stable process operation by using a process control system together with a combination of the techniques listed in the BAT Conclusions.

Yuasa Battery (UK) Limited operate to a process control system based on monitoring and procedures, and the following combination of process control techniques are applied:

The Company procures raw materials to set specifications with regular quality checks on the materials delivered. Melting of different Lead types is undertaken separately to ensure that quality is maintained, and Lead is recycled in-house wherever possible. Feed rates into furnaces is manual based on a visual level assessment by the operator. Furnace processes are manned almost constantly when operational, the exception being during break periods (maximum 25-minute break) when the furnaces are not fed. Lead additions to pots are only undertaken when an operator is present to activate the feed system.

Production of plate paste is automatic and uses feed weighing and metering systems (materials addition, mixing, and discharge), except for the addition of key ingredients which are added manually to a recipe specified by the Quality Department.

Acid bulk mixing and charging is all automatic, and the injection moulding process producing the battery lids, cases, and covers is also entirely automatic. The use of automatic systems wherever possible, with controls by the Quality Department ensures optimum conversion efficiency, reduces emissions and rejects.

Critical process parameters such as furnace and oven temperatures are monitored and recorded, although this is the only control, with pressures and gas flows (where relevant) not being monitored for operational control. Lead melt is controlled manually by the operator based on the temperature and material feed. Temperatures are held below 500 ^{o}C to avoid the creation of Lead fume.

Abatement systems (filters and scrubbers) are checked weekly against key criteria as part of the maintenance checks. Checks on the fans, solenoid valves, and bearings are made, and where relevant, checks for air leaks are made. The pump flow pressure is also checked on the scrubber systems, and the water level is topped up. There is also a daily visual check on all systems. The PCME continuous monitors record particulate Lead releases from relevant emission points, and would trigger an alarm should the particulate level in any of the discharge points near the emission limit value. Extractive testing is also undertaken quarterly to confirm these figures and calibrate the monitors. Extractive testing includes monitoring of stack temperature and pressure.

Acid tanks include level gauge telemetry to monitor levels and identify any significant use or loses. Charging processes have time and current monitoring. The voltage and electrical contact temperatures of the systems are not monitored, although as part of the site Health and Safety Schedule fixed wire checks are undertaken once every five years and thermographic checks are performed on electrical panels either annually (high loadings) or every 3 years (all panels).

The waste water treatment plants are controlled by pH, and have several pH monitors which control the dosing of the reagents and the final discharge of the treated effluent. Each monitor is set to alarm at high and low level pH and ensure that only water of sufficient quality can be passed to the sewer. Should an alarm be raised by any of the monitors, the discharge valve is shut and the water is diverted back to an on-site sump to await further treatment. The shutting of the discharge valve is an automatic operation, initiated by the pH alarm. The waste water treatment plants also include Sulphate, Lead, and flow monitoring. The flow meter is MCERTS accredited. Quarterly samples are sent for third-party (UKAS) analysis. There is no on-line monitoring of temperature, turbidity, or conductivity.

Yuasa Battery (UK) Limited do not undertake on-line monitoring of vibrations to detect blockages and possible equipment failure, although filter systems and scrubbers are visually assessed daily, and this includes consideration of noise from the filters, which might indicate a blockage. Vibration is not a significant issue for the filters during normal operation.

BAT 4 Compliant	Apply a maintenance management system to address the performance of dust abatement systems as part of the EMS.

Yuasa Battery (UK) Limited maintains and works to a planned preventative maintenance system. The system is stored within an Excel spreadsheet which includes reference to all dust abatement systems at the site, and is assessed with tasks set weekly. Job sheets are raised and completed, and are confirmed as complete. The Utilities Department manages the preventative maintenance system and this is monitored by management during morning accountability meetings.

BAT 5 Compliant	BAT is to collect diffuse emissions as much as possible nearest to the source and treat them.

Diffuse emissions are controlled locally to the source and remain enclosed at all times. Where Lead dust may be an issue, extract systems are incorporated to remove the dust from the work area. Filters collect the Lead dust and where this is subsequently removed from the filter medium (e.g. in bag filter systems), it is either caught in sealed bins with clamped lids, or it falls into a plastic sheath stored within a collection bin. Once filled, the sealed collection bins are emptied directly into a larger waste bin, lined with a polyethylene bag, which is then sealed. Filled plastic sheaths are tied at both ends and remain within the collection bin. All collection bins are covered and sealed with plastic before being moved from the operational area for storage prior to removal from site for recycling. Two of the collection bin locations are also surrounded by plastic curtains to prevent any dust which is created, from escaping to the wider area.

Lead in air sampling is undertaken local to key operational areas, and the site operates two on-site, and one off-site ambient Lead monitors.

BAT 6 Non-Compliant	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 (using e.g. EN 15445); and defines and implements appropriate actions and techniques to prevent or reduce diffuse emissions over a given time frame.

The site does not currently (October 2016) have a documented action plan on diffuse dust emissions, but will produce one for implementation by the close of 2017, in order to ensure that 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.

The site does not receive complaints of diffuse emissions of any sort, and currently operates two on-site, and one off-site ambient Lead monitors. Monthly monitoring results and the annual average from all monitors are generally below 0.25 µg m^{-3}. An incident at the site in March 2016 has had a negative impact on the result at one of the on-site monitoring locations for 2016. The results demonstrate that emissions of Lead from the site, through point source or diffuse sources, which would include particulate, are usually sufficiently low such that the ambient air concentration remains within the requirements of the Air Quality Objectives, and particular instances can usually be easily identified through the monitoring undertaken at the site. As there is not considered to be any substantial diffuse dust issue from the site operations, the diffuse dust action plan will consider qualitative data on the potential dust sources and controls, rather than attempting to quantify any releases by undertaking reverse dispersion modelling (applying EN 15445), which is not considered to be a justifiable example method for the identification of diffuse sources in this case.

BAT 7 Not Fully Compliant	BAT to prevent diffuse emissions from the storage of raw materials.

Yuasa Battery (UK) Limited applies a combination of the techniques detailed within the BAT Conclusions to prevent emissions from the storage of raw materials.

Raw materials are stored in silos, tanks, and internally within the Raw Materials Warehouse. All Lead (raw materials or wastes) are stored internally around the site, thereby minimising the potential for release to the environment. Where potentially polluting liquid chemicals are stored within the Raw Materials Warehouse, these are to be stored over portable bunds, although not all are currently in place. Further bunded pallets are on order for use when storing items such as resins, Hydrochloric Acid and Sodium Hydroxide, and these will be in place by 31st October 2016.

Some chemicals are stored in specialist bunded chemical stores located within the yard. Where necessary (Lead Oxide storage), silica filters are installed on silo breather vents to prevent potential reaction with the moisture in air. Yuasa Battery (UK) Limited does not use especially reactive materials, although the Lead Oxide silos are protected against the ingress of moisture and are stored internally in a relatively cool environment to avoid self-heating. There is no requirement for an inert gas blanket.

One organic peroxide substance is currently used at the site and is stored in accordance with HSE Guidance CS21. The chemical is used as part of the lid bonding resin recipe, and has a Flammability Type 3 (burning between 'gently' and up to something akin to solvents and hydrocarbons). Storage of the organic peroxide is well-spaced out throughout the site, with strict controls over the quantities held. The chemical is stored only in relatively cool areas and is locked inside 'flammables' cabinets.

Powdered and dusty materials are stored within their delivery packaging until required for use, and the entire content of a bag is loaded into feed bins or directly into the mixer (for key ingredients), thereby avoiding trickle feeding or open bags of raw materials being stored around the plant. The mixer area is extracted and hence any dust created is removed. Additionally, staff wear dust masks and would clear away any spillage which does occur, promptly.

No water sprays or fog sprays are employed around the site, although other measures prevent the creation of significant quantities of dust, and wet floor sweepers and squeegees direct any spillage residues into the drainage system for treatment within the waste water treatment plant. Full housekeeping activities are undertaken at the end of each shift, although wet floor cleaning is undertaken throughout the day in all Lead areas.

Other small containers of raw materials include 20 kg lined metal containers of epoxy resin, which are stored in the process areas when in use, with any spillage landing on the work station or onto the concrete floor. The resins are viscose and hence can be easily contained and cleared when spillages occur. Additionally, spillages must be cleared quickly to avoid the resin setting in situ, and hence any period of diffuse VOC release is minimised, and will also be controlled by the local exhaust ventilation in the work area. Sodium Hydroxide and Hydrochloric Acid are stored in 45 litre plastic containers, and when taken to the de-ionisation plant for use, are bunded. All materials are stored within the Raw Materials Warehouse prior to collection for use as required.

Cleaning chemicals (detergents) are stored and used in the 5 litre containers that they are delivered in. Industrial Methylated Spirits (IMS) is delivered to the chemical stores in 205 litre drums and, prior to use, are decanted into smaller containers, within a bunded area, for use around the process areas. IMS is stored for use in 2 litre containers and Methyl Ethyl Ketone (MEK) is stored in 1 litre containers on the assembly line, or 5 litre containers around the injection moulding process. Thinners are also used and stored similarly to MEK in the injection moulding building. All of these chemicals are stored within purpose made containers and within bunded 'flammables' cabinets when not in use.

Printing inks are used in two locations within the battery inspection area, and as required, a small plastic bottle is filled from the 10 litre metal container positioned at each location. When required, it is used from a metal container as supplied by the manufacturer and is decanted into a small plastic bottle for use. Universal screen cleaner is also used in both locations with a maximum storage capacity of 15 litres at each location. When required, it is used from a plastic container as supplied by the manufacturer and is decanted into a small plunger can for use. Both of these chemicals are stored within purpose made containers which are stored within a bunded 'flammables' cabinet when not in use.

Waste oils and resins are stored within a bunded and curtained area, and gas bottles are stored within dedicated gas bottle stores, in the yard of Factory 1.

All storage tanks are constructed in materials that are resistant to the contained materials. Acid tanks are largely polyethylene tanks, although two rubber lined tanks are still employed at the site. The acid bunds are lined with glass reinforced plastic.

All bulk dilute Sulphuric Acid tanks have level gauge telemetry. The waste acid tank has a high level alarm and a cat and mouse gauge. All acid storage tanks have level monitoring via telemetry, although currently not all tanks are alarmed, relying on a combination of telemetry and manual checks. With the exception of the waste acid tank, all acid intake flanges are padlocked to ensure the control of acid deliveries, and thereby avoiding overfilling. All acid tanks will include high level warning alarms by 30th April 2017.

There are also two bulk Sodium Hydroxide tanks, one each located at the site trade effluent plants. These have cat and mouse gauges and padlocked intake flanges, as well as being fitted with LCD displays which show the levels inside each tank. The bulk Sodium Hydroxide tanks will have high level alarms fitted by 31st May 2017. In the mean-time, and by 30th November 2016, a formal daily record of inspections for all bulk dilute Sulphuric Acid and Sodium Hydroxide storage areas will be completed.

All tanks and delivery systems across the site are located either within individual bunded areas, or are contained within bunded process areas or roadways, with sumps to facilitate the collection of any spilled materials. Bunds are designed to retain 110 % or 25 % of the total volume of the tank(s) within, whichever is the greater. Open drainage channels across the process area direct any operational spillage to the waste water treatment plants which are monitored and can be recirculated as necessary.

Potential emissions from storage are abated before discharge from site, with potential dusty releases being filtered and discharges to sewer from process operational areas passing through one of two effluent treatment plants at the site. Discharges of clean, non-process area run-off are released to the Nant-Melyn Brook via drains which include emergency penstock valves close to the release points. Clean surface water run-off from the north-eastern area of the site, around Factories 4 and 5 also passes through a 40 m^3 petrol interceptor prior to release.

Additionally, all operational and access areas of the site are concreted or tarmaced and have kerbs to prevent or minimise run-off to landscaped areas.

BAT 8 Compliant	Diffuse emissions should be prevented from the handling and transport of raw materials, using a combination of the techniques listed in the BAT Conclusions.

The following combination of techniques is used to prevent emissions from the handling and transport of raw materials.

Lead Oxide, the principal raw material used by Yuasa Battery (UK) Limited with dust potential, is transported in sealed bucket conveyors, which include abatement filters. Lead Oxide silos include filtered breather vents. Other potentially dusty materials are transported in the bags or containers they are delivered in, and remain sealed until reaching their point of use. The paste mixer and the raw material bins which feed the mixer are extracted to abatement filters to avoid the escape of dust from delivery and mixing.

Lead ingots are fed into the furnaces using chain conveyors, and Lead pellets for producing the Lead Oxide are gravity fed from their storage silo onto an open belt and into the Lead Oxide mill. Neither of these processes are dusty. All process area storage is close to the point of use, and materials are brought from the Raw Materials Warehouse as required.

Acrylonitrile Butadiene Styrene used in the injection moulding process is blown to the machine for use, and all bulk acid is piped across the site. There are no below ground transfers of chemicals or substances.

All delivery connections are manual, with no automatic re-seal of connections. However, a delivery procedure is in place with Quality Department staff meeting with acid delivery drivers, and the acid levels being confirmed before a connection and delivery is made. Suppliers train their own drivers to work to their set delivery procedures, and this is agreed with Yuasa Battery (UK) Limited prior to the award of the contract. Flanges on the acid delivery pipes are padlocked, and therefore deliveries must be approved and supervised by Yuasa Battery (UK) Limited. None of the bulk deliveries has the potential to emit VOCs and hence back-venting to the tanker is not required.

The waste acid tank also has a manually operated connection point and this is locked-out, ensuring that a member of Yuasa Battery (UK) Limited staff must be present to supervise the removal of waste acid. The valve has its own direct means of fitting a padlock and is locked using the lockout key system, such that the Utilities department has control over when the valve is opened.

There is no wheel or chassis wash facility at the site although as all materials are appropriately contained, including those which may be dusty, and the roads are kept swept, it is considered that there is limited requirement for wheel and chassis wash facilities to be available.

BAT 9 Compliant	Optimise the efficiency of off-gas collection and treatment by using a combination of the techniques listed in the BAT Conclusions.

Yuasa Battery (UK) Limited applies a combination of the techniques detailed within the BAT Conclusions to optimise the efficiency of off-gas collection and treatment from their processes.

Off-gas collection and treatment is facilitated by enclosing furnaces where possible. The casting pots are enclosed and have extraction vents, although the feed-point is open. Small parts casting is open on three sides, with an extractor hood over the top of the pots. Hoods are designed to be as close as possible to the source emissions while still leaving room for process operations. Despite the more open nature of the small parts casting pots, the results from Lead in air samples are extremely low, and samples are taken on an annual basis in this area, whilst in most of the other site production areas, samples are taken on a quarterly basis. Where doors can be closed to contain the off-gases further (e.g. where only a single operator is manning a furnace), they are.

Although Yuasa Battery (UK) Limited does recycle dross and waste plates, they only recycle their own materials and hence the potential for organic contamination in the furnace feed is limited. Only secondary raw materials made of Lead are introduced into the furnace, and hence, for example, any acid soaked glass matting would be removed from the materials before being fed to the furnace. All Lead types are kept separate to avoid contamination and potential quality impacts.

Lead melting processes are held below 500 ^{o}C in order to avoid the creation of Lead fume, and extraction abatement filters are visually checked on a daily basis with formal checks undertaken weekly. All checks are documented.

The Lead dross recycling system installed at the site has an extraction system fitted. This has been modified from a local exhaust ventilation point already included within the Permit to include two Neederman arm flexible extraction points serving areas with a potential for dust emission in the work area. The extract discharges via point A9 and is used to remove dust from the process. The canopy above the dross recovery process also discharges through the A9 extraction point.

Local exhaust ventilation is process specific and is installed where required. There are no secondary or tertiary extraction systems. Local exhaust extraction rates are tested weekly against the rates specified in the system checks.

No fluid dynamics modelling of the off-gases from the furnaces has been undertaken, however the extraction rates of the local exhaust ventilation systems are set based on regular occupational monitoring, and thereby regularly assess and optimise the ventilation process. All extracted air from process areas is treated using filtration or scrubber techniques.

BAT 10 Compliant	Monitoring requirements

Yuasa Battery (UK) Limited monitor dust from key (Lead) processing and extraction emissions continuously, using a PCME DT990 monitor. The DT990 is no longer MCERTS certified, although MCERTS certification remains valid for products manufactured before 23/03/2010, as in the case of the Yuasa Battery (UK) Limited system. The system monitors the concentration of particulate in the ducted extract, and applies a calibration factor to convert the particulate concentration to Lead concentration. The calibration factor is determined through analysing the proportion of Lead in particulate retained on a filter from extractive monitoring campaigns, and the system is calibrated annually by PCME. The PCME DT990 meets the EN 13284-2 standards for monitoring particulate, although in this application, the monitor is used as an indicative tool for the monitoring of Lead emissions.

Additionally, once per quarter, Anchem, a MCERTS certified test company, undertake extractive testing for Lead to Standard, EN 14385.

No other testing is undertaken. Yuasa Battery (UK) Limited does not test for Mercury, Sulphur Dioxide, Oxides of Nitrogen, Total Volatile Organic Compounds, or Dioxins and Furans, as no other limits are currently stated within the installation Permit.

BAT 11 Compliant	BAT is to reduce Mercury emissions by using raw materials with a low Mercury content, and / or by using absorbents in combination with filtration.

Mercury emissions are negligible from the site. The only Mercury used within the Yuasa Battery (UK) Limited system is that within the bulk Sodium Hydroxide (Caustic Soda) which is used in the effluent treatment plants, and in the Caustic Soda and Hydrochloric Acid used in the de-ionisation plants. The bulk Caustic Soda used at the site contains less than 0.01 ppm Mercury, and less than 0.1 ppm Cadmium. The drummed Hydrochloric Acid currently used by the site contains a maximum of 0.1 ppm of both Mercury and Cadmium, and the drummed Caustic Soda contains 0.3 ppm of Mercury and 2.5 ppm of Cadmium. Drums are 45 litre plastic containers and are stored within a bunded area.

Discharges to sewer are monitored once per year for Mercury in order to produce a mass balance calculation of the annual discharge. The levels of Mercury within the discharge to sewer are always within consented limits (0.005 mg l^{-1}) and in 2015 and 2016, were less than the laboratory limit of detection (< 0.0001 mg l^{-1}, or < $1/50^{th}$ of the consented limit). Chemical suppliers send a product specification / analysis which is checked to ensure that it complies with the requested specification. There is no Mercury present in air emissions or in any of the other raw materials used at the site, and therefore no abatement measures are installed.

BAT 12 Compliant	Reduce emissions of Sulphur Dioxide from off-gases with a high Sulphur Dioxide 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 Sulphur Dioxide.

Off-gases are unlikely to contain significant levels of Sulphur Dioxide. Gas is used in strip bar and pellet casting, and in Lead recycling processes only, with other furnaces being electrically heated. Ovens, boilers and space heaters across the site are gas fired. Although the site does process some Lead alloys, these would contain Calcium, Tin and Aluminium, but no Sulphur compounds.

Sulphur Dioxide can be created in the event of over-charging of the batteries once produced, however charging is carefully controlled to avoid such a release, and any emission would be directly into the factory as there is no discharge point on the charging processes. Line 8 does have an extraction system fitted which would discharge to atmosphere, however it is not currently in use.

BAT 13 Not Fully Compliant	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.

Aging and curing ovens use flue gas recirculation as pre-heat for the incoming combustion air. Burning torches on the assembly line use natural gas with pure oxygen in order to increase the heat of the flame. The Lead dross recycling system includes a low-NO_x burner (maximum emission of 60 mg kWh^{-1}).

Combustion systems which do not incorporate technologies to minimise NO_x are:
Pellet Casters which are direct-fired systems;
Flash Drying Ovens;
Other Lead recycling systems;
Site Boilers;
Space Heaters.

In preparing this BAT Conclusions Gap Analysis, an additional burner has been identified which is not currently listed on the installation Environmental Permit. This is a small Cork Preparation Heater at Grid Casting, and comprises a simple open flame burner (5.33 kW nominal capacity) which heats the base of a mixing pot, similarly to a pan being placed onto a gas fired hob. It has no extracted emission point, and as a small, direct fired burner, it is not thought to include any techniques to minimise NO_x formation. The burner will be included onto the Permit at the next variation.

Neither of the site boilers are currently operated, and only two of the five available space heaters are currently in service. Additionally, the Lead recycling process in Factory 2 has stopped and the equipment, including the burner, is due to be decommissioned.

BAT 14 Compliant	Prevent or reduce the generation of waste water, using one or a combination of the techniques listed in the BAT Conclusions.
Yuasa Battery (UK) Limited undertake monitoring of all water use and discharge. Although the site has a water recycling system, the quality of the cleaned water is only sufficient for use as wash-down water. However, the recycling plant provides approximately 50 % of the wash water requirements of the site. Effluent from the site wet scrubbers is sent to the effluent plant and thus is recycled where possible, albeit after treatment. Charging cooling water and run-off from potentially contaminated areas is also recycled through the effluent plant and is stored within a wash water tank for use as required. Systems are therefore not closed loop, but do optimise the re-use of water around the site after treatment.	

BAT 15 Compliant	Prevent the contamination of water and reduce emissions to water. BAT is to segregate uncontaminated waste water streams from waste water streams requiring treatment.
Clean, non-process area run-off to surface water, such as that from roadways and car-parking is released to the Nant-Melyn Brook via drains which include emergency penstock valves close to the release points. Clean surface water run-off from the north-eastern area of the site, around Factories 4 and 5 also passes through a 40 m^3 petrol interceptor prior to release. Monthly checks are made on the discharge, with samples taken for pH and Lead. Data from 2012 – mid-2016 have been assessed, and the pH range recorded during this monitoring is 6.4 – 9.1 (with UK ground waters expected to range between 4.7 and 9.6), and sampling for Lead in the surface water discharge ranging from 291 to 5,550 µg/l, with the highest anticipated background level in UK ground water being 6,550 µg/l. These discharges are of clean, surface waters only, and are not contaminated by the process. Where other waters from around the site have the potential to be contaminated, these are treated within the waste water treatment plant in Factory 2 prior either to re-use as wash water, or discharge to sewer.	

BAT 16 Non-Compliant	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.
Sampling is undertaken in line with the requirements of the Environmental Permit and Trade Effluent Consents. However, sampling is not necessarily undertaken to the ISO 5667 standards. Daily and twice weekly samples are analysed in-house using equipment which is calibrated by the supplier on an annual basis, with automatic / in-house calibration undertaken otherwise. The site analysis is not performed to UKAS or MCERTs standards. Other samples, which are taken quarterly or less frequently are sent to a UKAS accredited laboratory for analysis (ISO 17025).	

Methods of analysis are detailed below.

Determinand	Release	Sampling Period	Analysis Standard
Lead Sulphate pH	S1	Daily	Cecil Lead cell spectrophotometer Palintest 8000 spectrophotometer Continuous high:low pH probe and alarm
Sulphate pH	S2	Daily	Palintest 8000 spectrophotometer Continuous high:low pH probe and alarm
Lead	S2	Twice per week	Cecil Lead cell spectrophotometer
Chromium Copper Lead Nickel Zinc Sulphate TSS COD Sulphide Oil and Grease	S1 and S2	Quarterly (reported twice per year where required)	Metals by Varian vista (ICP-AES) Metals by Varian vista (ICP-AES) Metals by Varian vista (ICP-AES) Metals by Varian vista (ICP-AES) Metals by Varian vista (ICP-AES) Colorimetric reaction (turbidimetric analysis) Filtration and gravimetric analysis Oxidation, reduction and colorimetry Colorimetric reaction (spectrophotometry) Subcontracted
Mercury Cadmium	S1 and S2	Once per year	Extraction of Mercury vapour to atomic fluorescence. Metals by Varian vista (ICP-AES)
Iron Arsenic Antimony Tin	No sampling	No sampling	Metals by Varian vista (ICP-AES) Dissolution and determination by ICP-MS Dissolution and determination by ICP-MS Metals by Varian vista (ICP-AES)

The BAT Conclusions document lists the following standards for analysis:
Mercury: EN ISO 17852; EN ISO 12846.
Iron, Arsenic, Cadmium, Copper, Nickel, Lead, and Zinc: EN ISO 11885; EN ISO 15586; EN ISO 17294-2.
Antimony and Tin: EN ISO 11885; EN ISO 15586; EN ISO 17294-2.
Sulphate: EN ISO 10304-1.

Although ALS Laboratories are accredited to international standard ISO 17025, the laboratory does not generally follow ISO standards of analysis, instead referencing Environment Agency Standing Committee of Analysts (SCA) blue books, Methods for the Examination of Waters and Associated Materials (MEWAM), etc. The SCA methods are produced by panels of experts in the appropriate field, often in co-operation with working groups and the main Committee, and the Committee is supported and sponsored by the Environment Agency. As such, they are industry-accepted methods accredited to ISO 17025 and MCERTS where appropriate, although the methods applied are not necessarily as specified in the BAT Conclusions document.

BAT 17 Compliant	BAT is to treat the leakages from the storage of liquids and the waste water from non-ferrous metals production, and to remove metals and sulphates by using a combination of the techniques listed in the BAT Conclusions.

Yuasa Battery (UK) Limited operate two waste water treatment plants, both of which treat the site effluent using the following steps:

Factory 2 Effluent Plant:

- pH measurement and adjustment;
- Flocculation;
- Sedimentation;
- Lamella filtration;
- Filter press with water to holding tank;
- Sand filtration;
- V-notch weir;
- Discharge to sewer.

Factory 4 Effluent Plant (a low volume discharge plant):

- pH measurement and adjustment;
- Flocculation;
- Sedimentation;
- Lamella filtration;
- V-notch weir;
- Discharge to sewer.

Using these methods, the water is sufficiently treated to be used as site wash water, and currently replaces approximately 50 % of the site wash water requirement. Only effluent passing through the larger treatment plant in Factory 2 can be recycled, and can be diverted at the point after the sand filter either into the recycling tanks, or can be re-circulated if required for further treatment before re-use or discharge. The effluent plant in Factory 4 treats a small volume of waste water by comparison.

Neither reverse osmosis or ultrafiltration are used for effluent treatment, however the re-use of much of the water treated at the site reduces the release of effluent into the sewer, thereby minimising the release of metals to the environment, and reducing the demand for freshwater by the process.

Relevant Emission Limit Vales stated within the Trade Effluent Consents for discharges to sewer are:

Pollutant	**Factory 2 Consent**	**Factory 4 Consent**
Arsenic, Cadmium and Cobalt	No limit specified (Cadmium limit = 0.01 mg l^{-1} in Permit)	No limit specified (Cadmium limit = 0.01 mg l-1 in Permit)
Copper	≤ 1 mg l^{-1}	≤ 1 mg l^{-1}
Mercury	No limit specified (Permit limit of 0.005 mg l^{-1})	No limit specified (Permit limit of 0.005 mg l^{-1})
Nickel	≤ 1 mg l^{-1}	≤ 1 mg l^{-1}
Lead	≤ 10 mg l^{-1}	≤ 5 mg l^{-1}
Zinc	≤ 2.5 mg l^{-1}	≤ 1 mg l^{-1}

The permissible discharges to sewer are higher than those BAT-AELs proposed in the BAT Conclusions document when discharging directly to a receiving water body, which are as follows:

- Arsenic, Cadmium and Cobalt: ≤ 0.1 mg l^{-1};
- Copper: ≤ 0.2 mg l^{-1};
- Mercury: ≤ 0.05 mg l^{-1};
- Nickel and Lead: ≤ 0.5 mg l^{-1}; and
- Zinc: ≤ 1 mg l^{-1}.

Although most of the Trade Effluent Consent conditions are above the BAT-AELs suggested in the BAT Conclusions document, the effluent from these treated releases is directed via an off-site, third party treatment facility for further processing. Additionally, where analysis is undertaken for the listed pollutants, results suggest that in all cases except for Lead, the BAT-AELs specified could be met. No analysis is available for Arsenic or Cobalt. Concentrations of Lead remain within the Consent level, but could not meet the BAT-AEL proposed if the discharge were to be discharged directly to a receiving water body.

Monthly monitoring of the surface water discharge for Lead suggests that of 47 samples taken between January 2012 and July 2016, 36 results exceeded 0.5 mg l^{-1}. This discharge is a non-process, clean surface water release and is not subject to any limit of consented value.

BAT 18 Compliant	Noise emissions should be reduced using one or a combination of the following techniques: • Embankments to screen the source of noise; • Enclose noisy plants or components in sound-absorbing structures; • Use anti-vibration supports and interconnections for equipment; • Orientation of noise-emitting machinery; • Change the frequency of the sound.

The Yuasa Battery (UK) Limited operation is not inherently noisy, and no screening or enclosure is required for plant or elements of the process. As part of their preventative maintenance routine, plant noise checks are undertaken monthly. The noisiest pieces of equipment are the extraction points and the cutting vacuum, although it is noted that the currently installed cutting vacuum has a lower pitch than the previous equipment, and hence is less noticeable. A review of results from the monthly noise monitoring of operational plant between October 2015 – September 2016 recorded all noise levels below 85 dB. The manufacturing process is undertaken within the confines of a building, and although hearing protection is required in some operational areas, the impact on the environment outside of the building and beyond the site boundary does not result in any nuisance.

Noise monitoring has been undertaken at the site boundary and at sensitive receptors in the past, in 2004 and 2006. Day and night-time noise surveys were undertaken at six boundary locations, and at eleven sensitive receptor locations. The results demonstrate that at two of the six boundary locations, there was a marginal likelihood of noise complaints during the day, increasing to three areas of marginal likelihood during the night. Other boundary locations, and all of the sensitive receptor locations recorded noise levels which were unlikely to lead to complaints, and at each of the sensitive receptors, road traffic, either light vehicle or heavy vehicle depending on the location, was the dominant source of noise.

BAT 19 Compliant	To reduce odour emissions, BAT is to use one or a combination of the techniques listed in the BAT Conclusions.

The Yuasa Battery (UK) Limited operation is not an inherently odorous operation. The most significant source of odour is from the use of resins within the process, and these materials are stored and handled appropriately, with small volumes of resin being mixed and stored at the point of use in order to avoid wastage due to curing. Extraction in the process areas means that any odour is very localised. There are no significant sources of odour used throughout the process. As such, there is no requirement for careful design, operation and maintenance of equipment that could generate odour emissions, or afterburner or filtration techniques, to minimise odour impacts.

BAT 90 Compliant	Prevent or reduce diffuse emissions from the preparation of primary and secondary materials using one or a combination of the techniques listed in the BAT Conclusions.

The following combination of techniques is used to prevent emissions from the handling and transport of raw materials.

Lead Oxide, the principal raw material used by Yuasa Battery (UK) Limited with dust potential, is transported in sealed bucket conveyors, which include abatement filters. Lead Oxide silos include filtered breather vents. Other potentially dusty materials are transported in the bags or containers they are delivered in, and remain sealed until reaching their point of use. The paste mixer and the raw material bins which feed the mixer are extracted to abatement filters to avoid the escape of dust from delivery and mixing.

Powdered and dusty materials in smaller quantities are stored within their delivery packaging until required for use, and the entire content of a bag is loaded into feed bins or directly into the mixer (for key ingredients), thereby avoiding trickle feeding or open bags of raw materials being stored around the plant. The pasting mixer area is extracted and hence any dust created is removed.

All potentially dusty materials are stored, transported and used within an enclosed building, with abatement wherever a potential for a dust release exists, and regular housekeeping, including floor cleaning across the factory. Dust is therefore well controlled and there is no requirement for further dust suppression using water sprays or pelletised raw materials for example.

BAT 91 Compliant	Prevent or reduce diffuse emissions from material pre-treatment in primary Lead and secondary Lead production, by using enclosed conveyers or pneumatic transfer system for dusty materials, and enclosing equipment. When dusty materials are used, emissions should be collected and sent to an abatement system.

Diffuse dust emissions are not created by Lead pre-treatment within the process, with Lead ingots being transported by chain conveyor to melting pots, and temperatures being held below 500 ^{o}C to prevent the formation of fume.

Dross and process waste for recycling are solid materials and are stored in bins. The dross from grid casting, pellet casting and small parts casting processes is stored directly within the bin from the dross recycling unit, and hence can be loaded directly into the unit for processing once full. This avoids double handling and any potential dust creation associated with such. The dusty residues from dross recycling are vacuumed out of the recycling bin once the process is complete, into a lined drum, which is sealed and lidded once full for storage prior to dispatch for further recovery.

Other process waste may require washing prior to recycling to remove any additional raw materials (e.g. acid residues, or glass matting), however once washed, the materials are simply loaded into the dedicated recycling furnace in their solid form and the washing effluent is directed to the effluent treatment plant.

BAT 92 Compliant	In order to prevent or reduce diffuse emissions from charging, smelting and tapping operations in Lead production, BAT is to use an appropriate combination of the techniques listed in the BAT Conclusions.

The following combination of techniques is used to prevent emissions from charging, smelting and tapping operations.

A combination of water and air cooled charging systems are used. These are not fully enclosed due to the requirement for manual charging. Charging Bath 8 does have an extraction system, however the extraction is not currently used. Furnaces are also not sealed. However, all Lead handling and processing is undertaken within an enclosed building, with filtered local exhaust ventilation where required, and ladles are extracted and filtered. All furnaces are heated to less than 500 ^{o}C to avoid the creation of fume.

Any dusty materials, e.g. Lead Oxide or powdered materials in smaller quantities, are handled in enclosed systems or are only removed from their packaging at the point of use and the entire content of a bag is loaded into feed bins or directly into the mixer (for key ingredients), thereby avoiding trickle feeding or open bags of raw materials being stored around the plant. The mixer area is extracted and hence any dust created is removed.

The site does not include any dog-house / tertiary collection systems.

BAT 93 Compliant	In order to prevent or reduce diffuse emissions from re-melting, refining and casting in primary and secondary Lead production, BAT is to use a combination of the techniques listed in the BAT Conclusions.

Capture hoods and filtered extraction is available on all furnaces and casting points. Grid casting lines have three extraction systems:
1. Pot extractions, all with capture hoods;
2. Ladle Extractions;
3. Dross extractions.

Small parts casting has canopy extraction over each pot, and burning processes (straps and inter-cell connections) are extracted through filters before the cleaned air is re-circulated into the factory. Grid casting ladles are extracted and filtered. Yuasa Battery (UK) Limited does not undertake any refining reactions or addition of chemicals to Lead, and launders are short runs due to the rapid cooling and solidification of Lead. Hence the use of lids on kettles and hoods on launders are not applicable to this process.

All furnaces are heated to temperatures below 500 ^{o}C to avoid the creation of fume, and dusty residues (e.g. from dross recycling) are vacuumed rather than being tipped or swept.

BAT 94 Compliant	In order to reduce dust and metal emissions to air from raw material preparation in primary and secondary Lead production, BAT is to use a bag filter, and to achieve a BAT-AEL of ≤ 5 mg m^{-3}.
The maximum Lead emission limit, measured as particulate is 2 mg m^{-3}, although the majority of the process stacks are limited to 0.5 mg m^{-3}. Where the potential for Lead emissions exist, extraction and filtration is provided, with filter systems comprised of any one or combination of bag filter systems, metal mesh filters, HEPA filters, ceramic filters, electrostatic precipitators, venturi scrubber and sprays, or perforated plates with filters and sprays. There is no particulate emission limit value assigned for other sources, although it is noted that with heating undertaken using gas firing or in electric furnaces, there is limited potential for particulate emissions from combustion sources.	

BAT 95 Not Applicable	In order to reduce dust and metal emissions to air from battery preparation (crushing, screening and classifying), BAT is to use a bag filter or a wet scrubber, and to achieve a BAT-AEL of ≤ 5 mg m^{-3}.
Batteries are not recycled at the site, and hence BAT 95 does not apply, although as noted in response to BAT 94, dust and metal emissions from processes with the potential for Lead emissions include extraction and filtration systems, and have emission limit values which are within BAT-AELs.	

BAT 96 Compliant	In order to reduce dust and metal emissions to air from charging, smelting and tapping in primary and secondary Lead production, BAT is to use a bag filter, and to achieve BAT-AELs of dust; 2-4 mg Nm^{-3}, and Lead; ≤ 1mg Nm^{-3}.
The maximum Lead emission limit, measured as particulate is 2 mg m^{-3}, although the majority of the process stacks are limited to 0.5 mg m^{-3}. Where the potential for Lead emissions exist, extraction and filtration is provided, with filter systems comprised of any one or combination of bag filter systems, metal mesh filters, HEPA filters, ceramic filters, electrostatic precipitators, venturi scrubber and sprays, or perforated plates with filters and sprays. Some discharge points are limited above the BAT-AEL, although these represent the expanded grid extract, assembly extracts, and a vacuum extract, and are not associated with charging, smelting, or tapping. The pasting machine mixers and the cutting machine are limited to 1 mg m^{-3}.	

BAT 97 Compliant	In order to reduce dust and metal emissions to air from re-melting, refining and casting in primary and secondary Lead production, BAT is to maintain the temperature of the melt bath at the lowest possible level according to the process stage in combination with a bag filter, when considering pyrometalurgical processes.
Lead melt is controlled manually by the operator based on the temperature and material feed. Temperatures are specific to the required process, e.g. Small Parts Casting approximately 400 ^{o}C, and Casting Furnace 490 ^{o}C, however, all furnaces are held below 500 ^{o}C to avoid the creation of Lead fume. Where the potential for Lead emissions exist, extraction and filtration is provided, with filter systems comprised of any one or combination of bag filter systems, metal mesh filters, HEPA filters, ceramic filters, electrostatic precipitators, venturi scrubber and sprays, or perforated plates with filters and sprays, and monitoring demonstrates compliance with the BAT-AELs.	

BAT 98 Not Applicable	In order to reduce emissions of organic compounds to air from the raw material drying and smelting process in secondary Lead production, BAT is to use one or a combination of the techniques listed in the BAT Conclusions, and to achieve a BAT-AEL of 10 - 40 mg Nm^{-3} total volatile organic compounds.

There is negligible potential for emissions of organic compounds from the raw material drying and smelting process. The only materials recycled at the site are in-house production wastes such as rejected products and dross, and as necessary the rejected materials can be pre-treated by washing to remove any potential contaminants. Lead types are not mixed, and are handled and melted separately by type. There are no afterburners or regenerative thermal oxidisers employed at the site.

The only potential for the release of Volatile Organic Compounds, is from the use of resins across the assembly lines. These epoxy resins are not heated in any way, and are used in areas of local exhaust ventilation. Spillages must be cleared quickly to avoid the resin setting in situ, and hence any period of diffuse Volatile Organic Compounds release is minimised. No monitoring or assessment of Volatile Organic Compound emissions to atmosphere has ever been undertaken, although occupational exposure monitoring is occasionally undertaken around the work stations. Levels of Volatile Organic Compounds in air are generally well below the occupational exposure levels and are often undetectable.

BAT 99 Not Applicable	In order to reduce PCDD/DF emissions to air from the smelting of secondary Lead raw materials, BAT is to use one or a combination of the techniques listed in the BAT Conclusions, and to achieve a BAT-AEL of ≤ 0.1 ng I-TEQ Nm^{-3} (as an average over a sampling period of at least six hours)

There is limited potential for emissions of dioxins and furans from the raw material drying and smelting process. The only materials recycled at the site are in-house production wastes such as rejected products and dross, and as necessary the rejected materials can be pre-treated by washing to remove any potential contaminants. None of the battery containers or plastic / resin parts are recycled or included in the smelting process, and hence the potential for Chlorine based / chlorinated, or organic compounds to be included into the smelting process are minimal. Lead types are not mixed, and are handled and melted separately by type.

Lead melt is controlled manually by the operator based on the temperature and material feed. There are no afterburners or regenerative thermal oxidisers employed at the site. There is no rapid quenching, Oxygen or adsorption injection applied to the furnace processes.

Flue gas temperatures on dusty stacks are low (< 100 ^{o}C), and efficient dust filtration systems are used. No monitoring or assessment of Dioxin or Furan emissions has ever been undertaken.

BAT 100 Not Applicable	In order to prevent or reduce Sulphur Dioxide emissions to air from charging, smelting and tapping in primary and secondary Lead production, BAT is to use one or a combination of the techniques listed in the BAT Conclusions and to achieve a BAT-AEL of 50-350 mg Nm^{-3}.

There is no potential for Sulphur Dioxide to be formed from the Lead smelting process. Although the site does process some Lead alloys, these would contain Calcium, Tin and Aluminium, but no Sulphur compounds. As such, there is no requirement for abatement processes to control Sulphur Dioxide emissions, and no monitoring or assessment of sulphur dioxide emissions has ever been undertaken.

BAT 101 Compliant	BAT is to use an acid-resistant floor surface and a system for the collection of acid spillages.

Acid resistant flooring and tiles are present in areas of acid injection, and a combination of sealed and stainless steel drainage is employed. Bunds for acid storage tanks are coated with glass reinforced plastic. Any new infrastructure would be similarly specified.

The site maintains a Site Protection and Monitoring Programme, and this includes a requirement to undertake hydrostatic testing on drains and bunds once each year.

BAT 102 Not Applicable	In order to prevent the generation of waste water from the alkaline leaching process, BAT is to reuse the water from the sodium sulphate crystallisation of the alkali salt solution.

Yuasa Battery (UK) Limited does not operate an alkaline leaching process. As such, this BAT Conclusion is not relevant.

BAT 103 Compliant	In order to reduce emissions to water from battery preparation when the acid mist is sent to the waste water treatment plant, BAT is to operate an adequately designed waste water treatment plant to abate the pollutants contained in this stream.

Yuasa Battery (UK) Limited operate two waste water treatment plants, both of which treat the site effluent using the following steps:

Factory 2 Effluent Plant:

- pH measurement and adjustment;
- Flocculation;
- Sedimentation;
- Lamella filtration;
- Filter press with water to holding tank;
- Sand filtration;
- V-notch weir;
- Discharge to sewer.

Factory 4 Effluent Plant (a low volume discharge plant):

- pH measurement and adjustment;
- Flocculation;
- Sedimentation;
- Lamella filtration;
- V-notch weir;
- Discharge to sewer.

Using these methods, the water is sufficiently treated to be used as site wash water, and currently replaces approximately 50 % of the site wash water requirement. Only effluent passing through the larger treatment plant in Factory 2 can be recycled, and can be diverted at the point after the sand filter either into the recycling tank, or can be re-circulated if required for further treatment before re-use or discharge. The effluent plant in Factory 4 treats a small volume of waste water by comparison.

Neither reverse osmosis or ultrafiltration are used, however the re-use of much of the water treated at the site reduces the release of effluent into the sewer, thereby minimising the release of metals to the environment, and reducing the demand for freshwater by the process.

BAT 104 Compliant	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 listed in the BAT Conclusions.

Where possible, process residues are reused at the site, with rejected products and dross being recycled for reuse in-house. The dusty residues from the dross recycling process are then sent for third party recycling, along with other Lead waste and Lead dust collected from the bag filtration systems across the process. The pasting machine includes a filter press to avoid excess Lead paste entering the effluent treatment system and the filter cake from this and the sludge from the effluent treatment plant are sent for Lead recycling.

Lead wastes are stored undercover within Factory 2 to prevent the potential for release to the environment.

BAT 105 Compliant	In order to allow the recovery of the Polypropylene and Polyethylene content of the Lead battery, BAT is to separate it from the batteries prior to smelting.
Batteries are not recycled at the site, and hence BAT 105 does not apply, although where batteries are rejected, these are split and the parts are segregated for recycling, resulting in the separation of Lead parts for in-house recycling, and battery cases for third-party recycling.	

BAT 106 Not Applicable	In order to reuse or recover the Sulphuric Acid collected from the battery recovery process, BAT is to organise operations on site so as to facilitate its internal or external reuse or recycling, including one or a combination of the techniques listed in the BAT Conclusions (where appropriate).
Batteries are not recycled at the site, and hence BAT 106 does not apply. It is important to note, that the batteries manufactured by Yuasa Battery (UK) Limited do not contain free acid, the acid instead being soaked onto glass fibre matting which is layered between the Lead plates. Hence even rejected batteries, which are split to enable recycling, would not provide available Sulphuric Acid for recovery or reuse at the site. Cells are however sent for third-party recycling, where the soaked matting has the sulphuric acid extracted for use in secondary acid production.	

BAT 107 Compliant	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 below:
Yuasa Battery (UK) Limited's operations are organised to ensure that, wherever possible, process residues are reused or recycled. This includes in-house recycling of rejected Lead products and Lead dross for reuse within the site processes, further recycling of lower quality Lead wastes by third-parties, filtration and treatment plants to minimise the release of Lead to air and sewer (and ultimately to water), and the segregation of other process materials, such as battery cases, oils, liquid resins etc for third-party recycling.	

2) Where BAT Conclusions are not complied with, carry out a BAT Assessment.

Relevant BAT Conclusions which are not complied with, in full or in part, are as follows:

BAT 6 - The site does not currently (October 2016) have a documented action plan on diffuse dust emissions, but will produce one for implementation by the close of 2017. It is considered that this proposed action will bring the site into compliance with the BAT Conclusion, and therefore, no further BAT assessment is provided here.

BAT 7 - Bunded pallets are on order for use when storing items such as resins, Hydrochloric Acid and Sodium Hydroxide, and these will be in place by 31st October 2016.
All bulk dilute Sulphuric Acid tanks will include high level warning alarms by 30th April 2017.
The bulk Sodium Hydroxide tanks will have high level alarms fitted by 31st May 2017.
In the mean-time, and by 30th November 2016, a formal daily record of inspections for all bulk dilute Sulphuric Acid and Sodium Hydroxide storage areas will be completed.
It is considered that these proposed actions will bring the site into compliance with the BAT Conclusion, and therefore, no further BAT assessment is provided here.

BAT 13 – The following natural gas burners are in operation but do not incorporate technologies to minimise NO_x:
Pellet Casters which are direct-fired systems;
Flash Drying Ovens;
Space Heaters;
Cork Preparation Heater.

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 by 31st December 2017. Additionally, the site will ensure that the new Cork Preparation Heater burner now identified at Grid Casting is included into the Permit during the next variation.

BAT 16 – Yuasa Battery (UK) Limited samples discharges of effluent and surface water run-off to sewer and to water course respectively. Sampling is not necessarily undertaken to the ISO 5667 standards, and daily analysis is undertaken in-house using calibrated, but not necessarily UKAS or MCERTs accredited analysers. However quarterly effluent samples are sent to a UKAS accredited laboratory for analysis (ISO 17025). The individual methods of analysis are laboratory specific and follow recognised standards, albeit these are not necessarily international standards.

As the third-party laboratory contracted to analyse the samples is ISO 17025 accredited, it is not thought to be necessary to undertake any further assessment into the application of ISO 5667 or other ISO standard analytical methods at this stage.

3) Where there is a BAT-AEL specified in the BAT Conclusion with which you cannot comply, this requires the provision of sufficient technical and commercial information to demonstrate the requirement for a derogation.

The BAT-AELs which are relevant to the Yuasa Battery (UK) Limited process can largely be met. Discharges to air and sewer remain within their limited values, and where these are currently higher than the BAT-AEL (i.e. emission limit values of 2 mg m^{-3} Lead from stacks A7, A13, A14, and A22), monitoring results suggest that lower limits could be attained, where these discharge points are still operational (currently A7 only).

Discharges to surface water are tested monthly, and results suggest that discharges of Lead are generally higher than the 0.5 mg l^{-1} BAT-AEL. However, this release is not a process release and is of clean, surface water run-off only.

4) Where compliance with the BAT Conclusions will also require demonstration of compliance with the requirements of the Energy Efficiency Directive, undertake a cost benefit analysis.

There is no requirement for the site to meet the obligations of the Energy Efficiency Directive at this stage. The site has a total currently installed combustion capacity of 6.48 MW, however the two site boilers which are now no longer in service account for 2.6 MW of this capacity. The current in service capacity of the site is approximately 3.6 MW, and there is no requirement for an increase or refurbishment of the site combustion processes with an aggregated thermal input of more than 20 MW.

5) For all discharges to surface waters from your site you must provide emissions data for the following hazardous pollutants: Cadmium, Mercury, Nickel, Lead, Benzene, and Poly Aromatic Hydrocarbons (PAH).

Yuasa Battery (UK) Limited sample discharges of clean surface water run-off to the Nant-Melyn Brook on a monthly basis, with samples analysed for Lead and pH. The discharge does not contain any process water and hence is not limited by any Discharge Consent, and there are no discharge limits specified within the Environmental Permit. Of the hazardous substances listed, the site principally uses Lead.

Cadmium is present in some of the Lead alloy employed at the site, although this would be a solid raw material which is stored, processed and used internally, and has negligible opportunity to contaminate the surface water discharge. All Lead (raw materials or wastes) are stored internally around the site, thereby minimising the potential for release to the environment.

The only Mercury used within the Yuasa Battery (UK) Limited system is that within the bulk Sodium Hydroxide (Caustic Soda) which is used in the effluent treatment plants, and in the Caustic Soda and Hydrochloric Acid used in the de-ionisation plants. The bulk Caustic Soda used at the site contains less than 0.01 ppm Mercury, and less than 0.1 ppm Cadmium. The drummed Hydrochloric Acid currently used by the site contains a maximum of 0.1 ppm of both Mercury and Cadmium, and the drummed Caustic Soda contains 0.3 ppm of Mercury and 2.5 ppm of Cadmium. Drums are 45 litre plastic containers and are stored within bunds.

There are plans to modify the de-ionisation unit within the effluent plant in Factory 2 during 2017, which will see reverse osmosis applied to de-ionise the water and will remove the requirement for using Caustic Soda and Hydrochloric Acid for de-ionisation, although 45 litre drummed chemicals will still be required for use in the Factory 4 plant.

Discharges of Mercury to sewer from the plant are negligible, and are measured once per year. In 2015 and 2016, the results were below the laboratory limit of detection < 0.0001 mg l^{-1}, suggesting no or negligible release to sewer. No Mercury monitoring has been undertaken on discharges of run-off to surface water.

Nickel is not used within the Yuasa Battery (UK) Limited process.

Benzene and PAH could be present around the site in resins, inks, universal screen cleaner, and oils. Neither IMS or MEK contain benzene or PAH. Resins, inks, and screen cleaner are used within the factory buildings and are stored in small quantities. The resins are viscose and hence are easily contained and cleared should spillages occur. All raw materials and wastes are stored appropriately to ensure that the potential for their release is minimised. Oils are used across the site, and could potentially be on the roadways due to vehicle movements.

Clean surface water run-off from the north-eastern area of the site, around Factories 4 and 5 passes through a 40 m^3 petrol interceptor prior to release, and the discharge of both drainage lines releasing to the Nant-Melyn Brook contain emergency penstock valves. Hence the potential for release of any of the listed pollutants to surface water are minimal. Results of the monthly monitoring of surface water discharges for Lead and pH, between January 2012 and July 2016 are retained at the site and can be viewed by the Compliance Officer on request. Monthly sampling continues.

6) Undertake screening tests, and modelling as necessary for releases to surface waters.

No screening test or modelling assessment is considered necessary as there is no process release to surface water, no emission limit values set, and limited monitoring data is available.