Permit Reference Number : EPR/BV5386IX Operator : GS Yuasa Battery Manufacturing UK Ltd Installation : GS Yuasa Battery Manufacturing UK Ltd

Form Number : MR1 Reporting of Mass Emissions to Sewer for the period from ...1 January 2018.....to...31 December 2018.....

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Annual mass [2]
S1 and S2	Mercury and its compounds	0.005 mg/l	<0.00010mg/l	
S1 and S2	Mercury and its compounds	0.9 g		0.0000166 g/m³
S1 and S2	Cadmium and its compounds	0.01 mg/l	<0.0006mg/l	
S1 and S2	Cadmium and its compounds	0.3 g		0.0001077 g/m³

[1] The result is given as a mass balance calculation, definition as given in condition 6.1.1
[2] The Annual Mass is given as a mass balance calculation, definition as given in condition 6.1.1

Signed ..... **Date** 6/2/19

(authorised to sign as representative of the Operator)

Permit Reference Number : EPR/BV5386IX Operator : GS Yuasa Battery Manufacturing UK Ltd Installation : GS Yuasa Battery Manufacturing UK Ltd

Form Number : R1 Reporting of Waste Disposal for the year ...2018.....

Waste Disposal & Recovery			
Waste Description	Disposal Route	Tonnes	Recovery Tonnes
1) Hazardous Wastes			
Lead and lead oxide waste	EnviroWales	972.0	972.0
Other hazardous waste	See below	161.9434	16.937
Total hazardous waste		1133.9434	988.937
2) Non-Hazardous Wastes	See below	261.12	159.544
Total non-hazardous waste		261.12	159.544
TOTAL WASTE	-	1395.0634	1148.481

Trends in Waste Disposal and Recovery				
Year	Parameter			
	Hazardous waste		Total Waste	
	Tonnes	per unit output [1]	Tonnes	per unit output [1]
2010	1344.89	0.0824059	1691.32	0.1036328
2011	1250.885	0.0719975	1542.276	0.0887692
2012	686.0394	0.0429621	923.3654	0.0578243
2013	1053.352	0.0542732	1264.863	0.0651712
2014	1054.71	0.0653937	1260.908	0.0781783
2015	1088.849	0.0649330	1249.611	0.0745200
2016	1116.079	0.0649365	1276.536	0.0742724
2017	1404.312	0.0794441	1645.108	0.0930663
2018	1133.9434	0.0610909	1395.0634	0.0751587

[1] Waste per unit output should be quoted in units of waste produced from battery process / tonnes of battery produced per year.

Operator's comments :

A review of waste has again been undertaken throughout 2018 to ensure improved accuracy of the figures reported.

Hazardous and total waste has reduced when compared with 2017, and a full description, along with an analysis of changes between 2017 and 2018 is appended to this report.

Signed .....

(authorised to sign as representative of the Operator)

Date 6/2/19

Permit Reference Number : EPR/BV5386IX Operator : GS Yuasa Battery Manufacturing UK Ltd Installation : GS Yuasa Battery Manufacturing UK Ltd

Form Number : WU1 **Reporting of Water Usage for the year ...2018.....**

Water Usage		
Water Source	**Annual Usage (m^3)**	**Water per unit output [1] (m^3/t)**
Abstraction Borehole	48166.0m^3	
Mains water	18967.0m^3	
Recycled Effluent	23073.0m^3	
TOTAL WATER USAGE	90206.0m^3	4.8598272

Trends in Water Usage		
Year	**Parameter**	
	Total Water usage	**Water per unit output [1]**
2013	76236.0m^3	3.9280113
2014	60181.0m^3	3.7313187
2015	72814.0m^3	4.3422321
2016	86768.0m^3	5.0484031
2017	97980.0m^3	5.5428841
2018	90206.0m^3	4.8598272

[1] Water per unit output should be quoted in units of total water use / tonnes of battery produced per year.

Operator's comments :
Abstracted water:-
Borehole A = 37,674m^3, Borehole B = 10,492m^3, Total = 48,166m^3

Total water consumption has decreased in 2018, and the amount of recycled water has increased by 1,803 m^3.
The % of water recycled in 2018 was 34.37%.

Signed .....
(authorised to sign as representative of the Operator)

Date 6/2/19

Permit Reference Number : EPR/BV5386IX Operator : GS Yuasa Battery Manufacturing UK Ltd Installation : GS Yuasa Battery Manufacturing UK Ltd

Form Number : E1 Reporting of Energy Usage for the year ...2018.....

Energy Usage			
Energy Source	Energy Usage		
	Quantity	Primary Energy (MWh)	CO_2 Produced (tonnes)
Electricity *	21706.946 MWh	52096.6704	6616.710
Natural Gas	7205.457 MWh	7205.457	1323.066
TOTAL	28912.403 MWh	59302.1274	7939.776

Trends in Energy Usage			
Year	Parameter		
	Primary Energy usage	CO_2 produced	CO_2 per unit output [1]
2015	51490.111	8699.995	0.5188205
2016	52442.174	9744.643	0.5669703
2016	52442.174	9744.643	0.5669703
2017	56257.718	9095.797	0.5145636
2018	59302.1274	7939.776	0.4277535

*** Conversion factor for delivered electricity to primary energy = 2.4**

[1] CO_2 per unit output should be quoted in units of total CO_2 produced / tonnes of battery produced per year.

Operator's comments :

I would add that CO_2 emissions are calculated using the DEFRA CO_2 emission factors, including transmission and distribution emissions.
Primary energy has continued to be calculated using the 2.4 conversion factor above.

Energy efficiency continues to be an objective and target for continued improvement.

Signed .....

(authorised to sign as representative of the Operator)

Date 6/2/19.....

Permit Reference Number : EPR/BV5386IX Operator : GS Yuasa Battery Manufacturing UK Ltd Installation : GS Yuasa Battery Manufacturing UK Ltd

Form Number : PI1 Reporting of Performance Indicators for the year ...2018.....

Annual Production/Treatment	
Production of batteries produced per year	18561.565 tonnes

Environmental Performance Indicators

Performance Indicators		
Parameter [1]	**Annual Mass**	**Units**
COD	**0.1076151**	**kg/tonne**
Mass of lead released from A1 – A7 and A9 - A26	**0.0023237**	**kg/tonne**
Mass of lead released to sewer	**0.0123617**	**kg/tonne**

Trends in Environmental Performance			
Year	**Parameter [1]**		
2011	**0.0878032**	**0.0040374**	**0.0156457**
2012	**0.1057535**	**0.0037291**	**0.0085624**
2013	**0.0610321**	**0.0043773**	**0.0030817**
2014	**0.1252405**	**0.0048269**	**0.0112394**
2015	**0.1387867**	**0.0051848**	**0.0104550**
2016	**0.0687224**	**0.0028735**	**0.0041387**
2017	**0.1018004**	**0.0027847**	**0.0081119**
2018	**0.1076151**	**0.0023237**	**0.0123617**

[1] Performance indicators should be quoted in units of parameter / tonnes of battery produced per year

Operator's comments:

COD mass to sewer = 1997 .5063 kg/year / 18561.565 tonnes of battery produced = 0.1076151 kg/tonne.
Lead mass from stacks = 43.133 kg/year / 18561.565 tonnes of battery produced = 0.0023237 kg/tonne.
Lead mass to sewer = 229.4536 kg/year / 18561.565tonnes of battery produced = 0.0123617 kg/tonne.
COD:- I would add that the annual COD release has been calculated from the average of the maximum monthly figures recorded from both Dwr Cymru and GS Yuasa quarterly samples. Samples were taken in each month of January to December inclusive for factory No. 2 (S1) and January, April, May, July and October for factory No.4 (S2).
Stacks:- In 2018, there has been a slight decrease in the Lead mass from stacks against 2017, but is broadly very similar, however, stack operational hours have also reduced slightly.
As in previous years, all LEV systems continue to be shut-down at break times.
Sewer:- The annual Lead release for S1 has been calculated from the average of the maximum monthly GS Yuasa figures recorded for each month of 2018, and for S2, has been calculated from the maximum monthly GS Yuasa figures recorded in January, April, May and July 2018.
Total Lead to sewer has increased in 2018 which is mainly due to an increase in the total volume of trade effluent discharged. It is also affected by the processing of a large volume of rain water which is captured from the north perimeter road along with continuous flushing of two curing ovens to prevent the formation of bacteria in the water systems.
COD and Lead in trade effluent will be targeted for improvement in 2019.

Signed ..... **Date** 6/2/19

(authorised to sign as representative of the Operator)