Hydro Aluminium Deeside

Environmental Permit No. BK3638IF

2021 Performance Report

January 2022

Contents

1. Introduction

1.1 Condition 4.2.2 of the Environmental Permit for Hydro Aluminium Deeside requires a report on the performance of our activities over the previous year.

1.2 As required by condition 4.2.2, the following sections detail:

(a) a review of the results of the monitoring and assessment carried out in accordance with the permit, including an interpretive review of that data;

(b) the annual production / treatment data set out in Schedule 5, Table S5.2; and

(c) the performance parameters set out in Schedule 5, Table S5.3 using the forms specified in Table S5.4 of that Schedule.

1.3 There have been no major process changes in 2021. The twin chamber preheater for aluminium ingot has been operational since January 2021. The facility to utilise waste heat from furnace off-gases has not been fully commissioned due to restrictions on travel and availability of personnel in 2021. Currently, chamber A is operating with the burner only to supply heated prime to the holding furnace, while chamber B is using waste heat / off-gas only (an 8 hour cycle, supplying pre-heated prime to the melting furnace).

1.4 An electromagnetic stirrer was installed below the melting furnace in August 2021. Once optimised this should enable reduced energy input per charge. Further analysis of stirrer operation will be ongoing in January – June 2022.

1.5 There were no major equipment breakdowns in 2021. After curtailments in 2020 due to the global pandemic, 2021 saw a buoyant sales market and a return to full production in order to meet strong UK and EU demand for aluminium extrusion ingot.

1.6 There were 311.5 production days in 2021 and a total output of 57061 tonnes of aluminium extrusion ingot.

2. Emissions to Air

2.1 Particulate emissions to air from points A1, A12 and A13 are monitored using an Auburn Systems U3600-QAL1 continuous emissions monitor (an MCERTS-certified CEM, MC170330/00). The results of continuous monitoring have been reported each quarter to Natural Resources Wales using permit reporting form Air1a.

2.2 Particulate emissions data is logged by the CEM and downloaded for analysis. The maximum readings from 2021 for each emission point are detailed in the table below.

Table 2.1. Summary of CEM monitoring results for 2021

Emission Point	Limit	Max daily average in 2021
A1	5 mg/m^3 daily average	2.64 mg/m^3 (05/12/21)
A12	5 mg/m^3 daily average	3.74 mg/m^3 (07/05/21)
A13	5 mg/m^3 daily average	1.54 mg/m^3 (03/01/21)

Emission Point	Limit	Max result, average of daily average values
A1	5 mg/m^3 monthly average	1.85 mg/m^3 (July)
A12	5 mg/m^3 monthly average	1.52 mg/m^3 (July)
A13	No limit set	0.84 mg/m^3 (June)

(NB, from 01/07/20 the limits were altered to a single limit for daily average of 5 mg/m^3)

2.3 No breaches of the emission limits for particulates were recorded in 2021.

2.4 Operational procedures have been reviewed and are deemed satisfactory to ensure continued data collection and analysis, and investigation of equipment alarms that may indicate a fault or limit breach. Alarms on the CEM are set at 3 mg/m^3 and 4.75 mg/m^3 to ensure that action is taken if the emission limit value of 5 mg/m^3 is in danger of being breached. Internal audits include checks that dust monitor alarms are being reported and acted upon.

2.5 Extractive sampling of particulates was undertaken between 14 – 16 June 2021 by Socotec UK Ltd (MCERTS accredited) to enable calibration of the CEM.

2.6 The Environmental Permit for the site requires twice-yearly extractive monitoring of stacks A1 and A12, and annual extractive monitoring of stack A13. All three release points were tested between 14 – 16 June 2021, with additional monitoring of A1 and A12 conducted between 06 – 09 December 2021. All monitoring was undertaken by Socotec using MCERTS-accredited personnel.

2.7 The results of extractive monitoring have been reported to Natural Resources Wales using permit reporting forms Air1b, Air1c and Air1d. Analysis of these results shows that all results are below the emission limit values detailed in the permit, for both sampling exercises conducted in 2021. There was one result higher than expected, for carbon monoxide on stack A12 (bag plant 3). The result measured on 09/12/21 was 92.7 mg/m^3 (±4.3), which is below the permit ELV, but is above the normal range of 10 – 30 mg/m^3. A combustion survey of the furnace burners is scheduled for January 2022 – the first of a routine quarterly combustion audit undertaken by external contractors.

3. Emissions to Water

3.1 Emissions to water from discharge point W1 are monitored up to four times per year when the casting pit cooling water system is emptied. In 2021 this occurred in August, October and December. The results of this monitoring are summarised below.

Table 3.1. Summary of W1 monitoring results

Parameter	**ELV**	**18/08/21**	**01/10/21**	**13/12/21**
BOD (mg/l)	10	1.92	2.08	<1
Suspended solids (mg/l)	35	<2	4.0	<2
COD (mg/l)	125	9.94	12.30	28.10
Ammoniacal nitrogen (mg/l)	5	<0.2	<0.2	<0.2
Aluminium (mg/l)	0.5	0.12	0.14	0.05
Total hydrocarbon oil (mg/l)	2	0.17	0.18	0.12
pH	6 – 9	7.57	7.94	7.89
Temperature (^{o}C)	25	17.0	14.0	11.0
Flow (l/sec)	No limit	-	-	-

Notes:

- Flow rate at release point W1 is not measured, following the removal of the v-notch weir during installation of a penstock valve at W1. Agreed with NRW that water emission volumes can be calculated from cooling water bleed-off and casting pit emptying (see Compliance Assessment Report no. I/110329/BK3638).

3.2 These results show that all releases are within the permitted limits, with some results being below the limit of detection in some cases (indicated by a "<" symbol in the table).

4. Environmental Noise

4.1 An environmental noise survey was conducted on 16-18 June 2021. Results from this are as follows, with the results from previous surveys included for comparison.

Table 4.1. Noise survey results

	Day, dB(A)						Night, dB(A)					
	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021
Measured noise (Factory operating)	49	50	47	46	48	49	42	46	46	42	43	44
Residual noise (Factory not operating)	48	47	46	45	46	46	37	42	43	41	38	39
Specific noise at nearest property	41	46	39	38	43	45	39	43	42	34	40	41
Background noise (L_{90})	43	45	42	42	41	42	35	42	42	38	35	37

4.2 The results of the 2021 noise survey are comparable to previous years with no major increase or decrease in operational noise levels during the day or night. There does appear to be a slight 1-2 dB increase in background noise during the day and night, and in night time residual noise with the factory not operating.

4.3 No noise complaints were received in 2021. The last such complaints were received between April – July 2017 as recorded in the 2017 Performance Report.

4.4 Noise reduction measures continue to be applied. The automated laydown station (where aluminium logs are placed after their removal from the casting pit) has removed the chiming created by rolling logs by hand along the old laydown station. The automated laydown station has also removed the need for logs to be turned through 90 degrees when suspended vertically, thereby avoiding noise created from logs hitting the turning frame and colliding with each other. The "anti-twist device" remains in use on the load hook of the overhead crane used to remove logs from the casting pit, helping to reduce chiming during the transfer from Caster to Laydown. With Single Drop casting, removing logs from the casting pit now occurs 6-7 times every 24 hours rather than 12-14 times, further reducing the potential for noise from this activity. Noise from sawing operations continues to be minimised, with sawing of logs and discharge of butt ends taking place within an acoustic enclosure. Cut logs are picked-up and carried by automated equipment to the packing area, in contrast to the old saw where logs rolled under gravity to a manual banding station. Preventative maintenance includes condition monitoring on all fans, including those serving the automated homogeniser and air-cooling station. "White noise" reversing alarms are in use on all site vehicles to further reduce tonal noise emanating from on-site activities.

4.5 The new ingot preheater incorporates combustion air fans, which are housed entirely within the factory building and do not contribute to additional environmental noise. Noise measurements taken with and without the fans operating found that there was no increase in the average noise level at the monitoring location with just the pre-heater fans in operation during the night time. This was therefore a positive indication that there would be no disturbance and complaints would be unlikely at the nearest residential property due to operation of these fans.

5. Operational Performance

5.1 Annual production data required by Table S5.2 is as follows.

Secondary aluminium produced	57,061 tonnes

5.2 Additional performance parameters are reported using permit reporting forms WaterUsage1, Energy1 and Performance1. These are included below.

Permit Number: EA/EPR/BK3638IF/V002 Operator: Hydro Aluminium Limited

Facility: Wrexham Aluminium Works **Form Number: WaterUsage1**

Reporting of Water Usage for the year 2021

Water Source	Usage (m^3/year	Specific Usage (m^3/unit output)
Mains water	25,198 m^3	0.44 m^3 per tonne of aluminium produced
TOTAL WATER USAGE	25,198 m^3	0.44 m^3 per tonne of aluminium produced

Operator's comments:

Slight reduction from 2020 result of 0.49 m^3 per tonne of aluminium produced, possibly reflecting the benefits of "steady state" production with the single drop casting system throughout 2021..

Signed …….Joel Priest…….. Date……28/01/2022……..
(authorised to sign as representative of Operator)

Permit Number: EA/EPR/BK3638IF/V002 Operator: Hydro Aluminium Limited

Facility: Wrexham Aluminium Works **Form Number: Energy1**

Reporting of Energy Usage for the year 2021

Energy Source	Energy Usage Quantity	Primary Energy (MWh)	Specific Usage (MWh/unit output)
Electricity *	7,381 MWh (cf 5952.5 in 2020)	19,190.6 MWh (cf 15,476.5 MWh in 2020)	0.336 MWh per tonne of aluminium produced (cf 0.32 in 2020)
Natural Gas	66,354 MWh (cf 54,878.86 in 2020)		1.16 MWh per tonne of aluminium produced (cf 1.12 in 2020)
TOTAL	-	85544.60 MWh (cf 70,355 MWh in 2020)	1.49 MWh per tonne of aluminium produced (cf 1.44 in 2020)

* Conversion factor for delivered electricity to primary energy = 2.6

Operator's comments:
2021 saw slightly higher energy consumption compared to 2020, in terms of total consumed and consumption per tonne of finished goods. However, May to October saw a declining trend in kWh used per tonne produced (from 1265 to 1077 kWh/t). We hope to see reductions in energy use per tonne with the use of waste gas mode for the ingot preheater and continued optimisation of the electromagnetic stirrer below the melting furnace.

Signed …… Joel Priest …….. Date……28/01/2022……..
(Authorised to sign as representative of Operator)

Facility: Wrexham Aluminium Works **Form Number: Performance1**

Reporting of other performance indicators for the period 01/01/2021 to 31/12/2021

Parameter	Tonne	Tonne / Tonne Product
Total raw material used (tonnes of primary aluminium)	14,071 (8,058 in 2020)	0.25 (0.16 in 2020)
Dross and skimmings, used filters and swarf produced	3,486 (3,053 in 2020)	0.06 (0.06 in 2020)
Bag plant residues and waste lime	107.12 (84.27 in 2020)	0.0019 (0.0017 in 2020)

Operator's comments:
Total prime use increased in 2021 due largely to favourable market conditions allowing higher finished goods premiums and no production curtailments in the year. Use of post-consumer material was more than double the quantity of primary metal, at 31,315 tonnes, including continued production of "Circal 75R" extrusion ingot with minimum 75% post-consumer scrap content.
Total dross arisings are higher due to increased production but at the same level as 2020 on a per tonne basis.
2021 saw continued use of the waste lime silo for bulk tanker collections allowing longer periods between collection (5 collections in 2021 each over 20 tonnes).

Signed …… Joel Priest …….. Date……28/01/2022……..
(Authorised to sign as representative of Operator)