Annual Permit Report

for

Swansea Power Plant
Westfield Industrial Park
Titanium Road
Waunarlwydd
SA5 4SF

Background

This site operates 27 Jenbacher 420 spark ignition gas engines for generating electricity.

The process is authorised and regulated by Natural Resources Wales (NRW) by way of an environmental permit (EPR/AB3393CP) under the Environmental Permitting Regulations 2016.

Report Purpose

This report complies with permit conditions to provide annual performance data on the following parameters:

1. Nitrogen Dioxide
2. Carbon Monoxide
3. Oxygen
4. Water Vapour
5. Water Usage
6. Energy Usage
7. Engine Operating Hours

Monitoring

Monitoring of emissions to air (parameters 1 to 3 above) have been undertaken by Socotec. Appendix A presents the summary of results as required by Schedule 3 of the environmental permit.

Water Vapour Emissions

Technically, it is difficult and expensive to measure this parameter with any accuracy on these types of engines. The only water vapour emitted is as a result of the combustion of natural gas, and the exhaust concentration is calculated to be in the region of 11% by volume, or approximately double the concentration of CO_2.

Water Usage

There is mains water servicing the site.

This water is not used as part of the combustion process, and its primary use is for the welfare facilities on site.

The figure reported is based upon previous values considering there have been no operational or personnel changes since 2017. We therefore expect water usage to be of similar efficiency: approximately 14 m^3.

This figure has been reported on the relevant forms in Appendices B

Energy Usage

- Electricity usage for 2022 was 1,433 MWhe
- Gas usage for 2022 was 83,068 MWh

These figures have been reported on the relevant forms in Appendices C and D.

Engine Operating Hours

Maximum operating hours = 915

Average operating hours = 889

These figures have been reported on the relevant form in Appendix D.

Conclusion

All reported values are within specified limits.

Written by Rhys Weir 27/01/2023

Appendix A

Permit Number : EPR/AB3393CP
Facility : Alcoa Combustion Plant
Operator : Conrad (Alcoa) Limited
Form Number : Air 01 27/01/22

Reporting of periodically monitored emissions to air for the period from 01/01/2022 **to** 31/12/2022

Nitrogen Oxide

mission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method	Result Date and Time [2]	Uncertainty [3]
A1	Oxides of Nitrogen(NO and NO_2 expressed as NO_2)	95 mg/m^3	Periodic	77	BS EN 14792	05 December 2022 12:20 – 13:20	2.8
A2		95 mg/m^3	Periodic	85	BS EN 14792	05 December 2022 11:00 – 12:00	2.8
A3		95 mg/m^3	Periodic	79	BS EN 14792	05 December 2022 13:35 – 14:35	2.8
A4		95 mg/m^3	Periodic	86	BS EN 14792	05 December 2022 15:00 – 16:00	2.8
A5		95 mg/m^3	Periodic	78	BS EN 14792	05 December 2022 16:10 – 17:10	2.8
A6		95 mg/m^3	Periodic	81	BS EN 14792	06 December 2022 08:25 - 09:25	2.9
A7		95 mg/m^3	Periodic	79	BS EN 14792	06 December 2022 09:40 – 10:40	2.9
A8		95 mg/m^3	Periodic	85	BS EN 14792	06 December 2022 11:00 – 12:00	2.9
A9		95 mg/m^3	Periodic	83	BS EN 14792	06 December 2022 12:20 – 13:20	2.9
A10		95 mg/m^3	Periodic	84	BS EN 14792	06 December 2022 13:35 – 14:35	2.9
A11		95 mg/m^3	Periodic	90	BS EN 14792	06 December 2022 14:45 – 15:45	2.9
A12		95 mg/m^3	Periodic	85	BS EN 14792	06 December 2022 14:45 – 15:45	2.9
A13		95 mg/m^3	Periodic	87	BS EN 14792	07 December 2022 08:05 – 09:05	2.2
A14		95 mg/m^3	Periodic	78	BS EN 14792	07 December 2022 09:00 – 10:00	2.1
A15		95 mg/m^3	Periodic	87	BS EN 14792	07 December 2022 07:50 – 08:50	2.1
A16		95 mg/m^3	Periodic	92	MCERTS	13 January 2023 12:46 – 13:46	5.0
A17		95 mg/m^3	Periodic	81	BS EN 14792	06 December 2022 15:10 – 16:10	2.2
A18		95 mg/m^3	Periodic	83	BS EN 14792	06 December 2022 13:55 – 14:55	2.2
A19		95 mg/m^3	Periodic	86	BS EN 14792	06 December 2022 12:30 – 13:30	2.2
A20		95 mg/m^3	Periodic	82	BS EN 14792	06 December 2022 11:10 – 12:10	2.2
A21		95 mg/m^3	Periodic	91	BS EN 14792	06 December 2022 10:00 – 11:00	2.2
A22		95 mg/m^3	Periodic	86	BS EN 14792	06 December 2022 08:50 – 09:50	2.2
A23		95 mg/m^3	Periodic	83	BS EN 14792	05 December 2022 16:00 – 17:00	2.1
A24		95 mg/m^3	Periodic	88	BS EN 14792	05 December 2022 14:40 – 15:40	2.1
A25		95 mg/m^3	Periodic	86	BS EN 14792	05 December 2022 13:15 – 14:15	2.1
A26		95 mg/m^3	Periodic	82	BS EN 14792	05 December 2022 10:50 – 11:50	2.1
A27		95 mg/m^3	Periodic	87	BS EN 14792	05 December 2022 12:00 – 13:00	2.1

Signed ……. Date……27/01/2021……
(authorised to sign as representative of Operator)

Carbon Monoxide

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method	Result Date and Time [2]	Uncertainty [3]
A1	Carbon Monoxide	No limit set	Periodic	304	BS EN 15058	05 December 2022 12:20 – 13:20	8.53
A2		No limit set	Periodic	309	BS EN 15058	05 December 2022 11:00 – 12:00	8.57
A3		No limit set	Periodic	338	BS EN 15058	05 December 2022 13:35 – 14:35	8.55
A4		No limit set	Periodic	308	BS EN 15058	05 December 2022 15:00 – 16:00	8.61
A5		No limit set	Periodic	317	BS EN 15058	05 December 2022 16:10 – 17:10	8.64
A6		No limit set	Periodic	337	BS EN 15058	06 December 2022 08:25 - 09:25	7.73
A7		No limit set	Periodic	364	BS EN 15058	06 December 2022 09:40 – 10:40	7.53
A8		No limit set	Periodic	355	BS EN 15058	06 December 2022 11:00 – 12:00	7.67
A9		No limit set	Periodic	370	BS EN 15058	06 December 2022 12:20 – 13:20	7.57
A10		No limit set	Periodic	340	BS EN 15058	06 December 2022 13:35 – 14:35	7.48
A11		No limit set	Periodic	332	BS EN 15058	06 December 2022 14:45 – 15:45	7.84
A12		No limit set	Periodic	353	BS EN 15058	06 December 2022 14:45 – 15:45	7.59
A13		No limit set	Periodic	299	BS EN 15058	07 December 2022 08:05 – 09:05	8.16
A14		No limit set	Periodic	290	BS EN 15058	07 December 2022 09:00 – 10:00	3.82
A15		No limit set	Periodic	366	BS EN 15058	07 December 2022 07:50 – 08:50	3.92
A16		No limit set	Periodic	436	MCERTS	13 January 2023 12:46 – 13:46	5.0
A17		No limit set	Periodic	374	BS EN 15058	06 December 2022 15:10 – 16:10	3.69
A18		No limit set	Periodic	352	BS EN 15058	06 December 2022 13:55 – 14:55	3.72
A19		No limit set	Periodic	360	BS EN 15058	06 December 2022 12:30 – 13:30	3.73
A20		No limit set	Periodic	360	BS EN 15058	06 December 2022 11:10 – 12:10	3.69
A21		No limit set	Periodic	377	BS EN 15058	06 December 2022 10:00 – 11:00	3.70
A22		No limit set	Periodic	365	BS EN 15058	06 December 2022 08:50 – 09:50	3.72
A23		No limit set	Periodic	349	BS EN 15058	05 December 2022 16:00 – 17:00	1.10
A24		No limit set	Periodic	353	BS EN 15058	05 December 2022 14:40 – 15:40	3.99
A25		No limit set	Periodic	332	BS EN 15058	05 December 2022 13:15 – 14:15	3.98
A26		No limit set	Periodic	352	BS EN 15058	05 December 2022 10:50 – 11:50	3.95
A27		No limit set	Periodic	352	BS EN 15058	05 December 2022 12:00 – 13:00	3.98

Signed ……. Date……27/01/2022……

(authorised to sign as representative of Operator)

Oxygen

	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method	Result Date and Time [2]	Uncertainty [3]
A1	Oxygen	No limit set	Periodic	9.5	BS EN 14789	05 December 2022 12:20 – 13:20	0.024
A2		No limit set	Periodic	9.6	BS EN 14789	05 December 2022 11:00 – 12:00	0.024
A3		No limit set	Periodic	9.6	BS EN 14789	05 December 2022 13:35 – 14:35	0.024
A4		No limit set	Periodic	9.6	BS EN 14789	05 December 2022 15:00 – 16:00	0.025
A5		No limit set	Periodic	9.7	BS EN 14789	05 December 2022 16:10 – 17:10	0.025
A6		No limit set	Periodic	10.0	BS EN 14789	06 December 2022 08:25 - 09:25	0.025
A7		No limit set	Periodic	9.7	BS EN 14789	06 December 2022 09:40 – 10:40	0.024
A8		No limit set	Periodic	9.9	BS EN 14789	06 December 2022 11:00 – 12:00	0.025
A9		No limit set	Periodic	9.8	BS EN 14789	06 December 2022 12:20 – 13:20	0.025
A10		No limit set	Periodic	9.6	BS EN 14789	06 December 2022 13:35 – 14:35	0.024
A11		No limit set	Periodic	10.2	BS EN 14789	06 December 2022 14:45 – 15:45	0.026
A12		No limit set	Periodic	9.8	BS EN 14789	06 December 2022 14:45 – 15:45	0.025
A13		No limit set	Periodic	10.6	BS EN 14789	07 December 2022 08:05 – 09:05	0.033
A14		No limit set	Periodic	9.8	BS EN 14789	07 December 2022 09:00 – 10:00	0.025
A15		No limit set	Periodic	10.1	BS EN 14789	07 December 2022 07:50 – 08:50	0.026
A16		No limit set	Periodic	9.95	MCERTS	13 January 2023 12:46 – 13:46	0.20
A17		No limit set	Periodic	10.1	BS EN 14789	06 December 2022 15:10 – 16:10	0.020
A18		No limit set	Periodic	10.2	BS EN 14789	06 December 2022 13:55 – 14:55	0.021
A19		No limit set	Periodic	10.2	BS EN 14789	06 December 2022 12:30 – 13:30	0.021
A20		No limit set	Periodic	10.1	BS EN 14789	06 December 2022 11:10 – 12:10	0.020
A21		No limit set	Periodic	10.2	BS EN 14789	06 December 2022 10:00 – 11:00	0.021
A22		No limit set	Periodic	10.2	BS EN 14789	06 December 2022 08:50 – 09:50	0.021
A23		No limit set	Periodic	10.4	BS EN 14789	05 December 2022 16:00 – 17:00	0.021
A24		No limit set	Periodic	10.4	BS EN 14789	05 December 2022 14:40 – 15:40	0.021
A25		No limit set	Periodic	10.1	BS EN 14789	05 December 2022 13:15 – 14:15	0.020
A26		No limit set	Periodic	10.0	BS EN 14789	05 December 2022 10:50 – 11:50	0.020
A27		No limit set	Periodic	10.1	BS EN 14789	05 December 2022 12:00 – 13:00	0.020

Signed …… Date**……**27/01/2023**……**

(authorised to sign as representative of Operator)

Appendix B

Permit Number : EPR/AB3393CP
Facility : Alcoa Power Plant
Operator : Conrad (Alcoa) Limited
Form Number : W 01 27/01/22

Reporting of Water Usage for the period from 01/01/2022 **to** 31/12/2022

Water Source	**Usage (tonnes)**
Mains water	14
Other (specify)	
TOTAL WATER USAGE	14

Operator's comments:

This water is not used as part of the combustion process, and its primary use is for the welfare facilities on site.

Signed ……. Date……27/01/2023……

(authorised to sign as representative of operator)

Appendix C

Permit Number : EPR/AB3393CP
Facility : Alcoa Power Plant
Operator : Conrad (Alcoa) Limited
Form Number : Energy 01 27/01/22

Reporting of Energy Consumption for the period from 01/01/2022 **to** 31/12/2022

Energy Usage Energy Source	Quantity	Primary Energy (MWh)	Specific Usage (MWh/unit output)
Electricity *	1,433 MWh	3,438	0.12
Natural Gas	83,068 MWh	83,068	2.92
TOTAL	84,501 MWh	86,506	3.04

* Conversion factor for delivered electricity to primary energy = 2.4

Operator's comments:

Gas consumption is reported as Higher/Gross Heating Value.

The electricity consumed by the plant is to keep plant preheated on standby in between periods of operation, and to operate other essential services such as security and telecoms.

Although energy efficiency is very important, and vital in some respects to the business, any potential for greater efficiency will be low due to the high build quality of the site and the way in which it is operated and maintained.

Signed ……. Date……27/01/2023…….
(Authorised to sign as representative of operator)

Appendix D

Permit Number : EPR/AB3393CP
Facility : Alcoa Power Plant
Operator : Conrad (Alcoa) Limited
Form Number : Perf 01 27/01/22

Reporting of Performance Parameters for the period from 01/01/2022 **to** 31/12/2022

Performance Parameters		
Parameter	**Units used**	**Performance parameter**
Electrical power generated	28,406 MWhe	
Water usage	14 m^3	0.0004 m^3/MWhe produced
Energy usage	1,433 MWhe and 83,068 MWh	0.12 and 2.92 Total energy used/MWhe produced
Maximum operating hours (per engine)	915	Total hours
Average operating hours	889	Total hours

Signed …… Date……27/01/2023…….
(Authorised to sign as representative of operator)