

Dow Corning CHP
Environmental Permit JP3632ZH
Fugitive Emissions – 2017 Review
Summary Report

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1. Introduction

Within the site Environmental Permit, clause 4.2.2 states that:-

4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to Natural Resources Wales by 31 January (or other date agreed in writing by Natural Resources Wales) each year. The report(s) shall include as a minimum:

- (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;

This summary report is the outcome of such a review for 2016 at Dow Corning CHP, operated by Cofely Industrial Energy Services.

2. Permit Changes

None.

3. Monitoring changes

None.

4. Review of Data

From the LCP 60 NO_x Returns for monthly mean it can be shown that all units (HR-001A, HR-100B & FB-001) achieved levels of emissions below the limits set out in the permitted conditions. (See [Table 1](#) in Appendix A)

	Monthly Mean Limits	Achieved Monthly Mean (Average)
HR-001A	125 mg/m ³	66.67 mg/m ³
HR-001B	125 mg/m ³	70.73 mg/m ³
FB-001	250 mg/m ³	218.59 mg/m ³

These figures are comparable to previous years and are indicative of the plant operating regime.

From the LCP 60 CO Returns for monthly mean it can be shown that all units (HR-001A, HR-001B & FB-001) achieved levels of emissions below the limits set out in the permitted conditions. (See [Table 1](#) Appendix A)

	Monthly Mean Limits	Achieved Monthly Mean (Average)
HR-001A	80 mg/m ³	18.7 mg/m ³
HR-001B	80 mg/m ³	10.2 mg/m ³
FB-001	100 mg/m ³	21.6 mg/m ³

Levels of the two heat recovery units are comparable to each other and Fired Boiler unit is significantly different as expected from the difference in %O₂ and NO_x suppression. (See [Figure 1](#) & [Figure 2](#) in Appendix A)

From the annualised hours set out in Table 2 in Appendix A, it can be seen that they reflect a general running philosophy that the gas turbines and heat recovery units are used as base generating units for both electricity and steam, with the fired boiler taking up the rest of the plant demand. At the end of 2017 an issue with a Boiler Feedwater Valve meant increased usage of the Fired Boiler however this was offset by the Fired Boiler being off from January to May for a superheater replacement.

Considering [Figure 3](#) we can see that the fuel consumption (in total 868,091,314 KWh for 2017) during the period was approx. 72.4 MWh per month. This is a slight reduction on the previous year and is indicative of better operational efficiency over the reporting period. Over the first two thirds of the year, prior to the October steam shutdown, the average was running at 75.8 MWh this then lowers during the shutdown to 48.6 MWh with the final two months at 82.1 MWh. This increase at year end is a reflection of the inconsistency of the Dow Chemical production run post shutdown. The resultant CO₂ emitted from the installation reflects directly these figures.

If we now consider [Figure 4](#) in Appendix A we see that efficiency was consistent up to the shutdown period, after which a lower trend is noticeable. All efficiencies trend upward at the end of year as customer processes stabilise and plant operation normalises.

Further to this, a fault with the Fired Boiler Boiler Feed Water (BFW) control valve meant that the Fired Boiler was being used as a base boiler with one of the HRSG's used as a capacity boiler. This fault was rectified at the end of December 2017 and normal operational strategy resumed.

During 2017 overall CHP efficiency is consistent and comparable to other CHP installations. The same factors that influenced heat & electrical efficiency is reflected in the CHP efficiency data. The high efficiency data for shutdown is reflective of the use of shell boilers for a very low steam demand over a prolonged period, see [Figure 5](#) in Appendix A. It is also evident that condensate recoveries suffered a slight decline throughout the period in the first half of the year, but post October shutdown have improved gradually and are continuing to make inroads into attaining higher levels. This is due to a combination of improvements and fault rectifications from both the customer and CHP maintenance regimes.

In conclusion, 2017 has been a stable year for emissions, and periods of peaks and troughs can be attributed directly to shutdown and maintenance periods. Data shows that a significant improvement is going to be required to achieve ELV's as laid out by IED and BRef but work has already begun on recognising this.

Prepared by
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Operations Engineer
18th February 2018

APPENDIX A

TABLES AND FIGURES

2017 CON2 Data

	HR-001A		FB-001		HR-001B	
	NOx	CO	NOx	CO	NOx	CO
January	65.24	6.7	215.71	3.4	58.41	2.9
February	61.98	6.8	-	-	57.91	3.7
March	61.14	8.5	-	-	59.38	4.3
April	63.12	6.1	-	-	61.92	3.3
May	61.51	6.3	-	-	60.68	2.9
June	60.11	5.9	186.98	6.3	60.77	2.7
July	52.64	4.3	186.73	5.7	63.89	2.0
August	53.57	4.9	188.11	4.1	60.23	2.6
September	65.07	3.7	185.49	3.5	69.36	2.0
October	58.32	5.9	183.36	12.4	62.24	1.8
November	59.73	6.4	188.50	11.4	61.76	2.9
December	61.63	4.1	188.25	4.2	60.32	3.3
ELV's	125	80	250	100	125	80

Table 1 Monthly Mean Concentrations

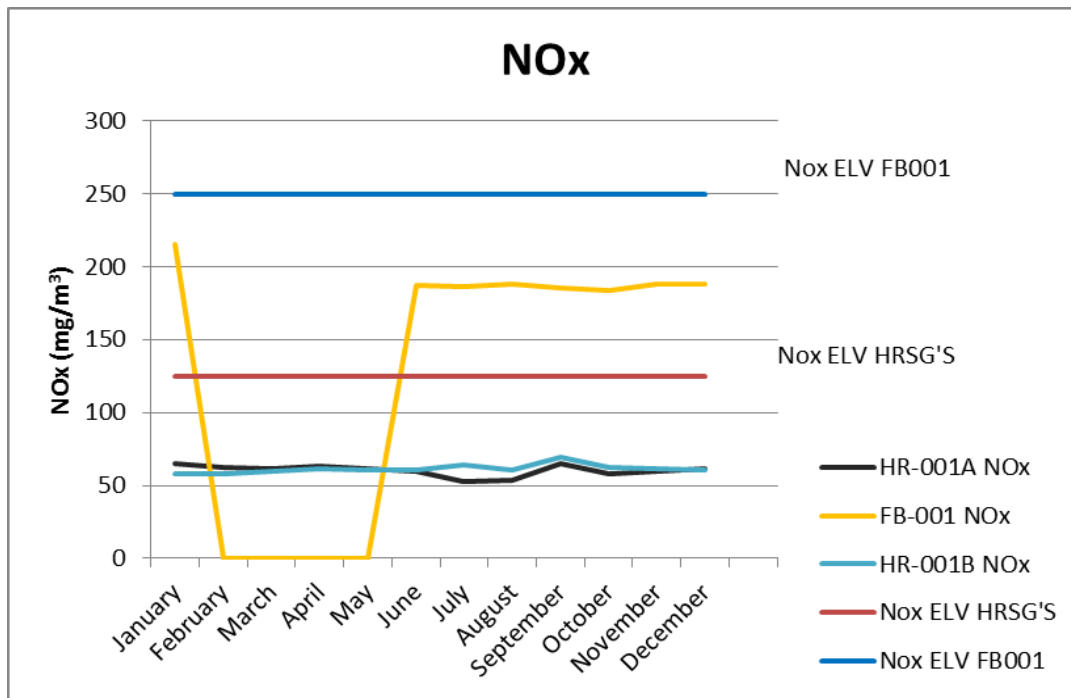


Figure 1 Monthly Mean Concentrations for NOx HR-001A, HR-001B, FB-001

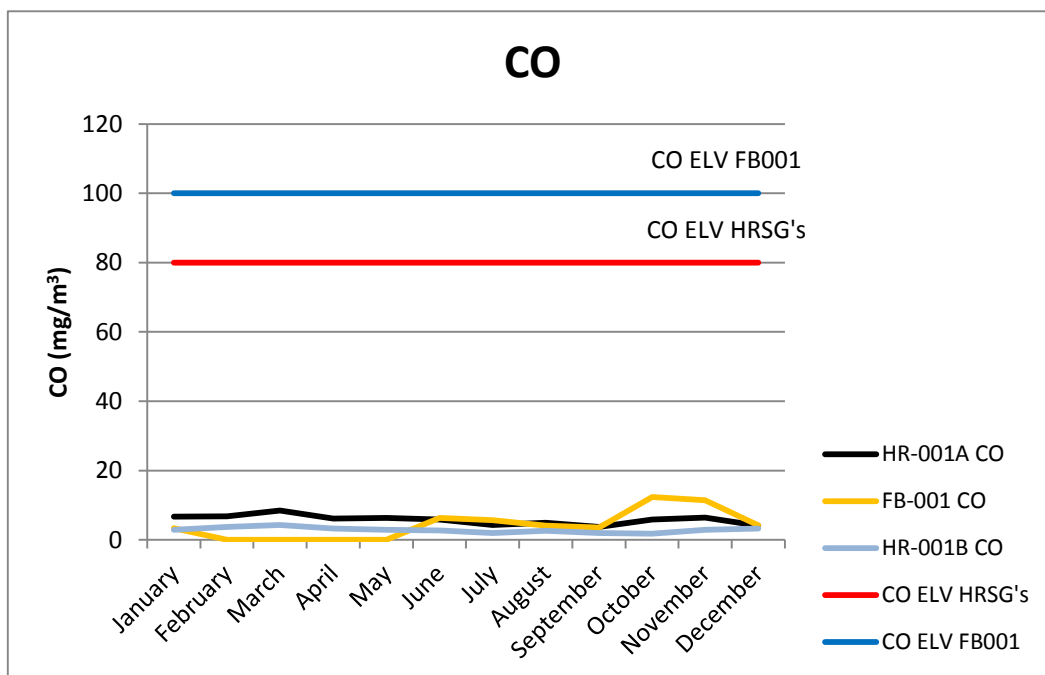


Figure 2 Monthly Mean Concentrations for CO HR-001A, HR-001B, FB-001

RELEASES TO AIR

ANNUAL RETURN

OPERATING HOURS

Operator: Engie

Form:

IED HR1

Location: Barry Cogeneration Plant

Version/date:

V.3.1 31 Dec 2015

Permit/Variation Number: EPR/JP3632ZH/V002

Year: 2017	A1 (hours)	Bypass (hours)	A2 (hours)	Bypass (hours)	A3 (hours)	Bypass (hours)	LCP4 (hours)	Bypass (hours)
Annual Operating Hours (a), (b)	7233.45	0.00	1143.62		7294.8	0.0		
Cumulative Operating Hours (c), (d)								
Derogated Annual Hours (e)								
Five year rolling average (f)								

Table 2 Annual Operating Hours for HR-001A, HR-001B & FB-001

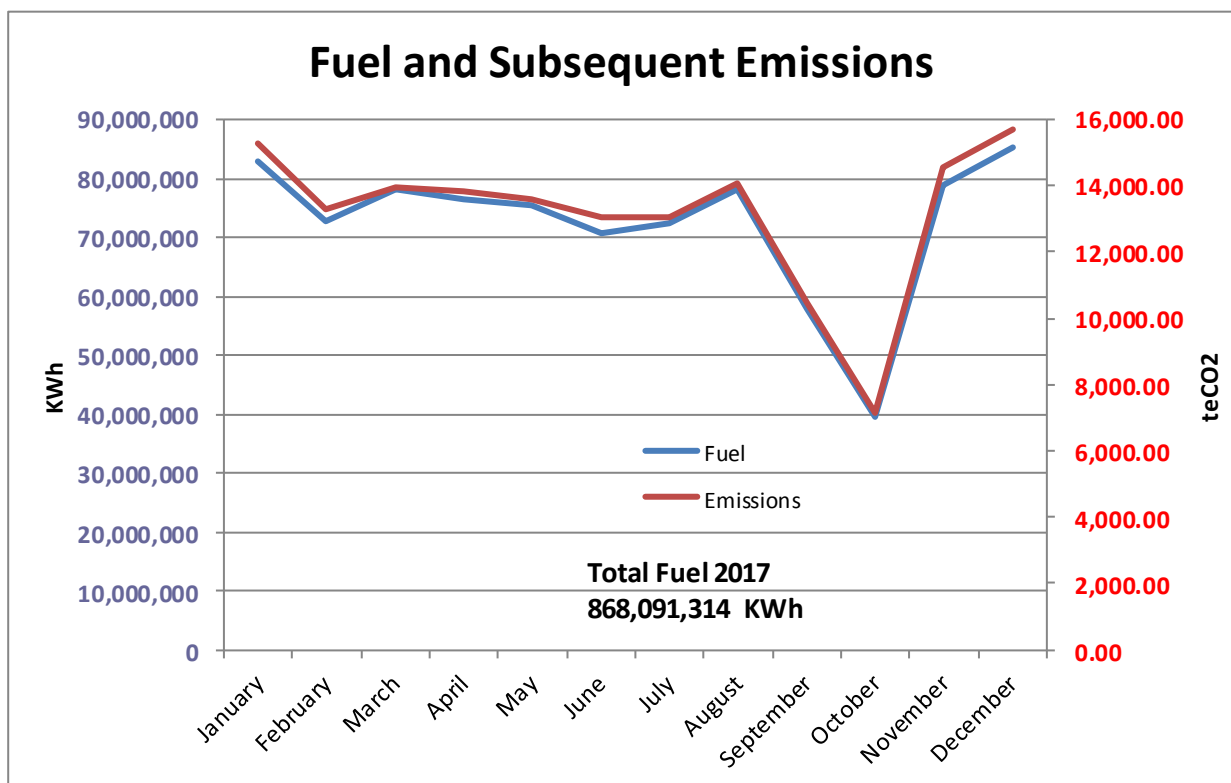


Figure 3 Installation Total Fuel Consumption and Subsequent CO₂ Emissions

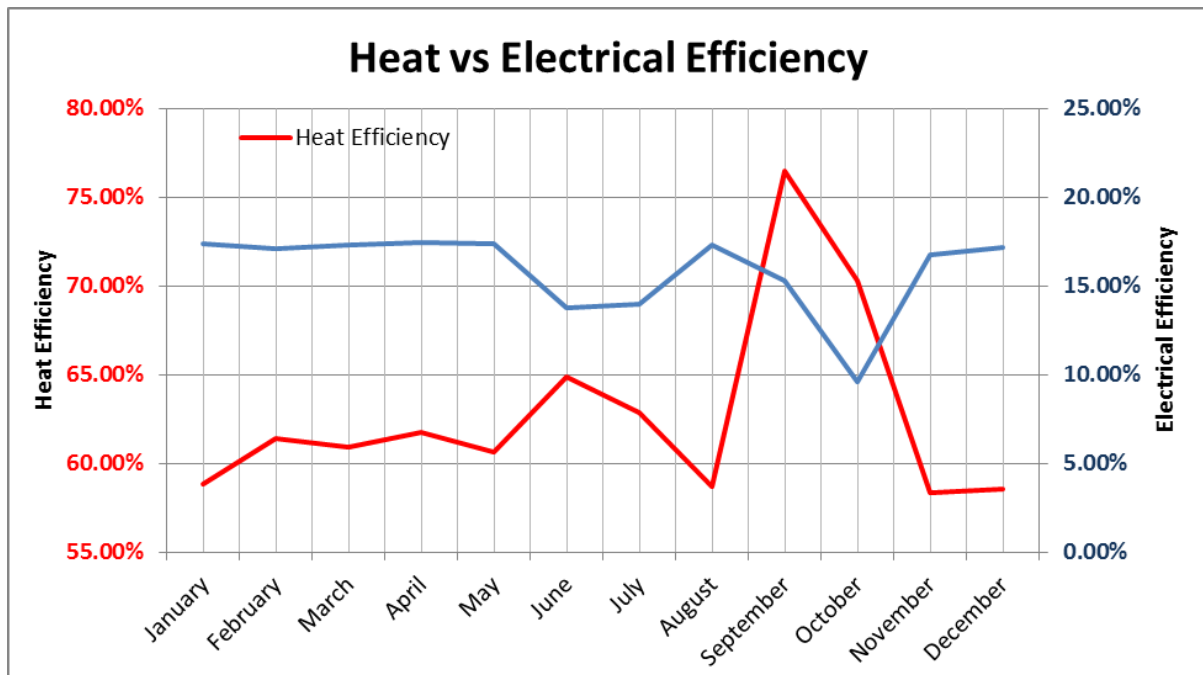


Figure 4 Installation Heat and Electrical Generating Efficiencies

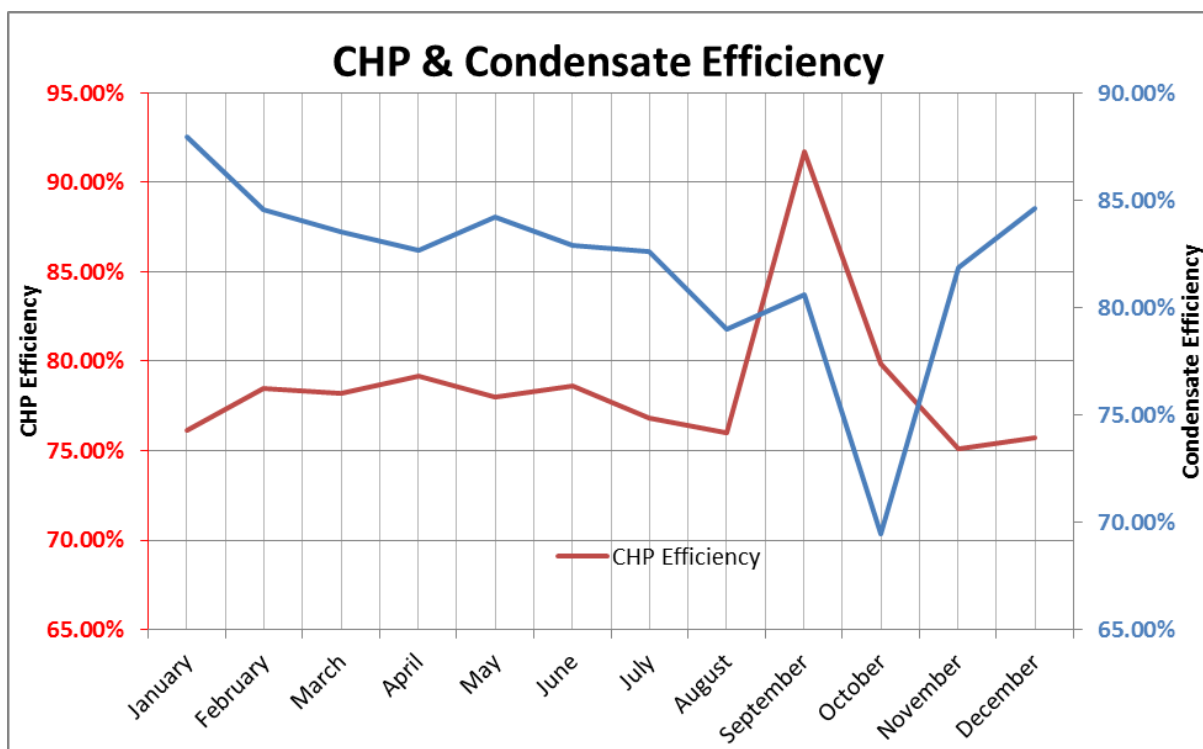


Figure 5 Condensate return to CHP from Dow & Overall Installation Efficiencies