



Annual Performance and Monitoring review

EPR Permit JP3632ZH

Cogen Plant - Dow Silicones UK Ltd

This report is to fulfil ERP permit JP3632ZH condition 4.2.2

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;

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Summary

The report includes details of our performance during 2018 . SPC charts have been used for all CEMS monitoring we carry out for NOX and CO for the last 3 years. SPC charts have been used for extractive sampling we have carried out since 2008.

Points of interest for 2018 :

- Dow Silicones UK Ltd took over responsibility for operation of the Combined Heat and Power plant on 1st March 2018. 2018 has been spent familiarising with systems, updating operating procedures, training operators in safer Dow work systems and cataloguing a huge amount of maintenance work that needs to be carried out.
- The Beast from the East caused an impact on site, as it caused valves to freeze which took down the CHP plant and hence the site was shut down. Subsequently we suffered months of poor reliability and were unable to run certain items of equipment. We were unable to export electricity to the grid for the remainder of the year.

Incidents

There was one permit breach reported in 2018 and one report due to invalid hours:

A1 HRSG1A49 ERU) – Invalid days due to CO sensor failure

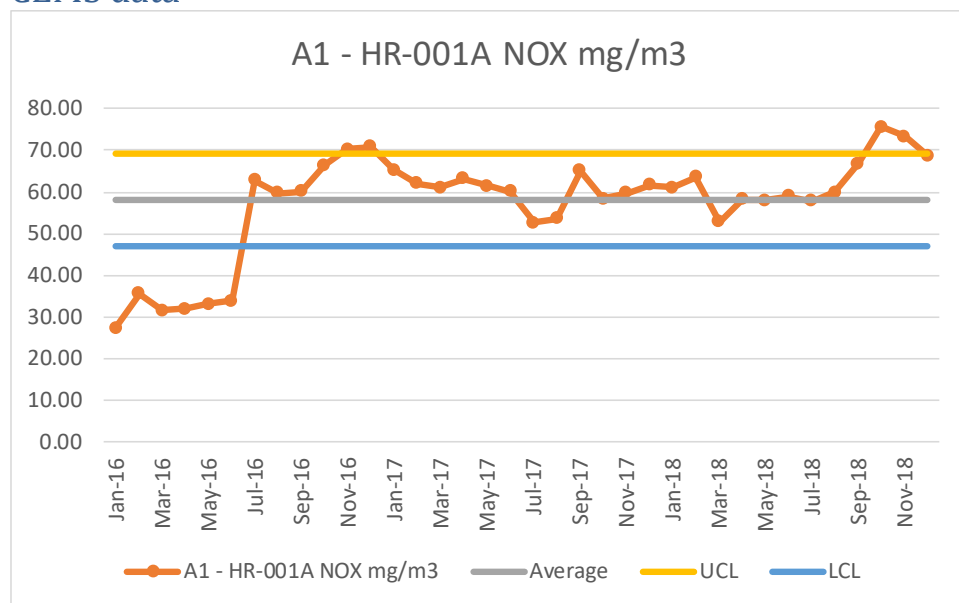
Whilst gathering data for Q2 monitoring results it was discovered that there was an intermittent fault with the CO sensor on the fired boiler. Investigation showed that spares were not held for this piece of equipment and the checking regime for this item was not suitable. A new sensor was ordered and installed. Subsequently the maintenance regime has been updated and a spare is now on stock – this is a common spare for all three CEMS.

A2 – Fired boiler High CO due to O2 sensor calibration issue

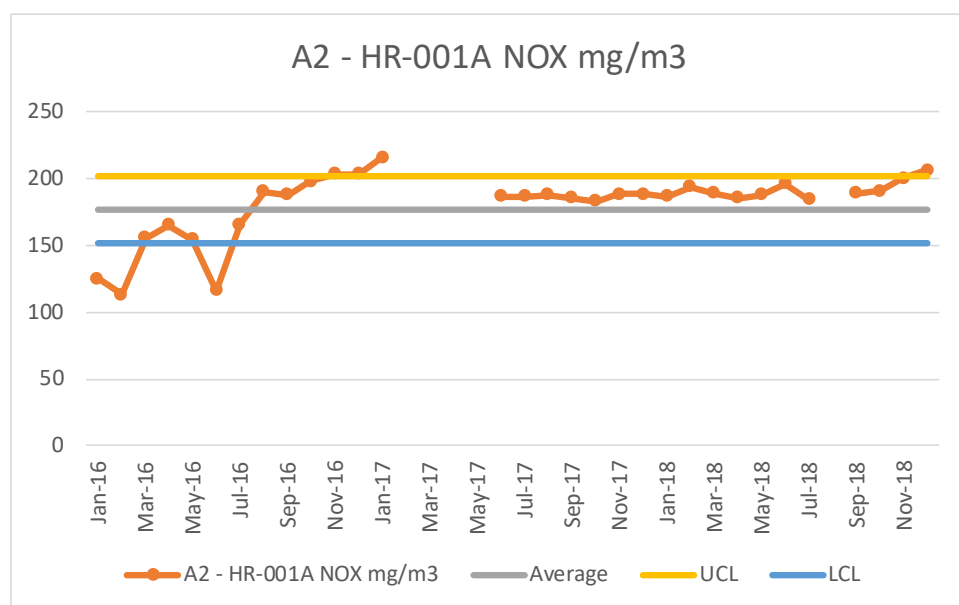
High CO alarms were activated on the plant. On investigation the operators believed it to be an issue with the CO sensor itself and had this checked and calibrated. Further investigation showed that it was actually the O2 sensor reading incorrectly and the CO sensor had been reading correctly. Once the O2 sensor was calibrated the CO results came back in control and well below the permit level. Further investigation showed that no planned maintenance or calibration checks were in place for the O2 sensor, and it hadn't been checked for 18 months. The O2 sensor has now had a maintenance plan created to make sure it is checked periodically.

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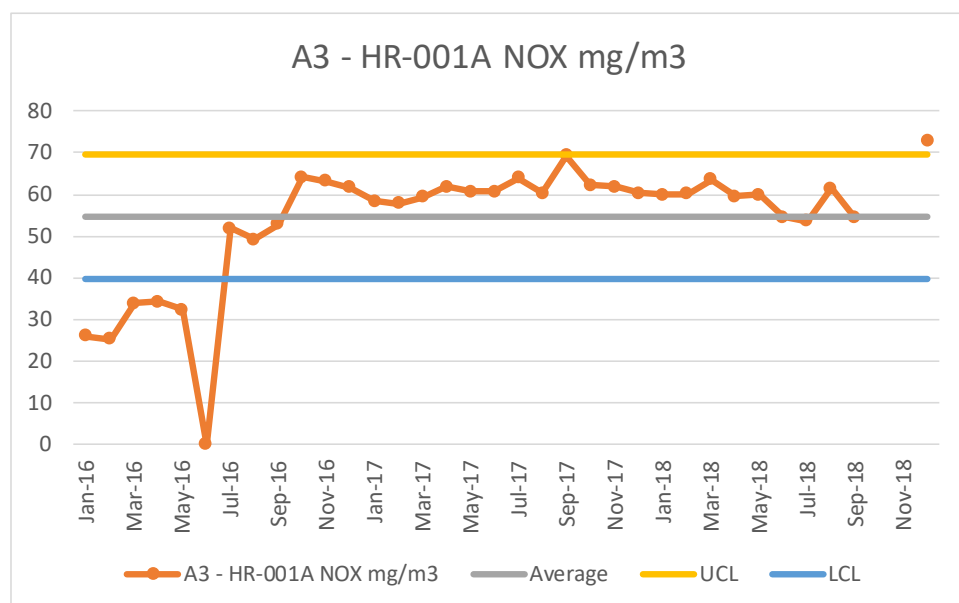
Air monitoring CEMS data



Results within permit
limit (125mg/m3).
*O2 ref 15%

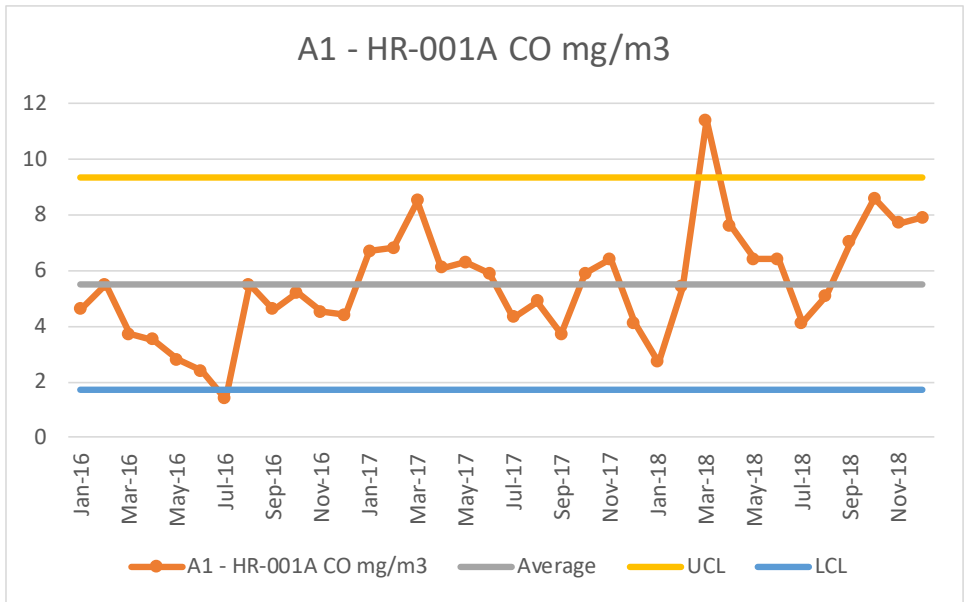


Results within permit
limit (250mg/m3).
*O2 ref 3%

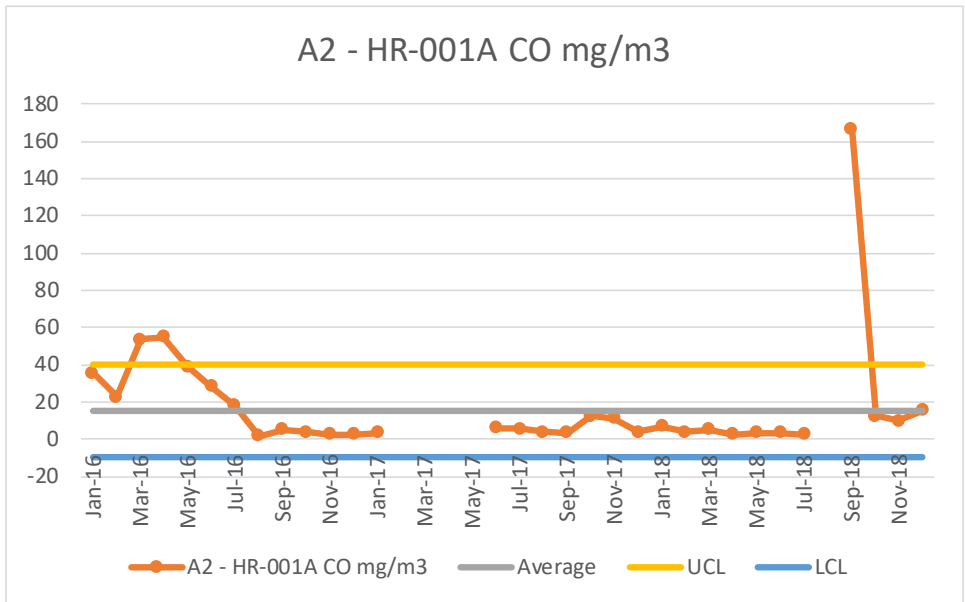


Unit was down during
October, November and
most of December.
December result was
calculated on a few hours
of running.

Results within permit
limit (125mg/m3).
*O2 ref 15%

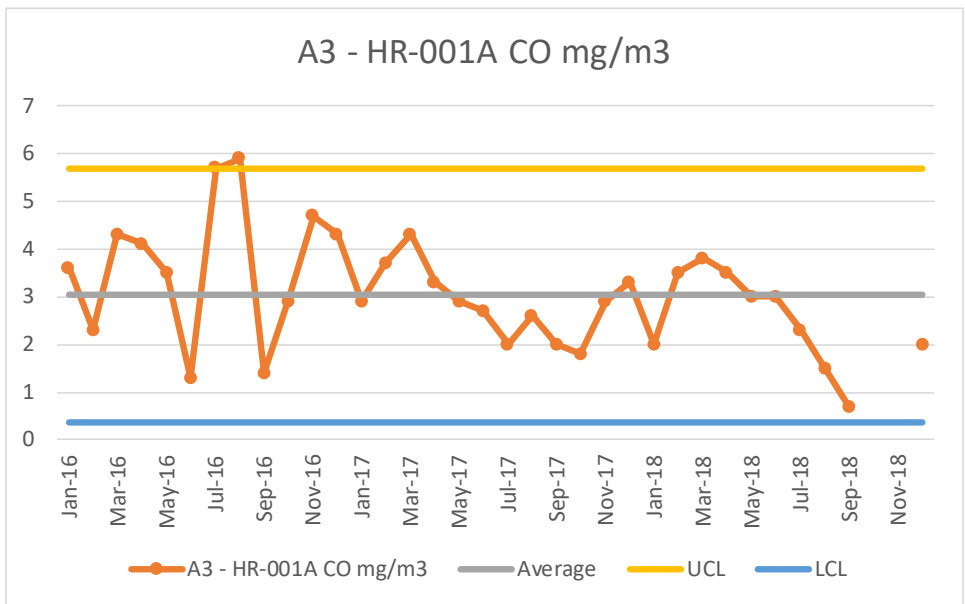


Results within permit limit (80mg/m3).
*O2 ref 15%



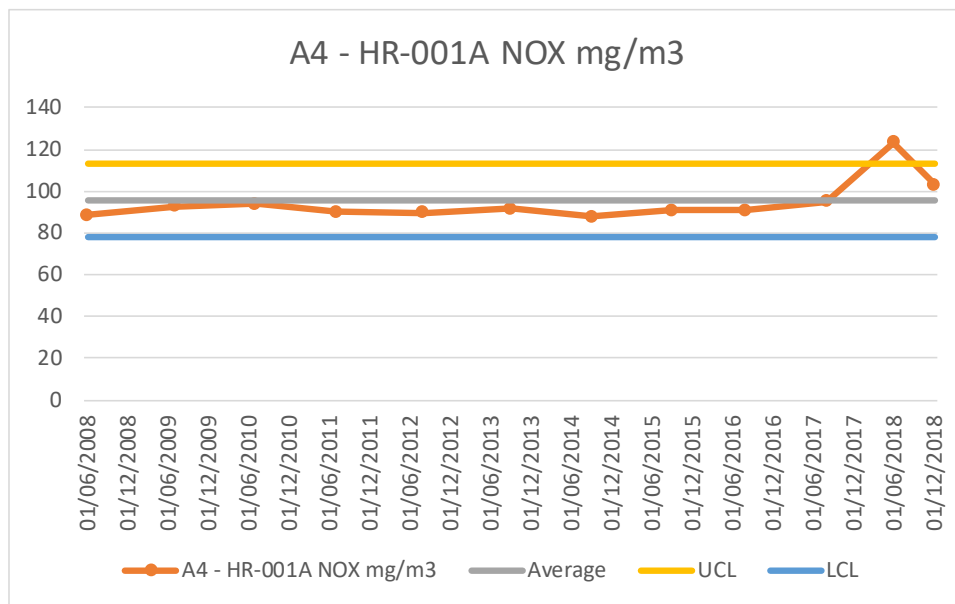
September result out of control and over the permit limit – this was reported as a breach and was investigated. There is an assignable cause (see “Incidents” section for details)

Results permit limit (110mg/m3).
*O2 ref 3%

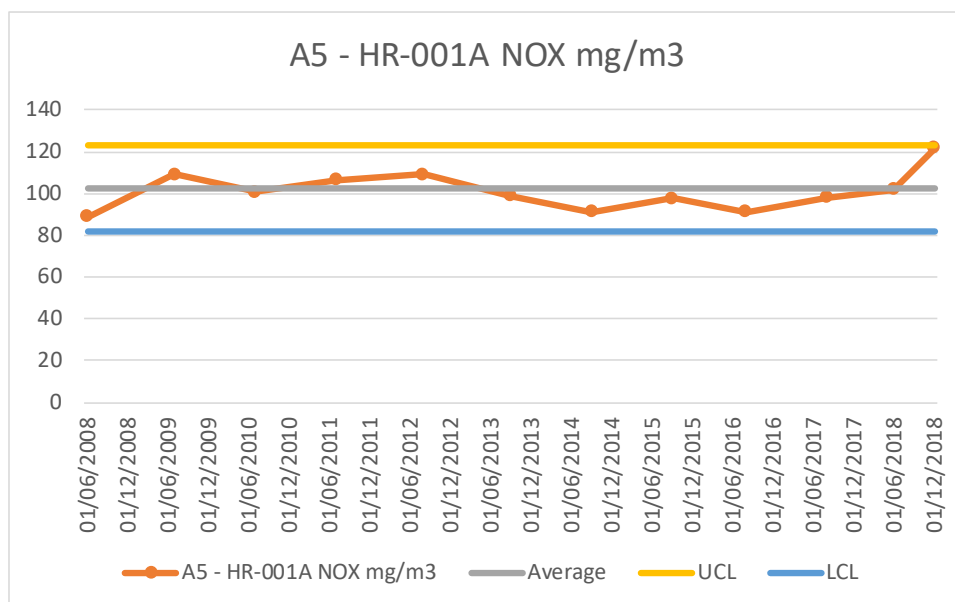


Results within permit limit (80mg/m3).
*O2 ref 15%

Periodic extractive sampling

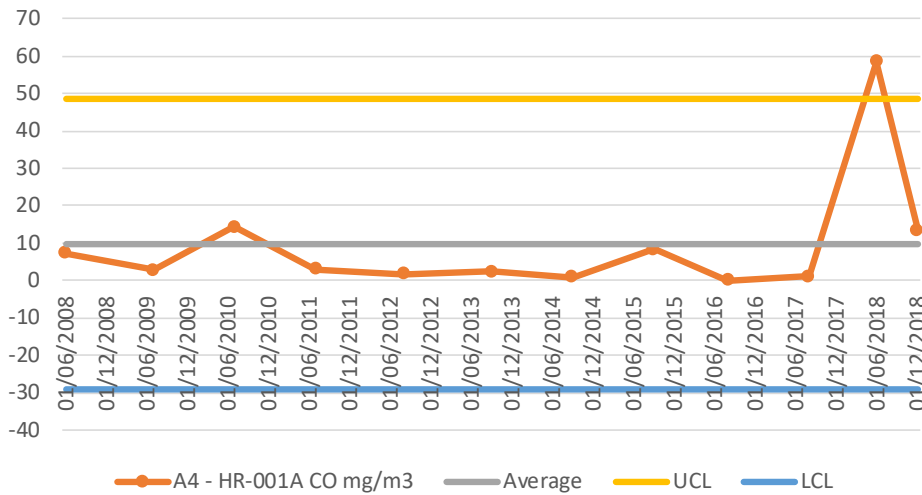


Results within permit limit (135mg/m3).
*O2 ref 3%



Results within permit limit (135mg/m3).
*O2 ref 3%

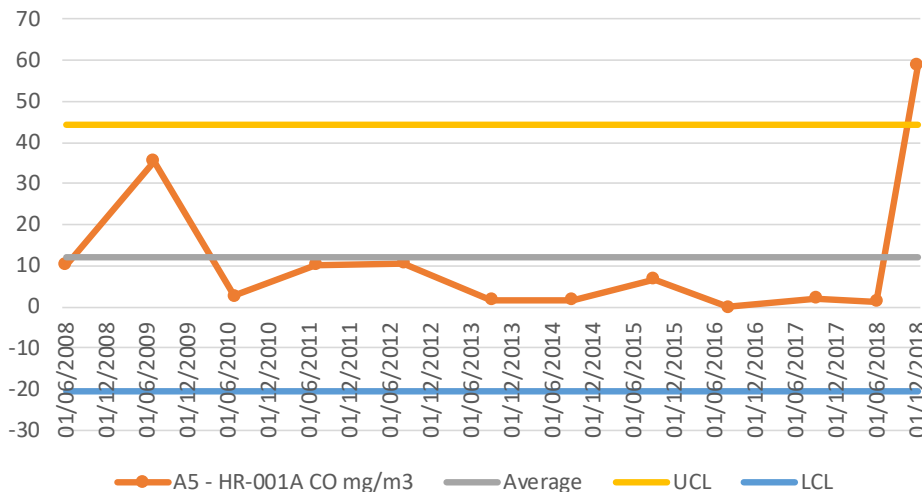
A4 - HR-001A CO mg/m3



Results within permit limit (200mg/m3).
*O2 ref 3%

June result out of control – but low again in December, Will continue to monitor this.

A5 - HR-001A CO mg/m3



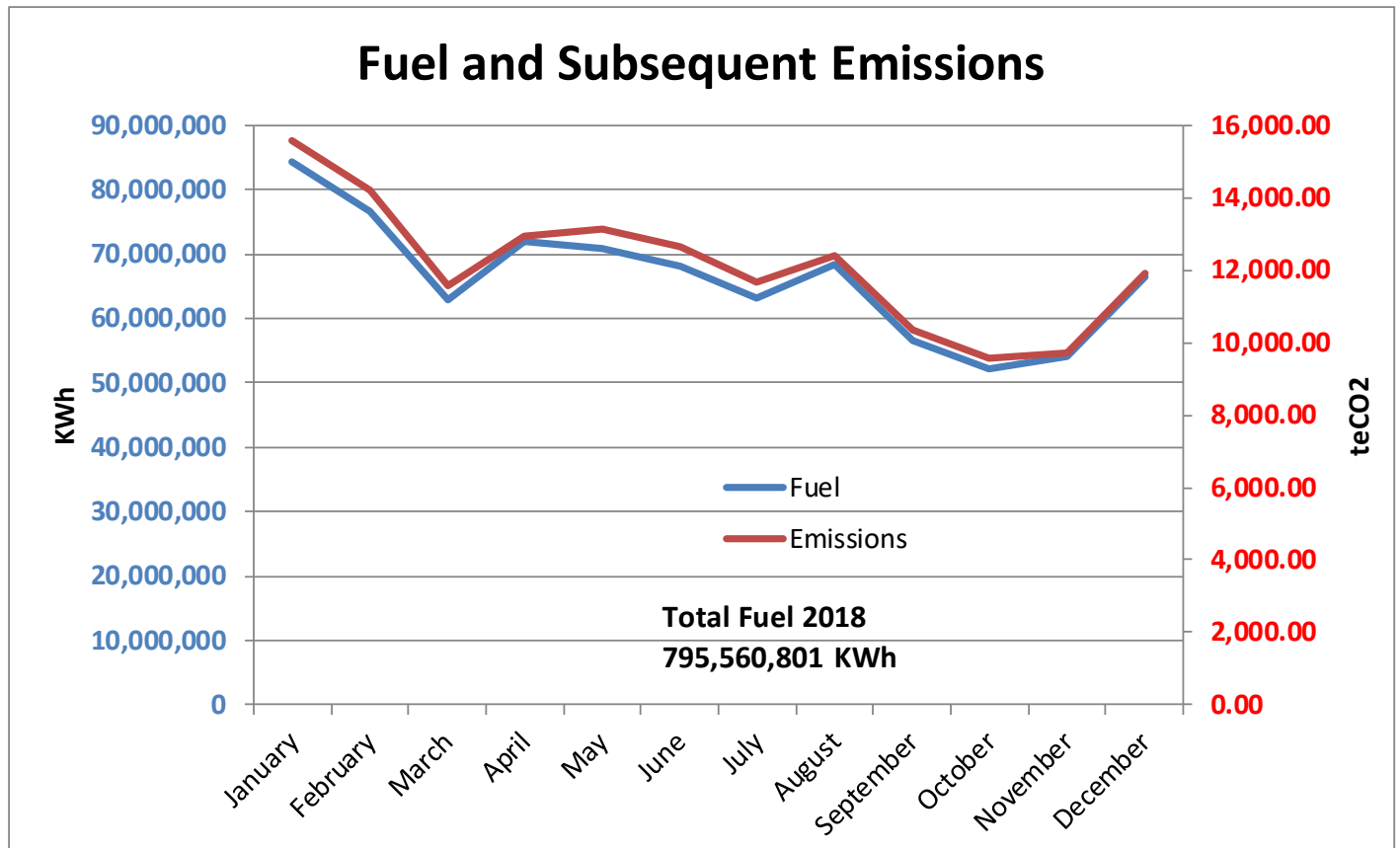
Results within permit limit (200mg/m3).
*O2 ref 3%

June result in control but December result out of control. Will continue to monitor this.

Fuel and Subsequent Emissions

Fuel and emissions was down in 2018 in comparison to 2017. Part way through March we were unable to generate electricity to export to the grid due to gas turbine damage due to extreme weather. No electricity was exported for the remainder of the year.

Average fuel consumption for the years was 66,296 MWh per month compared to 72,341 MWh per month for 2017.

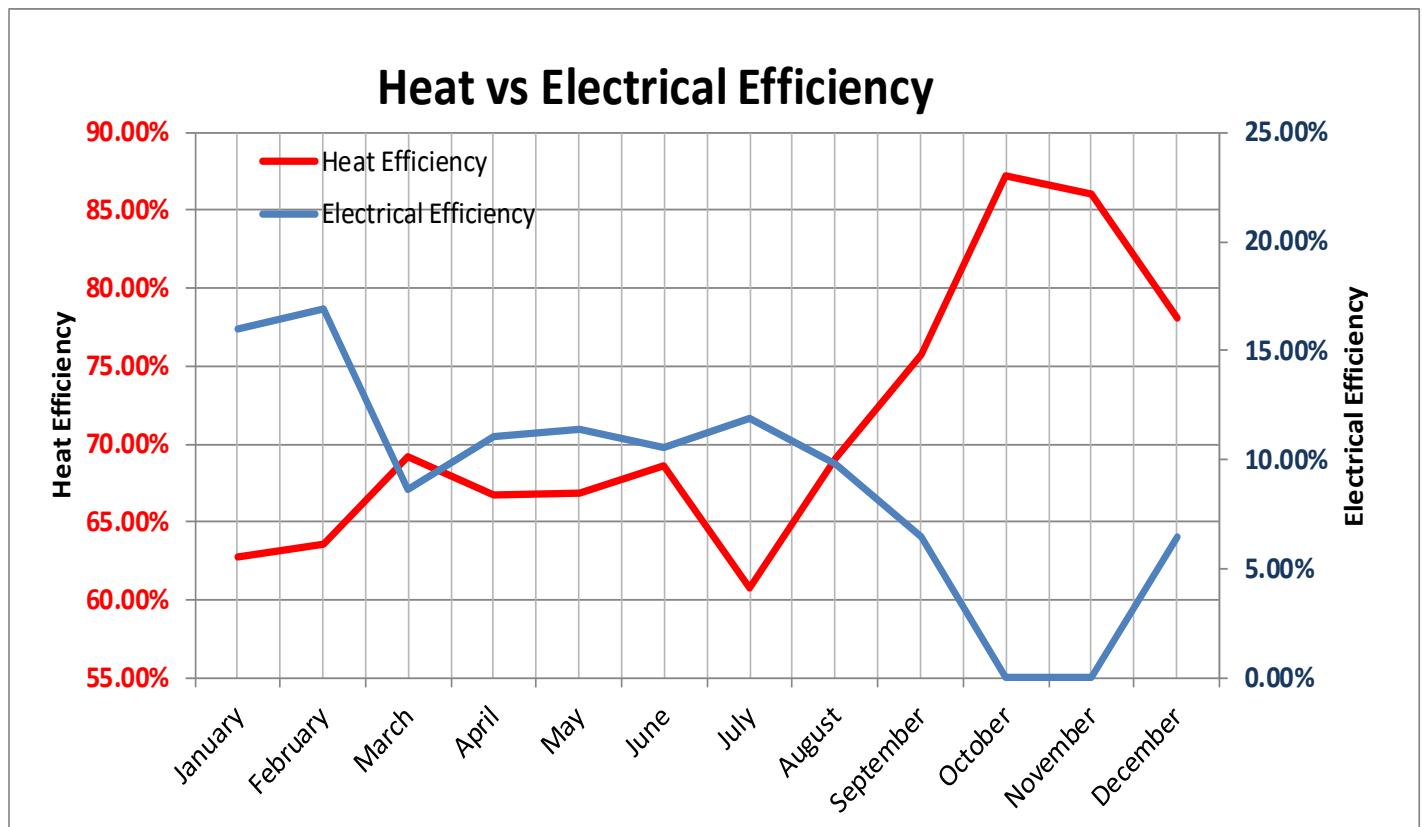


Heat vs Electrical Efficiency

The electrical efficiency was high for the first 2 months of the year, then went down due to being able to generate electricity for export.

Later on in the year the electrical efficiency went to 0% for an extended period whilst a full maintenance overhaul was carried out.

The electrical efficiency should come back up during 2018.



Running Hours

Year:	2018	A1 (hours)	Bypass (hours)	A2 (hours)	Bypass (hours)	A3 (hours)	Bypass (hours)
Annual Operating Hours		6725.92	2243.58	2298.12		3276.1	782.5

From the annualised hours, 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.

Maintenance issues and damage to the gas turbines meant that for much of the year A1 and A3 (the 2 units with gas turbines and HRSG) were run in Fired boiler mode.

CHP efficiency

CHP efficiency was variable during the year and at its lowest during the site shutdown in July when Dow Silicones needed less steam. The CHP efficiency is comparable to previous years in spite of being unable to export electricity.

