



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 2021 . SPC charts have been used for all CEMS monitoring we carry out for NOX and CO for the last 6 years. SPC charts have been used for extractive sampling we have carried out since 2008.

Points of interest for 2021 :

- Fired boiler upgrade was carried out but optimisation work is still ongoing as the NOx levels have not come down as far as hoped following on from the burner upgrade. Running time for this boiler has been minimised until the optimisation can be carried out (this has proved to be an issue with getting the right people to site to work on this due to COVID and the need to complete critical inspections and repairs on the other boilers)
- Lower steam demand due to not running W714 and W718 has caused reduction in efficiency when the steam turbine is running.
- Operational issues have meant the steam turbine has not run as much as planned during 2021. There is a team working on functioning and reliability of the steam turbine.

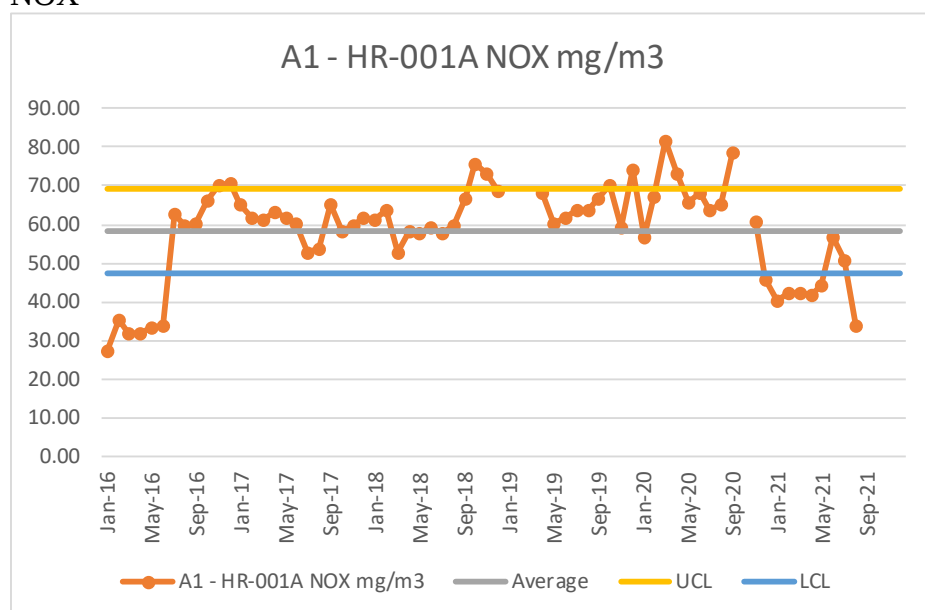
Incidents

There was one invalid days report for A1 between April and June 2021. We couldn't identify a reason for the data issues, but we believe the ongoing work to upgrade the FB may have affected the cabling causing the issue, as we also saw a number of spurious DCS alarms during this period. LAND visited not long after the issue with A1 resolved itself and found nothing wrong with the analyser at all.

A schedule 5 was submitted for running the FB in H1 with higher NOx levels due to the delay in the low NOx boiler upgrade.

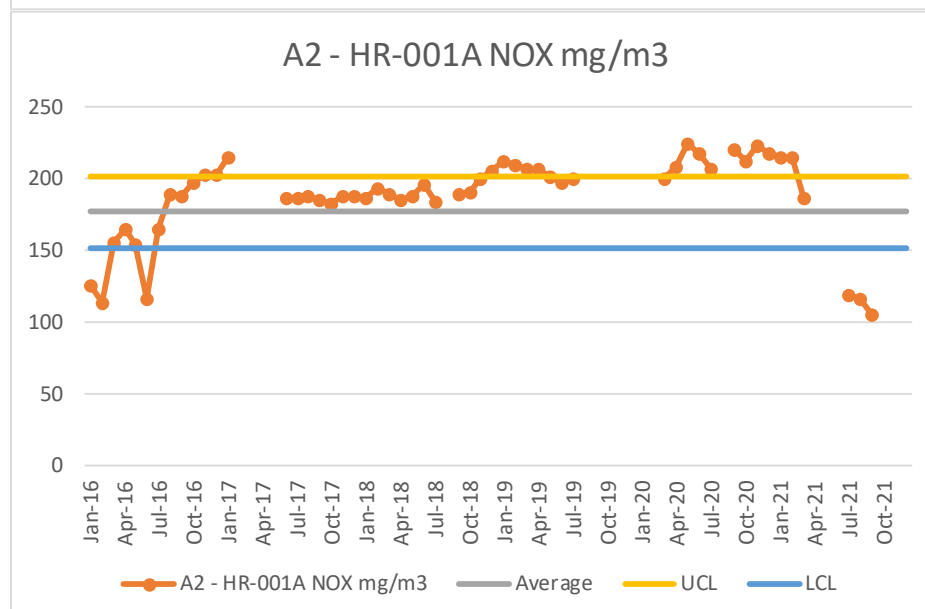
There was a steam leak in January which caused noise complaints to be received. A successful repair was carried out to remedy this leak.

Air monitoring CEMS data NOX



Permit limit:
Monthly ave 75mg/m3
Annual ave 55 mg/m3
*O2 ref 15%

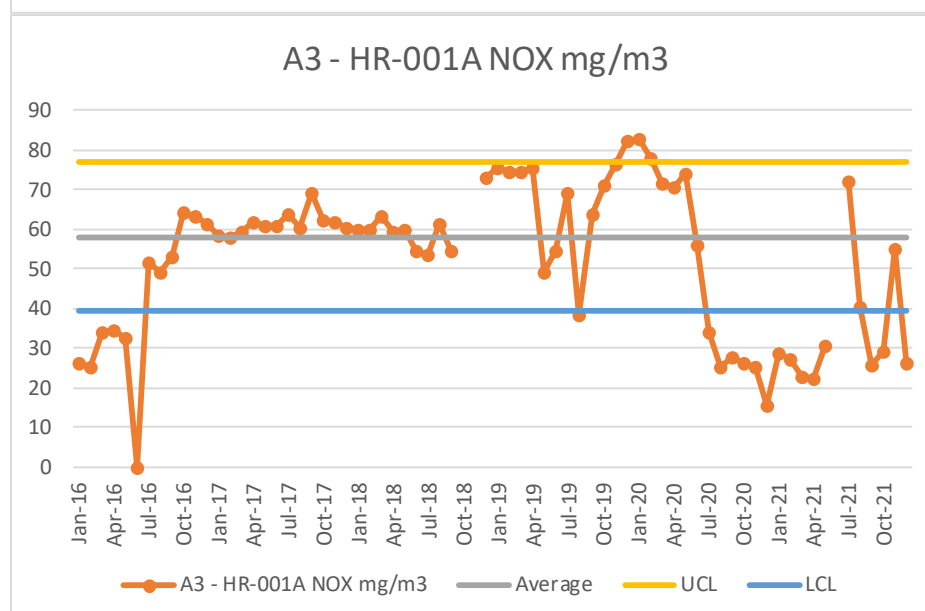
SPC limits will be updated once 2022 data has been added.



Permit limit:
Monthly ave 100 mg/m3
Annual ave 100 mg/m3

Burner was upgraded to reduce NOx during 2021. The level has reduced but still awaiting optimisation work – planned for Q1 2021.

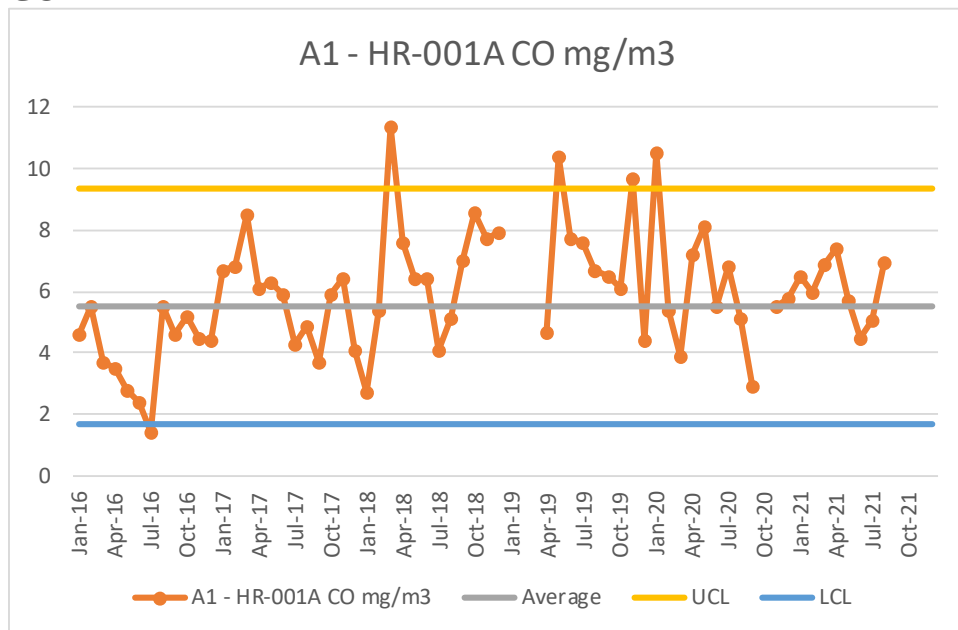
SPC limits will be updated once 2022 data has been added.



Permit limit:
Monthly ave 75mg/m3
Annual ave 55 mg/m3
*O2 ref 15%

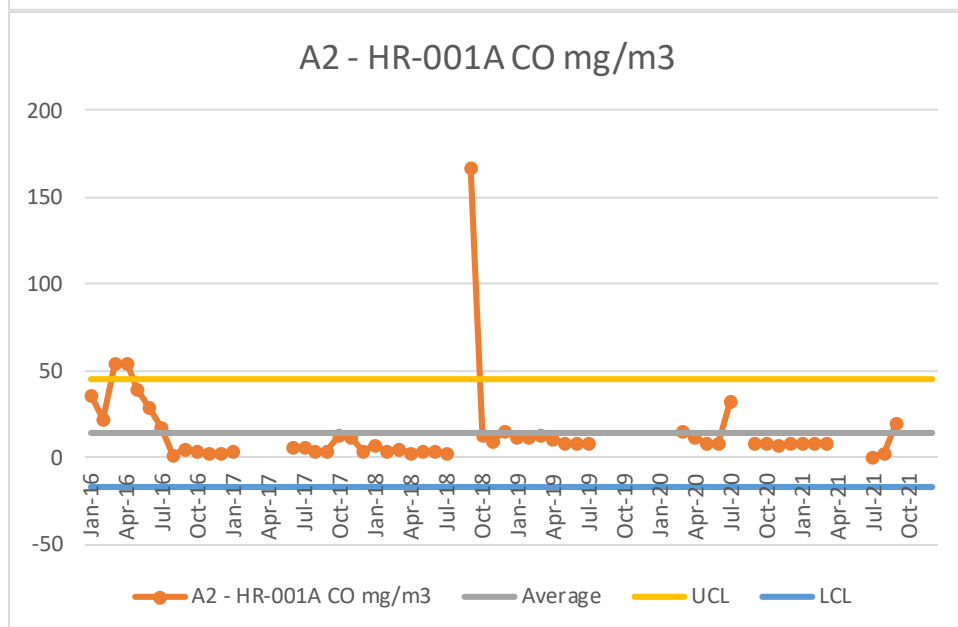
SPC limits will be updated once 2022 data has been added.

CO



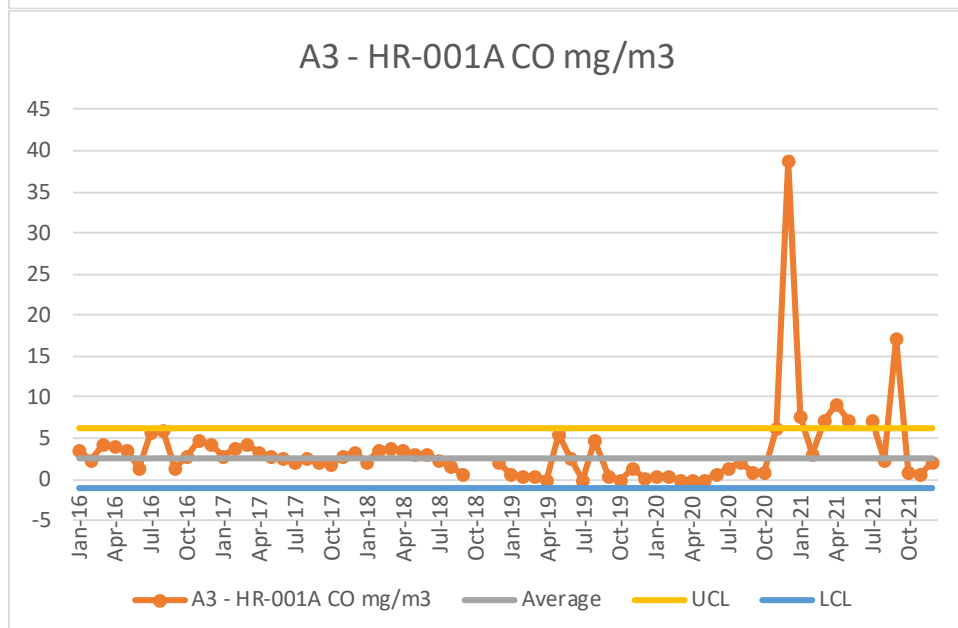
Permit limit:
 Monthly ave 80mg/m3
 Annual ave 30 mg/m3
 *O2 ref 15%

SPC limits will be updated once 2022 data has been added.



Permit limit:
 Monthly ave 100mg/m3
 Annual ave 40 mg/m3

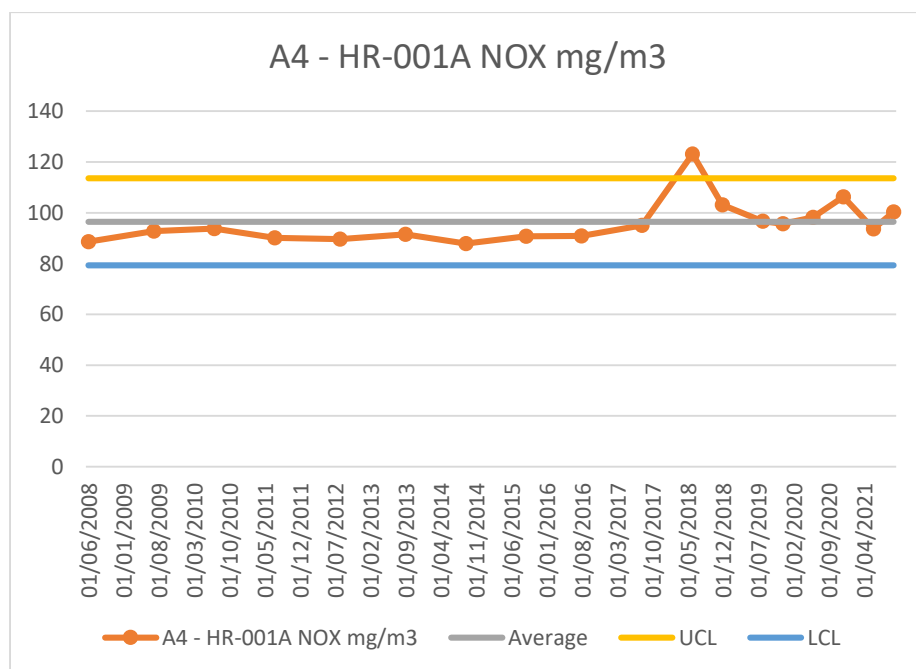
SPC limits will be updated once 2022 data has been added.



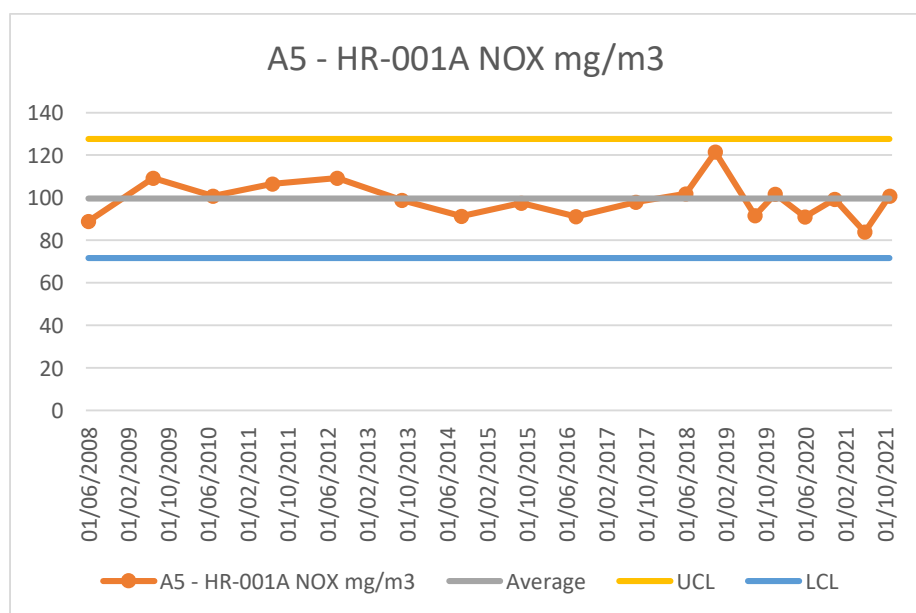
Permit limit:
 Monthly ave 80mg/m3
 Annual ave 30 mg/m3
 *O2 ref 15%

SPC limits will be updated once 2022 data has been added.

Periodic extractive sampling NOX

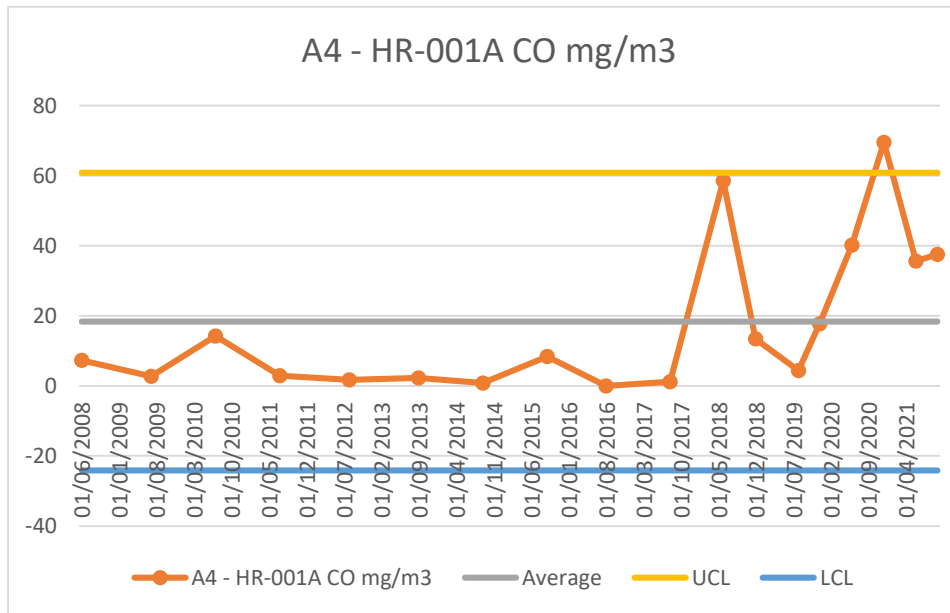


Permit limit:
6 monthly extractive
sample 110 mg/m3
*O2 ref 3%



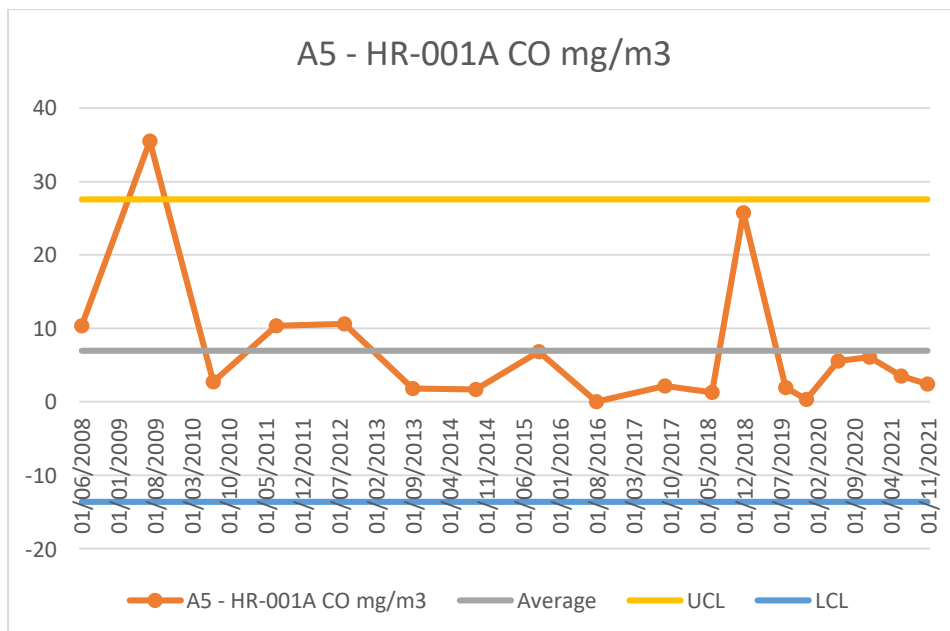
Permit limit:
6 monthly extractive
sample 110 mg/m3
*O2 ref 3%

CO



Results within permit limit, but higher than usual. Will continue to monitor.

Permit limit:
6 monthly extractive sample 100 mg/m3
*O2 ref 3%



Results within permit limit.

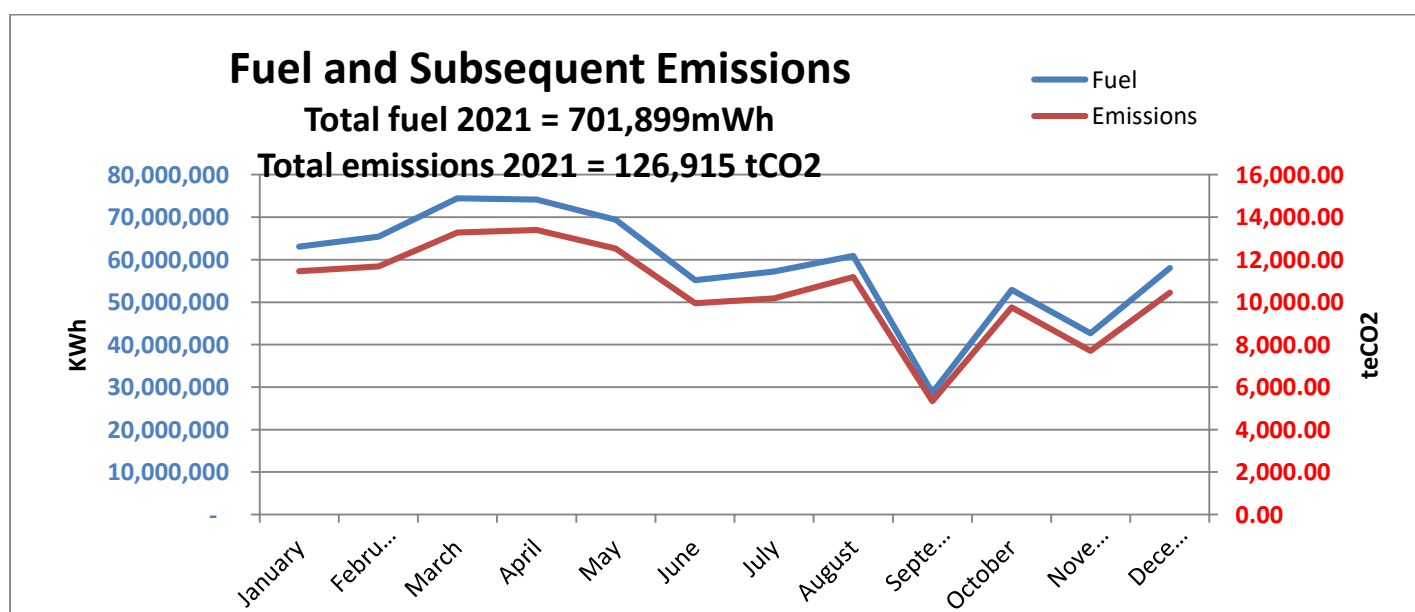
Permit limit:
6 monthly extractive sample 100 mg/m3
*O2 ref 3%

Fuel and Subsequent Emissions

Fuel and emissions were lower again during 2021 due to heat demand being lower due to not operating W714 and W718. Also there was very little electricity exported during 2021, so less gas was used to create export electricity.

Average fuel consumption for the year was 58,492 MWh per month compared to 68,613 MWh per month for 2020.

Average CO2 emissions for the year were 10,576 tCO2 per month compared to 12,312 tCO2 per month for 2020



Running Hours

Year:	2021	A1 (hours)	A2 (hours)	A3 (hours)	A4 (hours)	A5 (hours)
Annual Operating Hours		3920.258	1137	5408.685	1689.5	1693.5

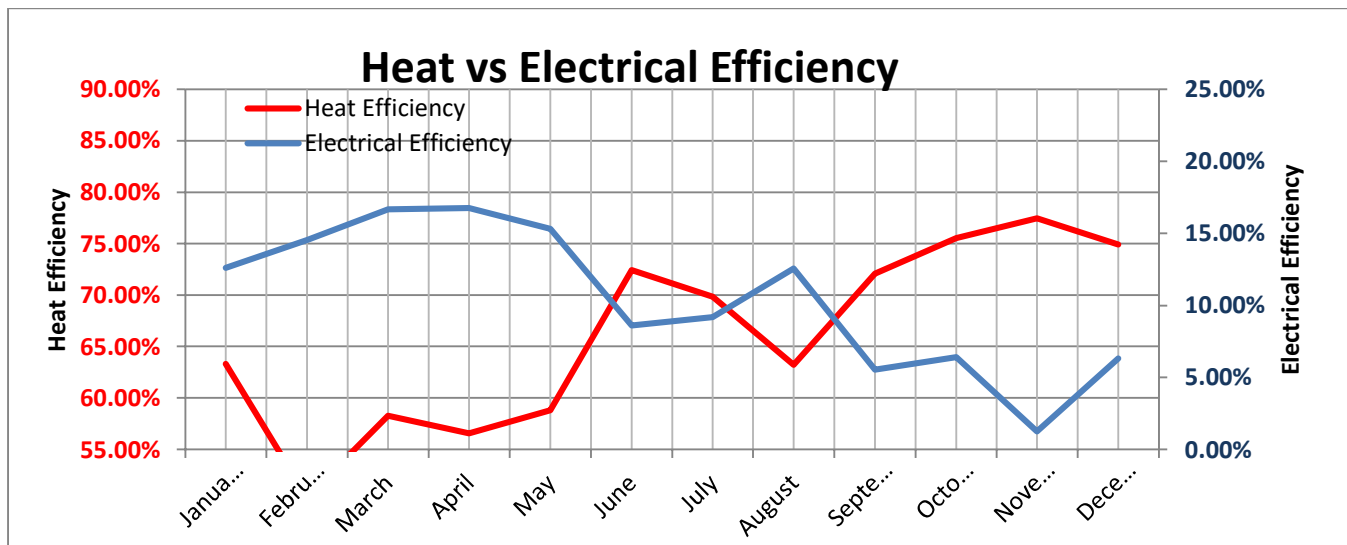
The annualised hours reflect a general running philosophy that the gas turbines and heat recovery units are used as base generating units for both electricity and steam, with the fired boiler/MP boilers taking up the rest of the plant demand.

During 2021 HRSG / GT A was out of operation for the last 4 months of the year for inspection and repairs. The Fired Boiler (A2) was run as little as possible to take up the slack where steam was needed, due to the delays in the low NOx burner upgrade.

The MP boilers are kept ready to go, should they be needed, so the hours here have been calculated based on hours that each MP boiler is running above 20%. These ran more during 2021 than in 2020 due to not having GTA available and trying to minimise the use of the FB.

Heat vs Electrical Efficiency

The heat efficiency was higher during periods of the year where the GT's were not running. The electrical efficiency was higher during periods of the year where the GT's were running.



CHP efficiency

CHP efficiency was variable during the year. This efficiency is calculated as a sum of the electrical efficiency and the heat efficiency. The efficiency measured in this way shows as higher at periods when there is higher heat efficiency.

Since not running W714 and W718, the demand for steam has been lower and at times we have struggled to run the steam turbine. This has affected our electrical efficiency during 2021.

We also had HRSG / GTA out of operation for the last 4 months of the year for inspection and repairs.

