



Permit Number:- EPR/BP3532HX

End of Year Report 2019

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1 – Introduction

1.1 – General Introduction

This document represents Kennametal Manufacturing UK Ltd's performance report for the calendar year 2019 and has been compiled in line with the conditions set out in section 4.2.1 of the site's environmental Permit EPR/BP3532HX.

2 – Environmental Setting

2.1 – Site Location

The installation is located at Lake Road, Leeway Industrial Estate, Newport, Gwent. The centre of the site is at National Grid reference ST 343 860. The site covers an area of approximately 1 Ha.

Kennametal Manufacturing UK Ltd. is located on Leeway industrial Estate which is an industrialised area south of Newport City Centre. The site comprises of two buildings (east building and west building) separated by Lake Road. Immediately to the north is a used car dealership, Spartan (motor factors) and a Volvo garage. To the east of the site boundary are Yummies Fast Food Supplies and Deflecto (plastic fabricators). To the west of the site is TDG Temperature controlled services. Immediately to the south of the site are White Bros and Speed Ltd (construction), Fox (storage facility), and MCL Logistics (haulage). It is considered that none of these operations have the potential to cause pollution to the Kennametal Manufacturing UK Ltd site.

2.2 – Details of Installation

Kennametal Manufacturing UK Ltd. are producers of boron nitride and titanium diboride ceramic materials, these activities are included in the EPR (England & Wales) 2010 regulations. Both of these materials are produced by high temperature carbothermic reduction processes.

The other activities on site are non listed activities these are pre-treatments of the raw materials in the powder production area. Size reduction and classification of ceramic powders to produce final products for customers, the boron nitride powder is also treated in order to form specialist grades. Manufacture of water based ceramic coatings, hot pressed ceramic billets and machining of shapes are also non listed activities carried out on site.

A site report has been submitted as part of the application to operate under the Pollution prevention and Control Regulations 2000. The report concluded that there was little likelihood of land pollution from the installation.

The nearest surface water course to the factory is 'Julian's' reen which lies approximately 1km to the east of the site. The nearest major watercourse is the river 'Usk' estuary, which lies approximately 3km to the south-west of the site at its nearest point.

The site lies on an indicative flood plane, however there have been no recorded instances of flooding at the site.

3.1 - Monitoring Data

Emissions monitoring via a third party contractor is conducted at the designated release points on a quarterly basis. The results for 2019 are tabled below.

Where the analysis of trends is concerned, it is worth noting that short term trends are not normally considered a reliable indication of performance as anomalous high measurements along with peaks and troughs within the process will often present a trend which is not necessarily a true representation. Long term trends are considered more reliable and meaningful as these anomalies and variations within the process are less likely to have such a significant effect on the overall trend.

Table 3.1 Emissions Monitoring Results for 2019

			2019					
			Q1	Q2	Q3	Q4		
Emission Point Reference	Substance to be Monitored	Emission Limit Value (mg/m3)	Periodic Monitoring Result (mg/m3)	Periodic Monitoring Result (mg/m3)	Periodic Monitoring Result (mg/m3)	Periodic Monitoring Result (mg/m3)	Average Result (mg/m3)	Total (mg/m3)
A1 BN Firing Stack	Particulates	25	17.3	0.53	31.4	4.2	13.36	53.43
	Ammonia	30	2.38	277.8	24.4	5.3	77.47	309.88
	Carbon Monoxide	200	99	164.2	160	161	146.05	584.20
	NOx	100	11.9	19.8	40.8	31	25.88	103.50
	Sulphur Dioxide	20	5.7	0.8	2.3	5.2	3.50	14.00
	Total Cyanide	**	0.02	0.16	74.2	1.6	19.00	75.98
A3 BN Jet Mill	Particulates	5	16.1	16.8	2.7	2.54	9.54	38.14
A6 No2 Oven	Particulates	25	69.8	253	56.78	251	157.65	630.58
A7 TiB2 Mill	Particulates	5	1.6	2.74	0.58	4.6	2.38	9.52
A8 TiB2 Firing Stack	Particulates	25	4	0.62	1.3	4.4	2.58	10.32
	Ammonia	30	0.38	0.11	0.7	10	2.80	11.19
	Carbon Monoxide	100	97.3	55.8	84.3	43	70.10	280.40
	NOx	100	2.7	0.5	1.9	0.58	1.42	5.68
	Sulphur Dioxide	20	4.4	2.2	3.9	0.84	2.84	11.34
	Total Cyanide	**	0.02	0.02	0.02	0.01	0.02	0.07

** Currently no limit agreed

ELV Exceeded

Emission Point A1 – BN Furnaces Exhaust Stack

The measured values of all of the monitored parameters at this emission point were lower than the respective emission limit values (ELVs) throughout 2019, except for particulates in Q3 and ammonia in Q2.

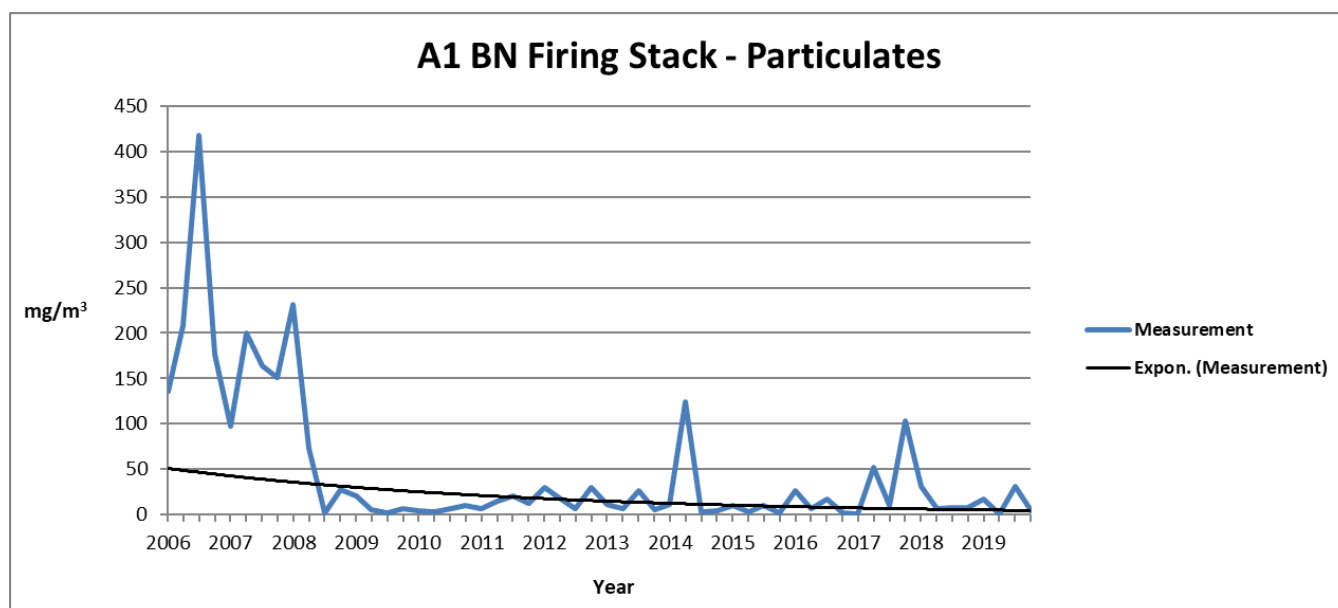
The particulate exceedance was most likely due to one or more damaged filter socks. A rigorous maintenance regime is already in place but unfortunately, due to the number of filter socks involved (384), it is impossible to ensure that all socks are in good condition all of the time. The other three measurements taken during the year were significantly below the ELV.

The ammonia exceedance, which was anomalously high, was due to a blockage in one of the afterburner lances at the start of a firing. A preventative maintenance program has been implemented to prevent this from happening again.

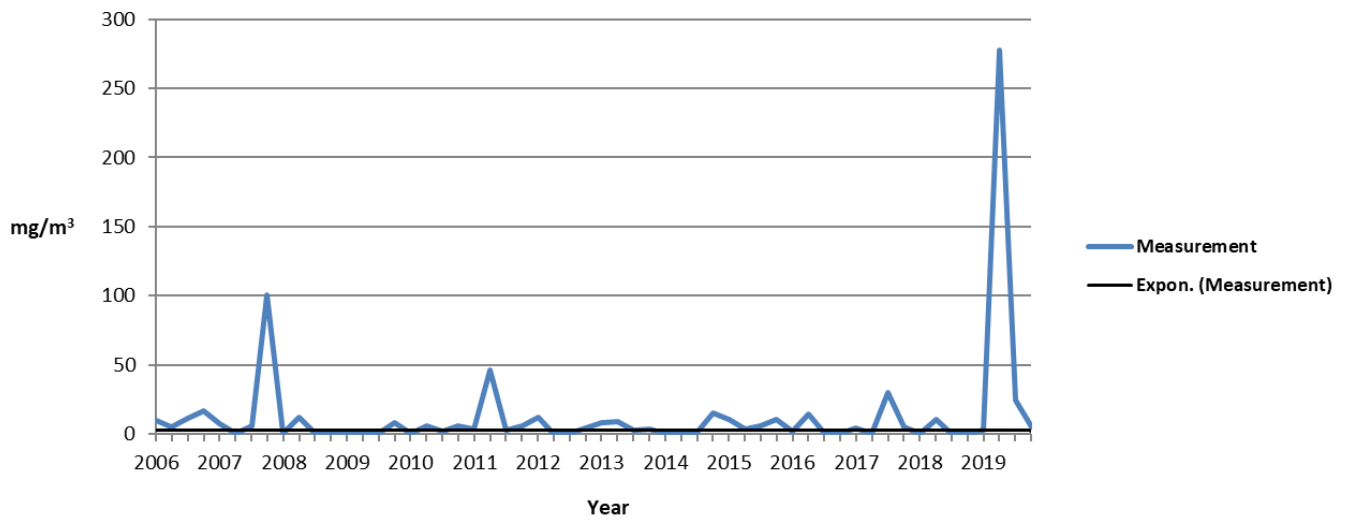
There remains a long term negative trend for particulates, ammonia and sulphur dioxide (figure 3.1). There is a long term positive trend for oxides of nitrogen, carbon monoxide and cyanide (figure 3.1). The positive trend for carbon monoxide is largely due to the anomalously high reading in Q2 2018 and the positive trend for total cyanide is largely due to an anomalously high reading in Q3 2019.

The general decrease in particulate concentration is due to a combination of using better abatement equipment and improvements in the maintenance of this equipment. The mix of negative and positive trends for concentrations of gas emissions is likely to be due to the increase in throughput and/or changes to firing temperatures that have occurred over the years, as the firing process has evolved. The complex nature of the chemical reactions occurring within the firing vessels makes it difficult to know exactly why different trends are being observed for the different gases. The before mentioned process changes are likely to have varied effects on gas concentrations.

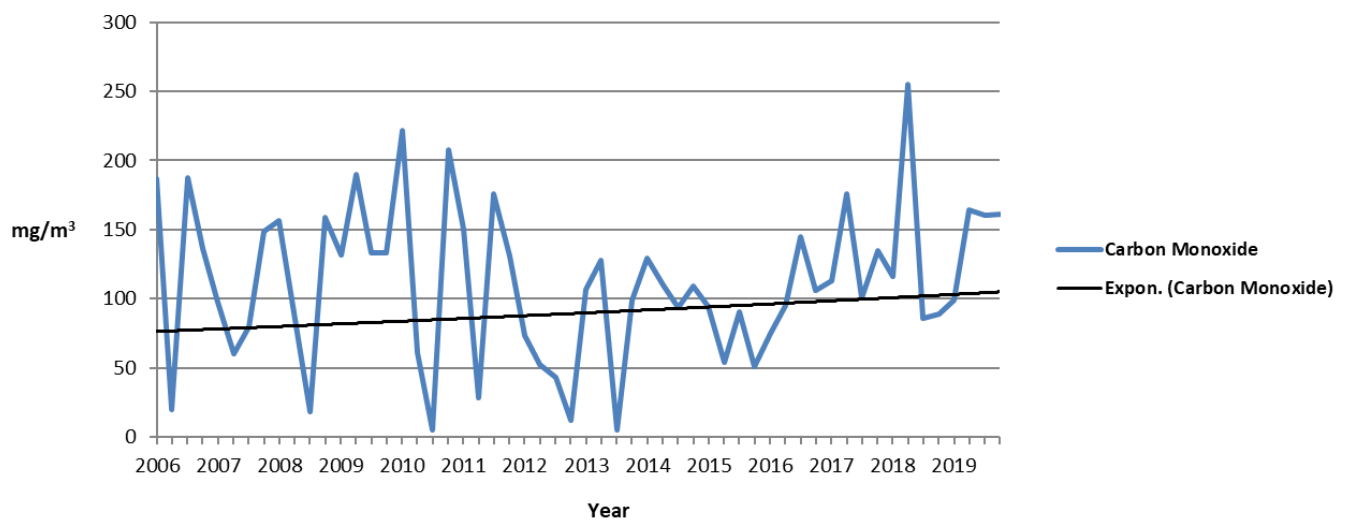
Figure 3.1



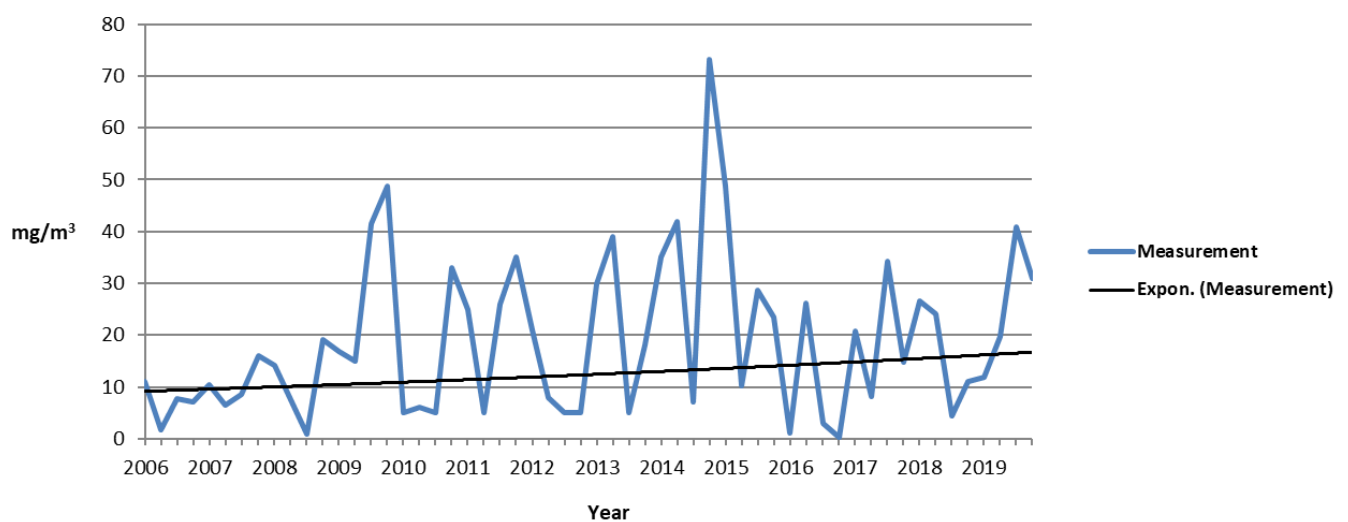
A1 BN Firing Stack - Ammonia

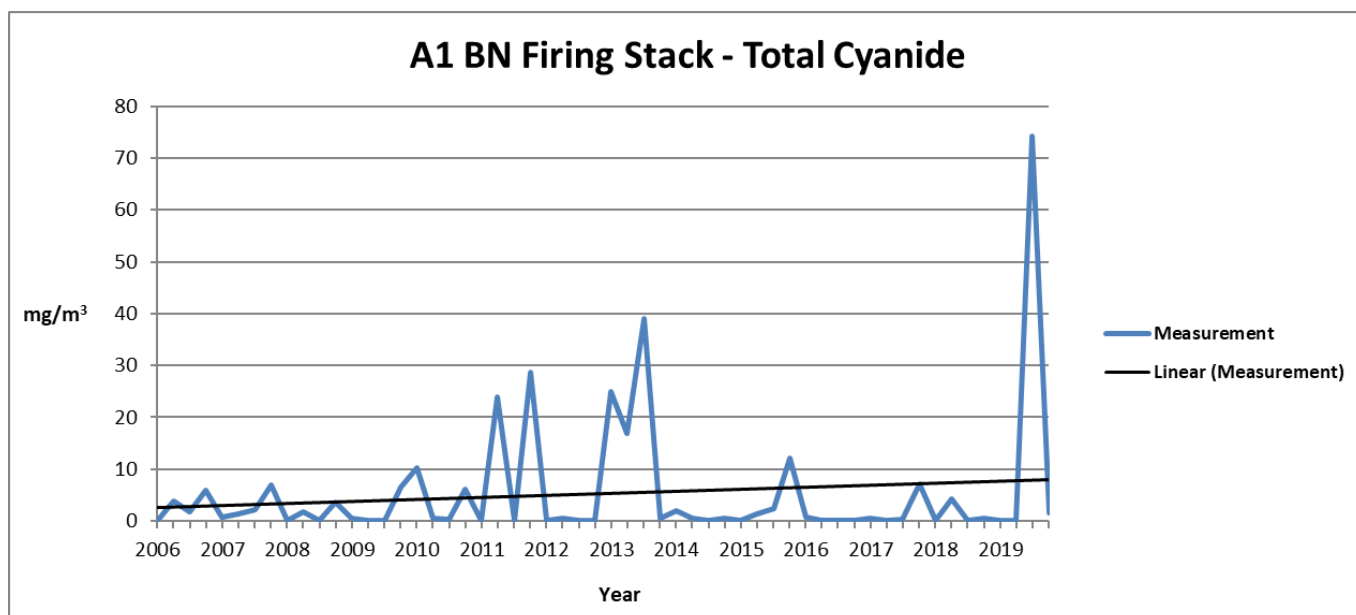
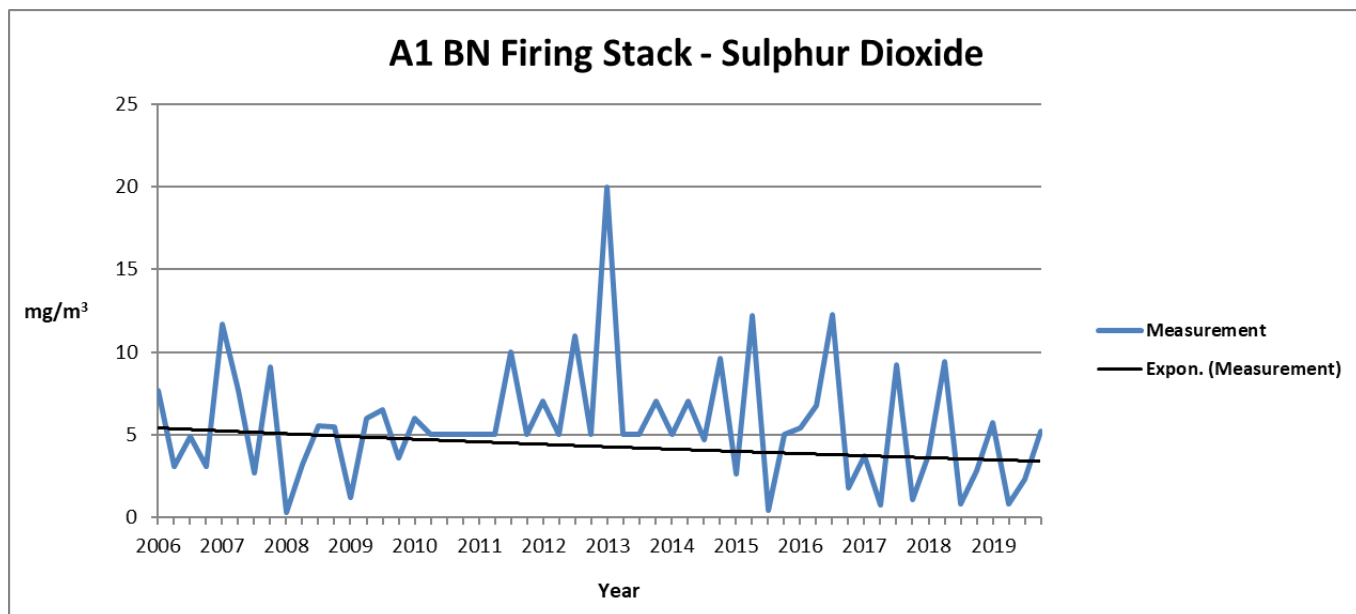


A1 BN Firing Stack - Carbon Monoxide



A1 BN Firing Stack - Oxides of Nitrogen





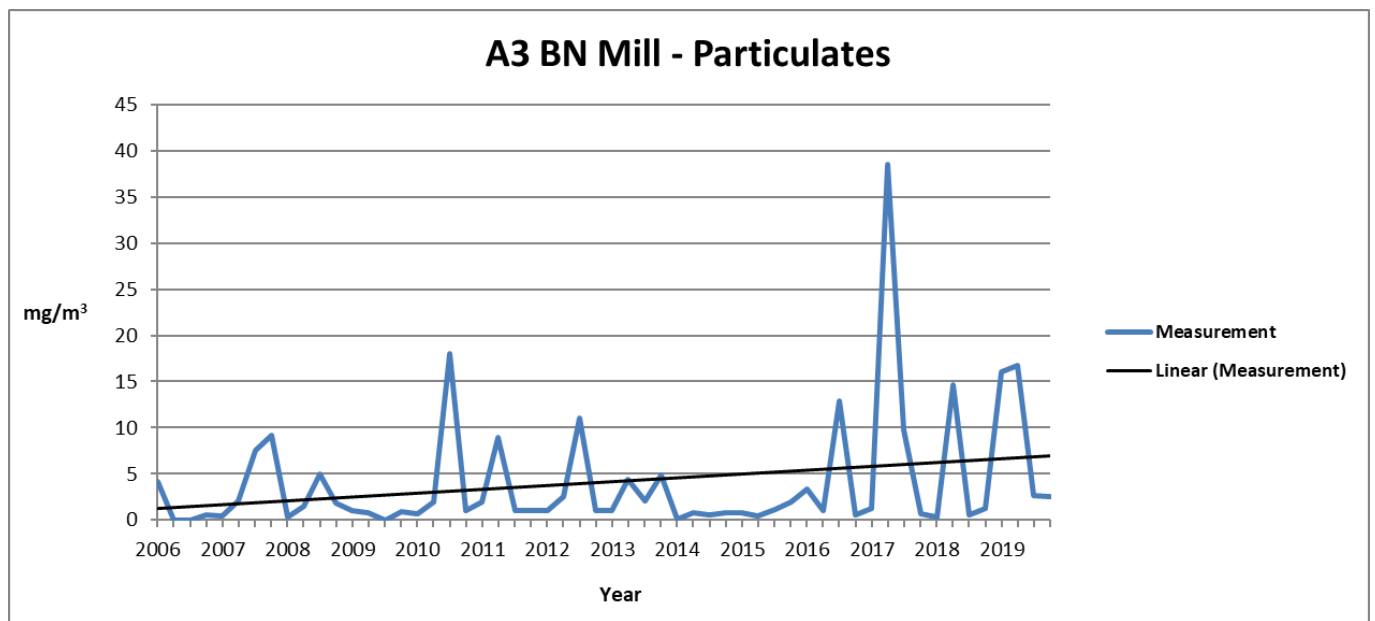
Emission Point A2

This emission point has not been in use since the third quarter of 2011.

Emission Point A3 – BN Jet Mill

The measured particulate concentrations at this emission point complied with the extremely low ELV for Q3 and Q4 but not Q1 and Q2. The cause of the breaches was found to be a damaged HEPA filter on both occasions. This damage occurred between the weekly maintenance inspections (previously monthly). The condition of the main filters and the torque setting of the filter cages are now also checked to prevent particulate bypassing the main filters and blinding the HEPA filter. There is a long term positive trend for this emission point (figure 3.2) due to occasional high results, but Q3 and Q4 results were comfortably below the limit.

Figure 3.2



Emission Point A6 – BN Drying Ovens

The particulate emissions limit for A6 (BN drying ovens) is still being breached but we are continuously working on resolving this.

The monitoring for each quarter in 2019 was either a full cycle (11 hours) of monitoring or monitoring undertaken at the known peak time in the process. Therefore, all reported measurements were high. This could give the false impression (figure 3.3) that the emissions have worsened, where in reality, these high measurements have almost certainly always occurred. The timing of past monitoring has meant that peak emissions haven't always been captured.

Although we are continuously looking to reduce the emissions, attempts to resolve this have thus far been unsuccessful.

Earlier in the year, after discussing this matter with NRW, we contacted several companies regarding the suitability of continuous emissions monitoring equipment (CEM). With a view to obtain more data and to allow us to see the effects of changes to the abatement/process in real-time. However, unfortunately, it has been ascertained that CEM equipment is not suitable for emissions of the nature emitted from the drying ovens. The amount of deposition and moisture associated with the emissions would interfere with the equipment, giving inaccurate measurements.

In light of this, it was agreed with NRW that two complete sets of monitoring data would be collected for the drying process, via the usual, filter capture method adopted by our MCERTs contractor.

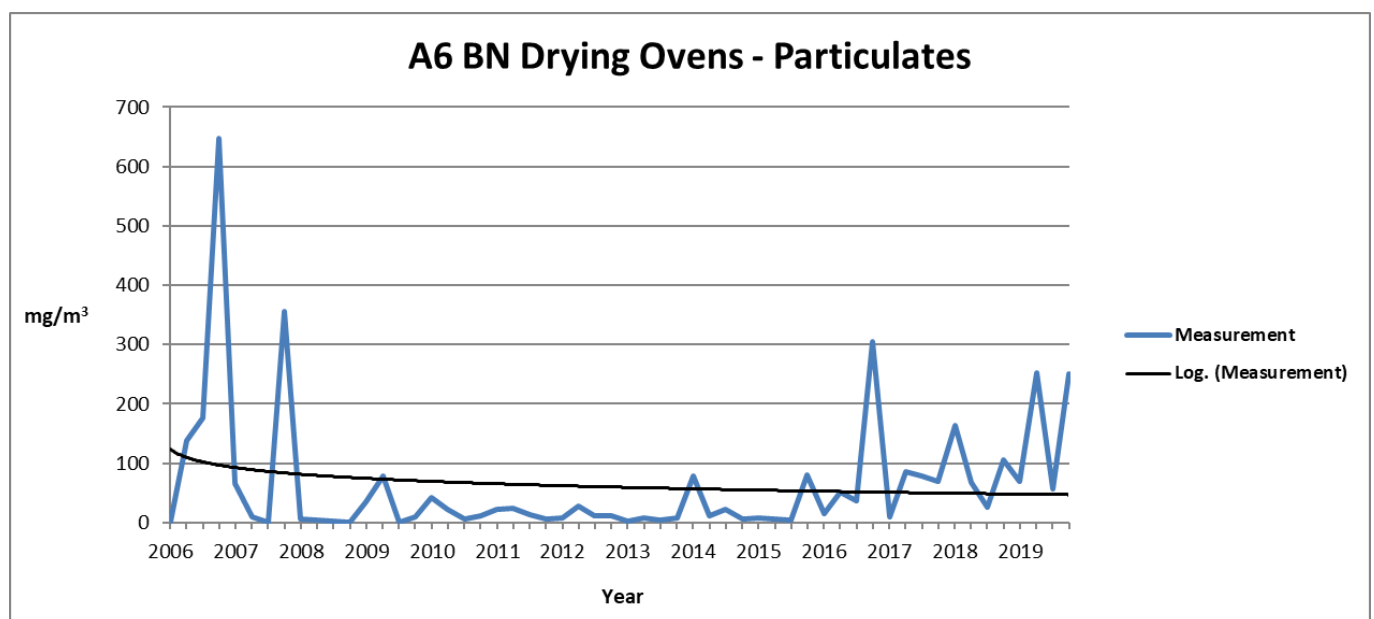
This was done to allow NRW to determine whether our emission limits could be increased and/or daily average limits introduced.

Unfortunately, the results came back higher than expected. Four complete oven cycles were monitored. The results for the first two cycles were exceptionally high and it was subsequently determined that this was due to the dilution air intake valve being closed. The results for the third and fourth full cycle were significantly lower but still higher than expected and higher than what has been measured in the past.

We then contacted an environmental engineering company, who were recommended to us by our corporate EHS team. This company made a proposal for a solution, which largely involved designing a more efficient venturi for the existing wet scrubber. They are, however, unwilling to provide any kind of performance guarantee. It would require a significant investment (20k-30k) with no guarantee of solving the issue. Therefore, we are exploring alternative solutions.

We are currently exploring options for filtration to filter out the remaining particulate. With a view to wash the filter whilst in situ to prevent it blinding and blocking the airflow. We are looking to add this downstream of the existing abatement in February and to hopefully determine its effectiveness and suitability by the end of Q1 2020.

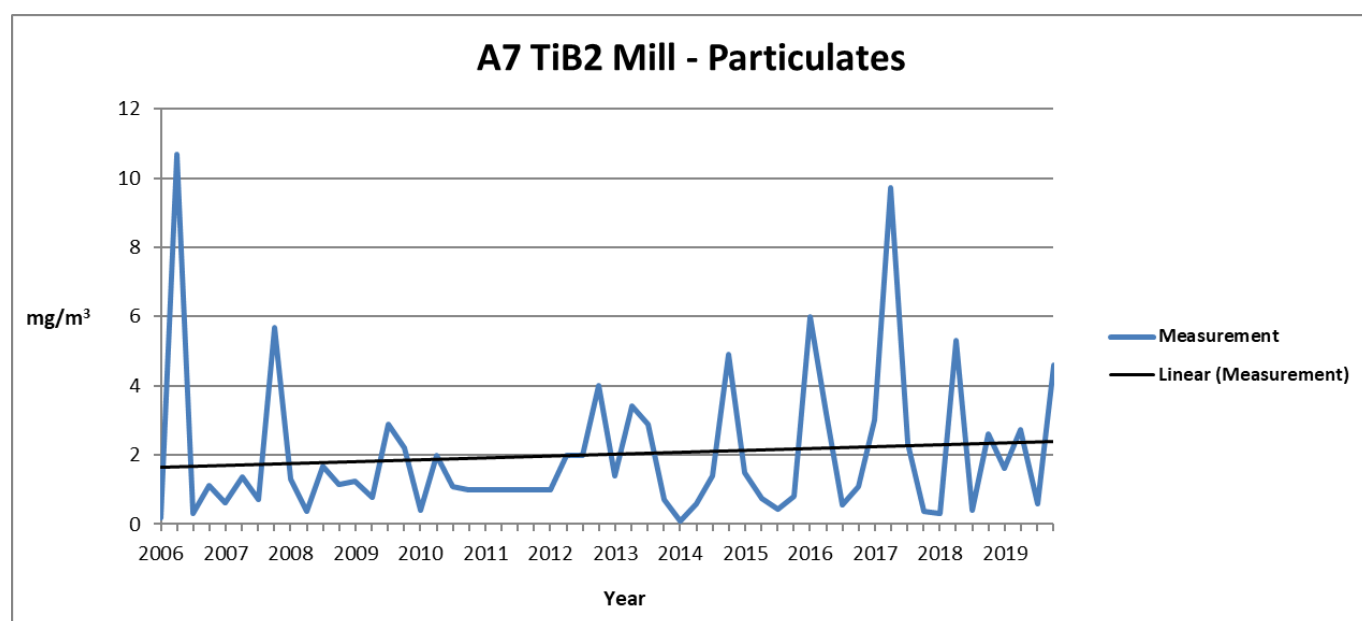
Figure 3.3



Emission Point A7 – Tib₂ Jet Mill

The measured particulate concentrations at this emission point complied with the extremely low ELV during all monitoring periods in 2019. There is a slightly positive long term trend, however, the results in 2019 have produced a negative short term trend (figure 3.4).

Figure 3.4



Emission Point A8

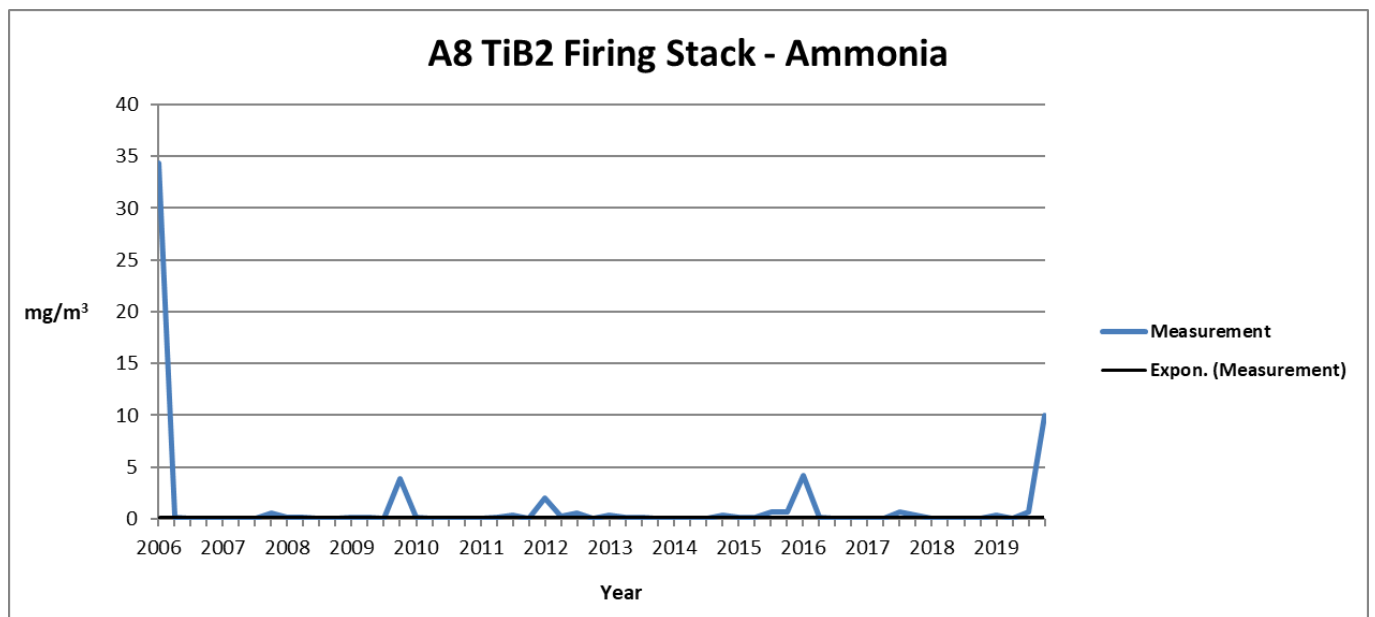
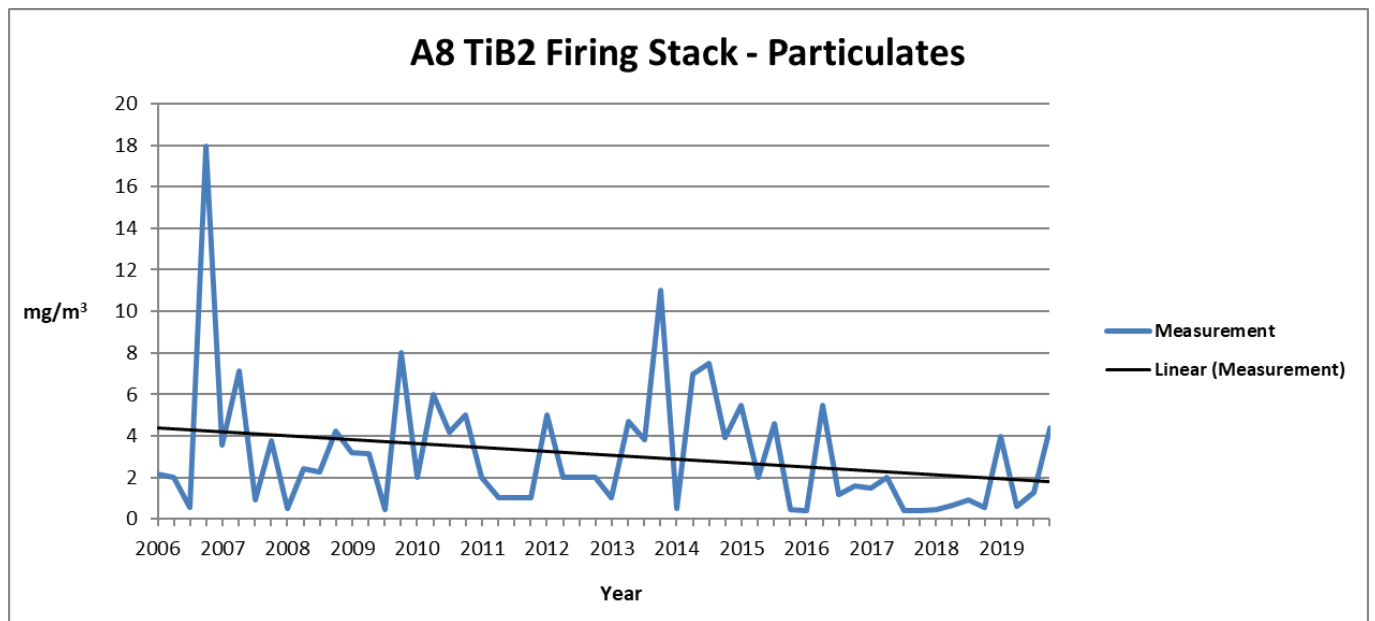
The measured values of particulates and all gases at this emission point were lower than the respective ELV during 2019.

The long term trend for particulates continues to be a negative, which is most likely due to improvements in the maintenance regime over the years. The results were low throughout 2019.

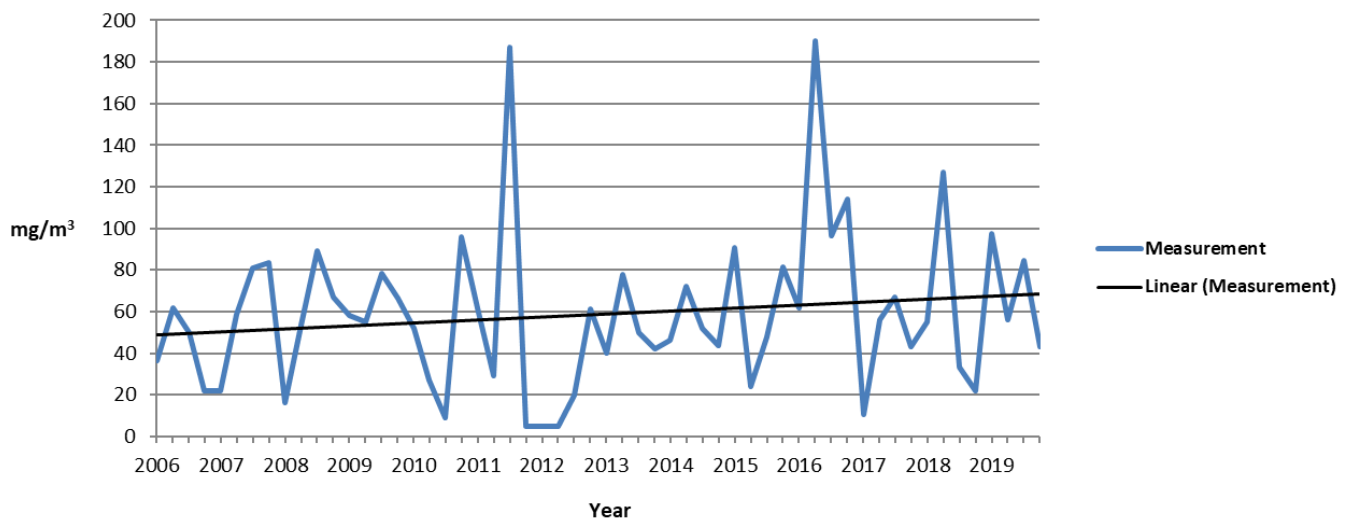
Carbon monoxide has a positive long term trend but since 2016 a negative trend is evident.

The other gases emitted from A8 are consistently low with no real long term trends.

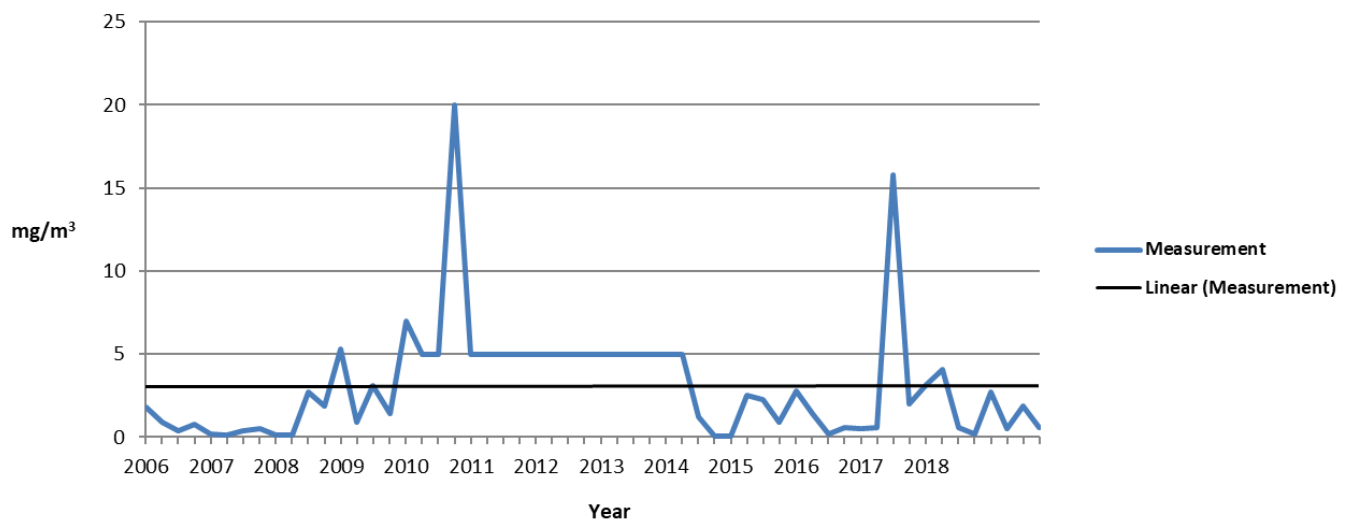
Figure 3.5



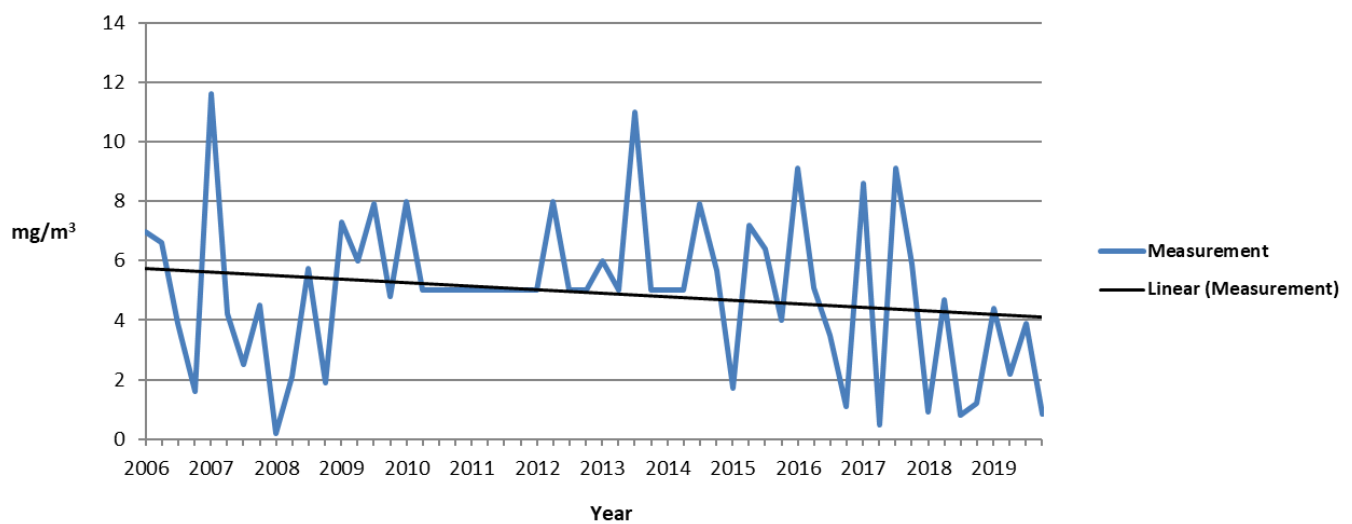
A8 TiB2 Firing Stack - Carbon Monoxide

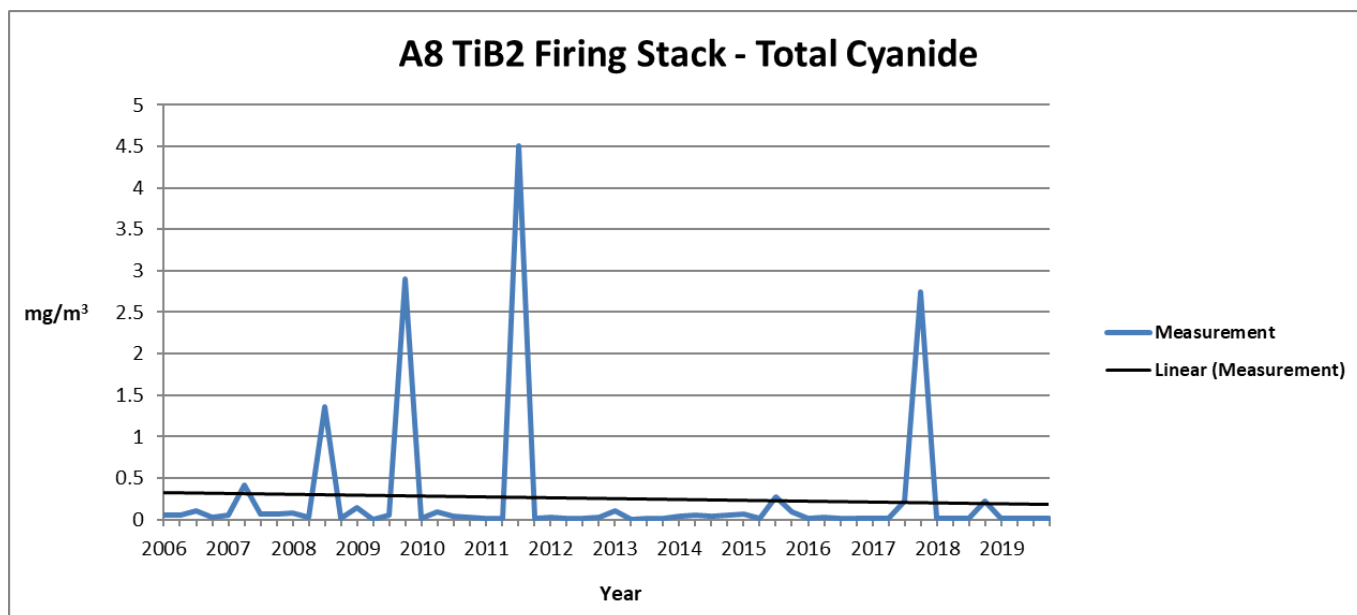


A8 TiB2 Firing Stack - Oxides of Nitrogen



A8 TiB2 Firing Stack - Sulphur Dioxide





3.2 – Improvement Performance

3.2.1 Improvements in 2019

Increased energy efficiency

During FY19 (Jul-Jun), the total energy usage was 11.68% less than in FY18. This is due to the production of 4.1% less product as well as an improvement in energy efficiency. Overall energy efficiency was 7.88% better than in FY18. Energy efficiency is improving year on year.

For the first 6 months of FY20, the total energy usage was 5.32% less than the same period in FY19. This is with a 5.62% increase in production, which translates as a 10.65% improvement in energy efficiency.

The improvements in energy efficiency are largely due to the pre-compaction of raw materials for around 35% of BN firings, installation of a more efficient VIP (electrical induction control) unit on furnace 5 and the completion of an air leak survey.

The final product continues to have 31% reclaim material included. Material that would otherwise, require energy for production.

Reduction in waste

During FY19 (Jul-Jun) there was a 5.7% decrease in waste produced compared to FY18. This was largely due to a reduction in metal waste which fluctuates from year to year depending on required maintenance and improvement projects etc. There were similar quantities of most other waste streams compared with FY18 and the amount of waste produced per ton of product was similar.

For the first six months of FY20, there was a 5.69% decrease in waste produced in compared to the same period in FY19. There was also 10% less waste produced per ton of product compared to the same period in FY19.

Recycling of customer waste

Used evaporator boats continue to be retrieved from the customer and sent to china for re-cycling. This is approximately 30 ton per year that would otherwise have been disposed of as landfill waste.

3.2.2 Targets and objectives for remainder of financial year (July-June)

- Maintain the performance levels achieved so far this year with regards to the aforementioned improvements.
- Find a solution to the issue with particulate emissions from A6 – drying ovens.
- Further improve energy efficiency for our BN powder firing process by using compacted raw materials to increase the charge size for the remaining 65% of firings (already in place for other 35%).
- Install a more efficient VIP unit on furnace 6 to improve energy efficiency on that furnace by ~10%.