Permit Number:- EPR/BP3532HX

End of Year Report 2020

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1 – Introduction

1.1 – General Introduction

This document represents Kennametal Manufacturing UK Ltd's performance report for the calendar year 2020 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 plain, 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 2020 are tabled below. There was no monitoring undertaken in Q1 or Q2 due to restrictions that were in place for the covid-19 pandemic.

Table 3.1 Emissions Monitoring Results for 2020

			2020					
			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	No Testing Covid 19	No Testing Covid 19	2.7	73	37.85	75.70
	Ammonia	30			9.3	2.2	5.75	11.50
	Carbon Monoxide	200			176	97	136.5	273
	NOx	100			19	5.1	12.05	24.10
	Sulphur Dioxide	20			6.8	3.6	5.20	10.4
	Total Cyanide	**			0.88	0.48	0.68	1.36
A3 BN Jet Mill	Particulates	5			0.84	1.5	1.17	2.34
A6 No2 Oven	Particulates	25			22.1	160.4	91.25	182.50
A7 TiB2 Mill	Particulates	5			1.7	0.34	1.02	2.04
A8 TiB2 Firing Stack	Particulates	25			0.52	3.1	1.81	3.62
	Ammonia	30			0.13	0.51	0.32	0.64
	Carbon Monoxide	100			20.5	59	39.75	79.50
	NOx	100			0.71	1.3	1.01	2.01
	Sulphur Dioxide	20			3.5	6.5	5.0	10.0
	Total Cyanide	**			0.03	0.05	0.04	0.08

** Currently no limit agreed

ELV Exceeded

Emission Point A1 – BN Furnaces Exhaust Stack

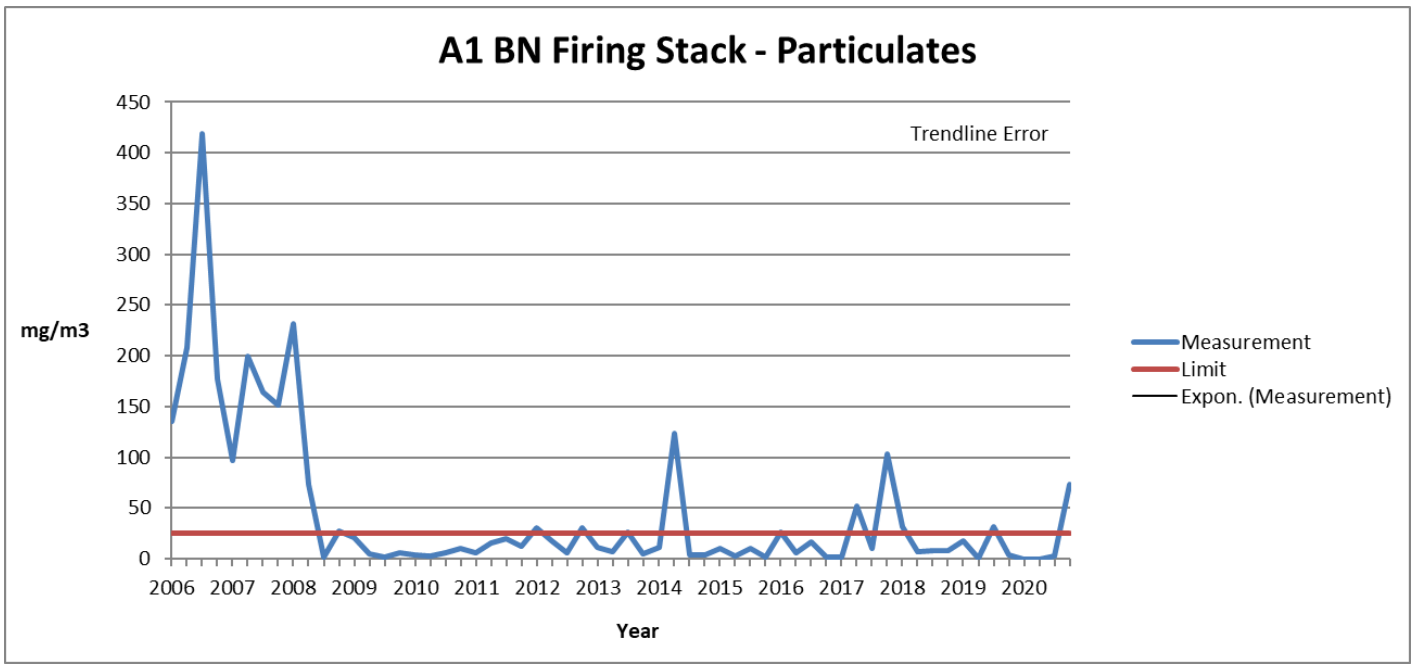
The monitoring for Q1 & Q2 were not compiled due to the Covid 19 crisis. The measured values of all of the monitored parameters at this emission point were lower than the respective emission limit values (ELVs) in Q3 2020, however for particulates in Q4 there was an exceedance.

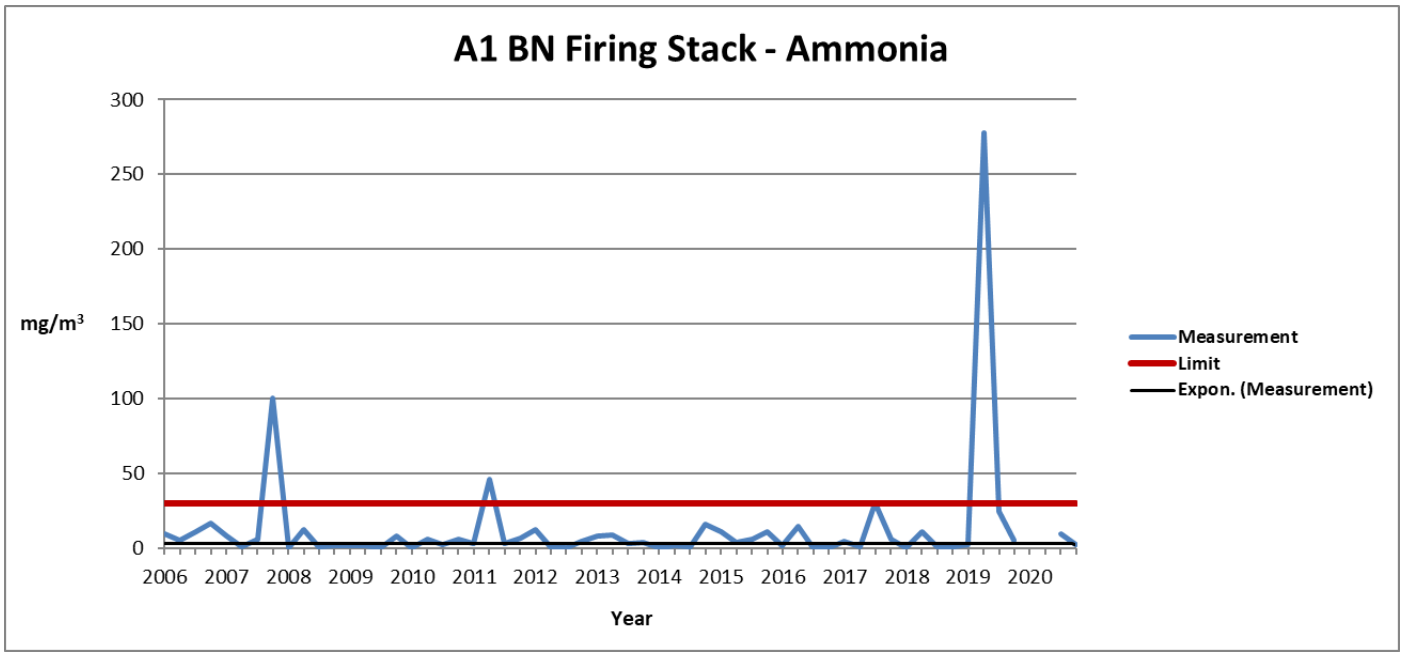
The particulate exceedance was most likely due to one or more damaged filter socks. A rigorous maintenance regime is already in place but unfortunately, due to the number of filter socks involved (384), it is impossible to ensure that all socks are in good condition all of the time. The other measurement taken during the year was significantly below the ELV. The frequency of checking/cleaning has been increased during FY21, this should hopefully reduce the particulate values in the short term. Also, we will carry out a root cause analysis to determine why the powder is building up in the stack so much.

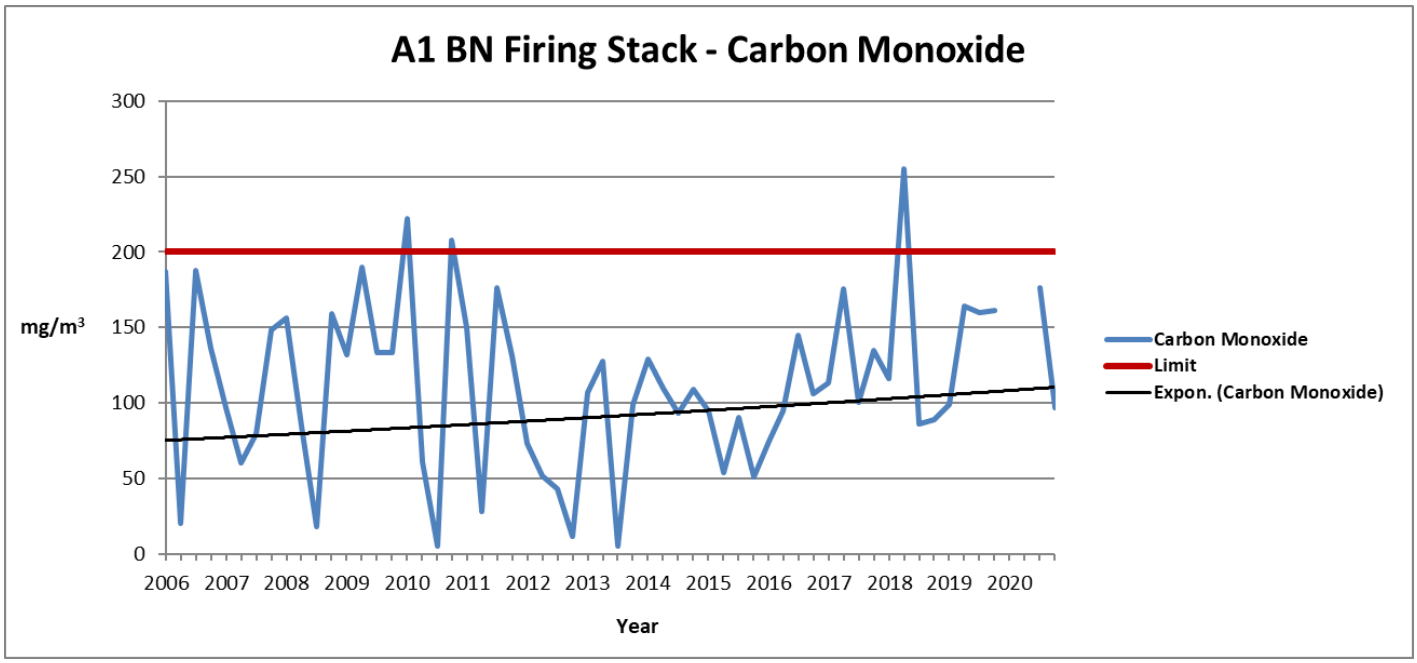
There remains a long term negative trend for particulates, ammonia and sulphur dioxide (figure 3.1). There is a long term positive trend for oxides of nitrogen, carbon monoxide and cyanide (figure 3.1). The positive trend for carbon monoxide is largely due to the anomalously high reading in Q2 2018 and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

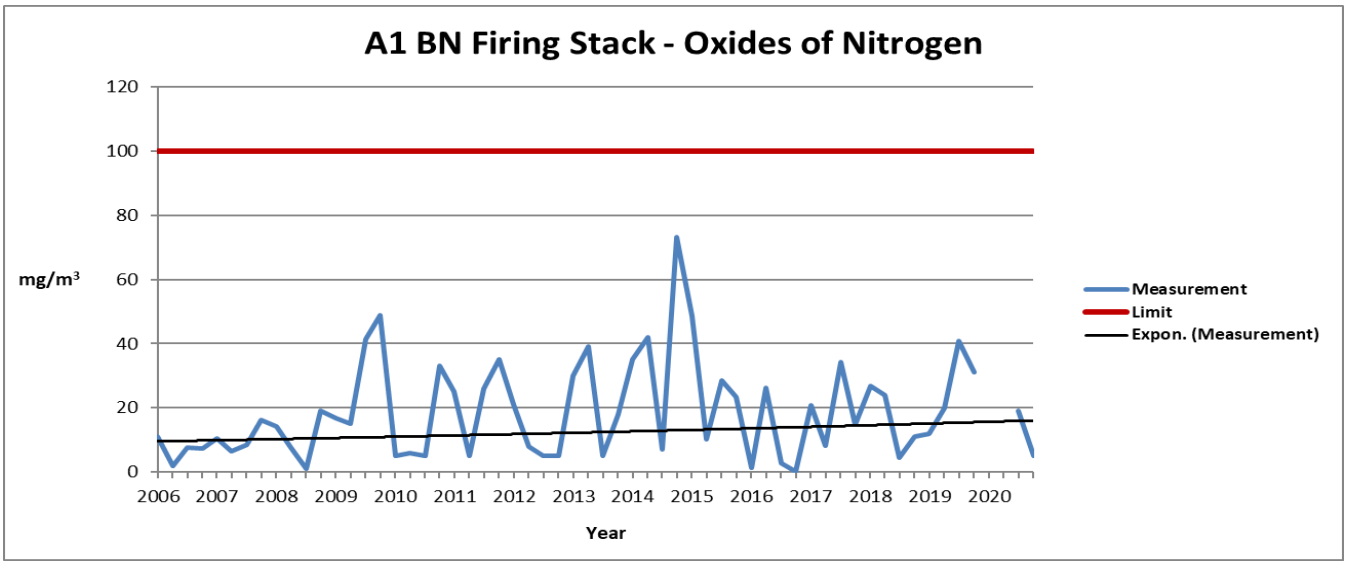
The general decrease in particulate concentration is due to a combination of using better abatement equipment and improvements in the maintenance of this equipment. The mix of negative and positive trends for concentrations of gas emissions is likely to be due to the increase in throughput and/or changes 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.

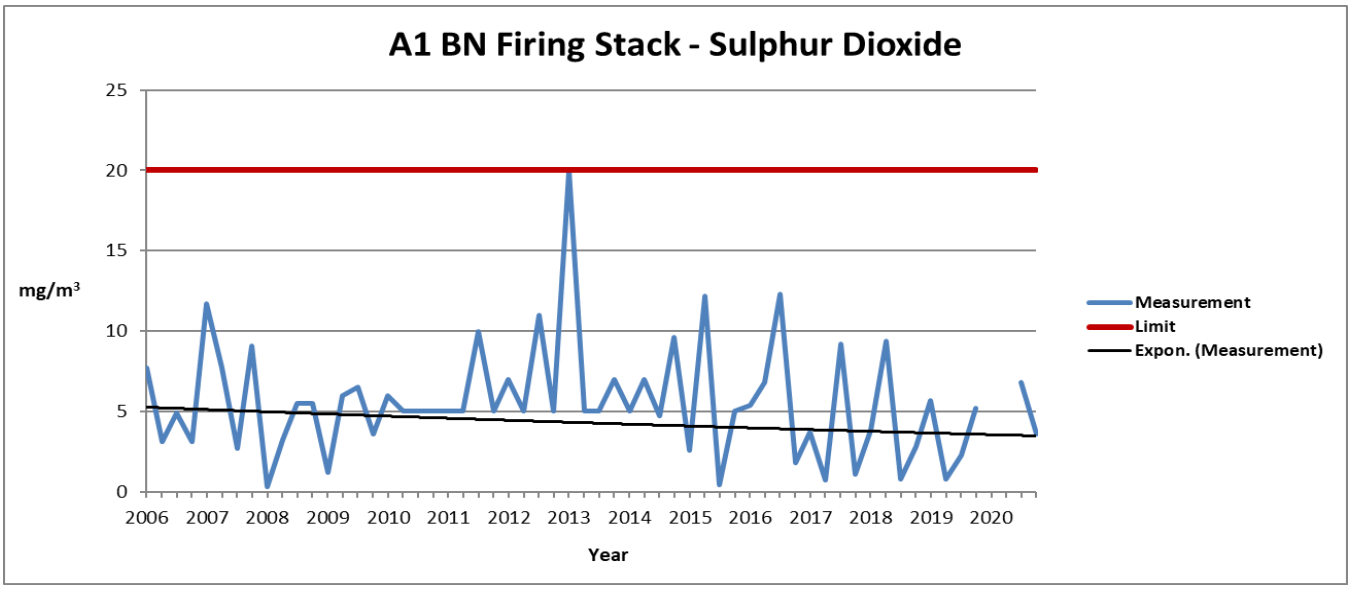
Figure 3.1

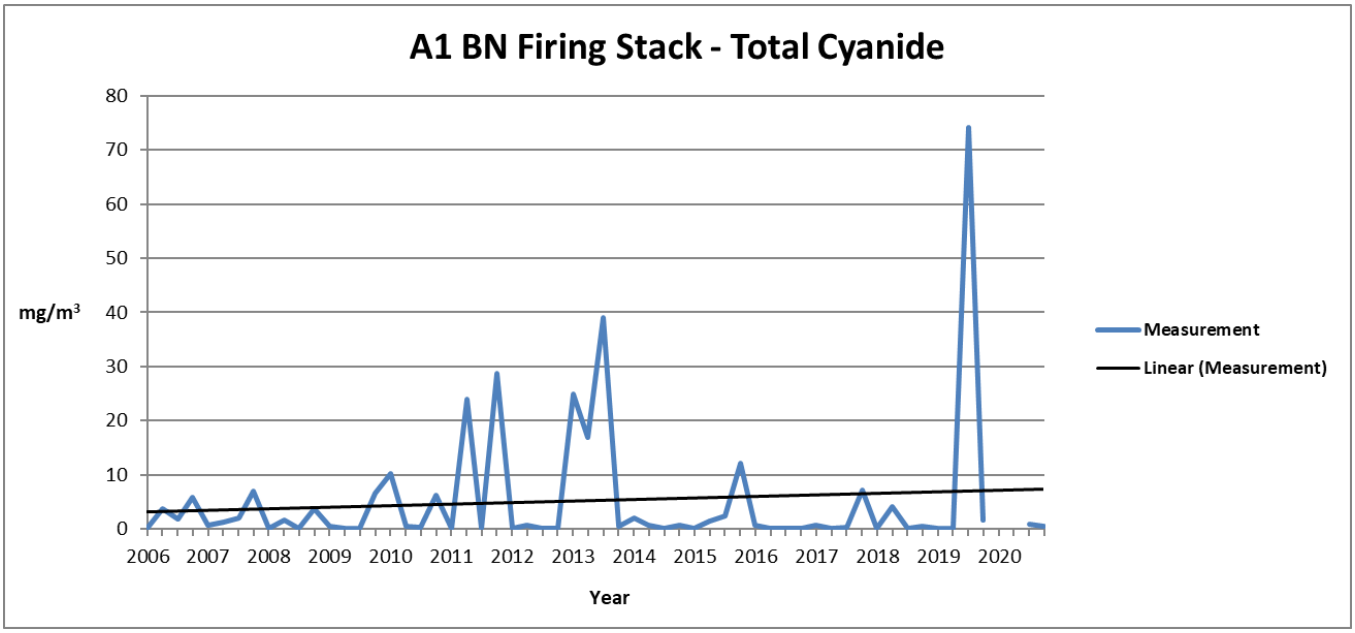



A1 BN Firing Stack - Ammonia
mg/m³
300
250
200
150
100
50
0
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Year
Measurement
Limit
Expon. (Measurement)


A1 BN Firing Stack - Carbon Monoxide
mg/m³
300
250
200
150
100
50
0
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Year
Carbon Monoxide
Limit
Expon. (Carbon Monoxide)


A1 BN Firing Stack - Oxides of Nitrogen
120
100
80
60
40
20
0
mg/m³
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Year
Measurement
Limit
Expon. (Measurement)


A1 BN Firing Stack - Sulphur Dioxide
25
20
15
10
5
0
mg/m³
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Year
Measurement
Limit
Expon. (Measurement)


A1 BN Firing Stack - Total Cyanide
80
70
60
50
40
30
20
10
0
mg/m³
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Year
Measurement
Linear (Measurement)

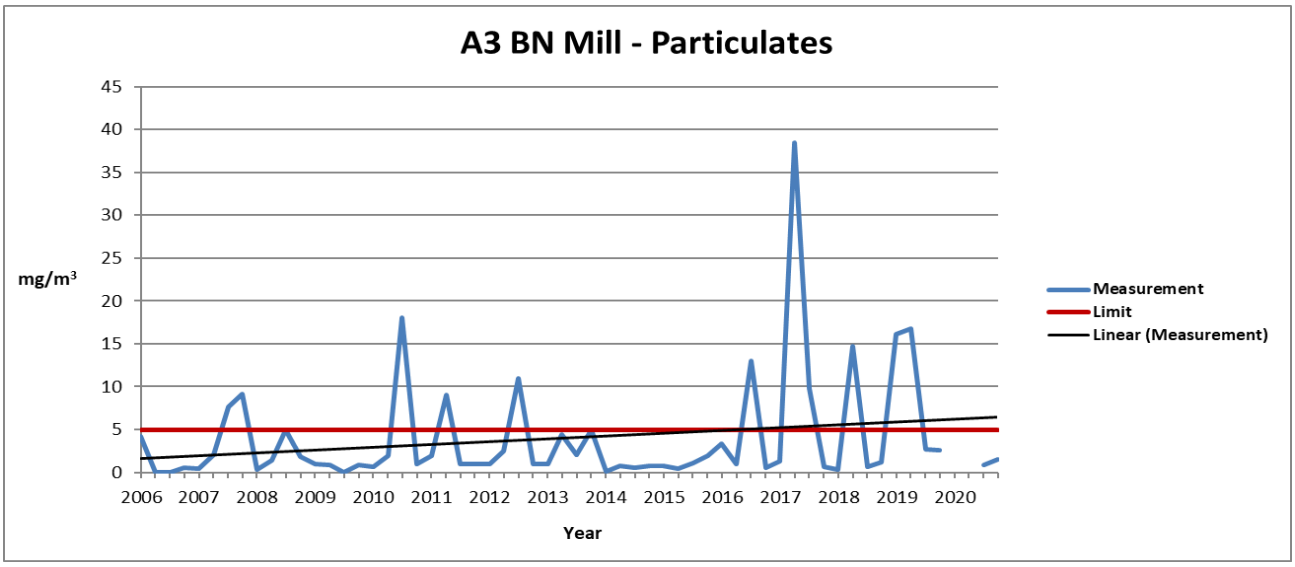
Emission Point A2

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 were not compiled for Q1 and Q2 due to the Covid 19 crisis. There is a long term positive trend for this emission point (figure 3.2) due to previous occasional high results, but recent Q3 and Q4 results were comfortably below the limit.

Figure 3.2

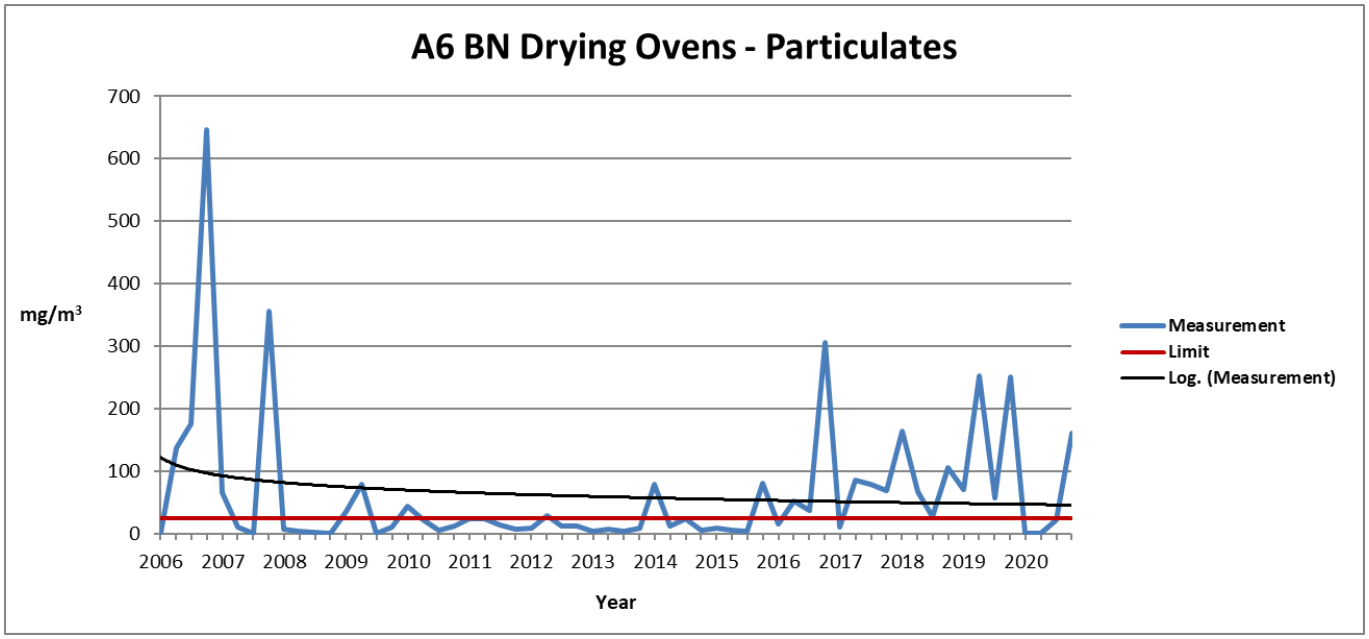


Emission Point A6 – BN Drying Ovens

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

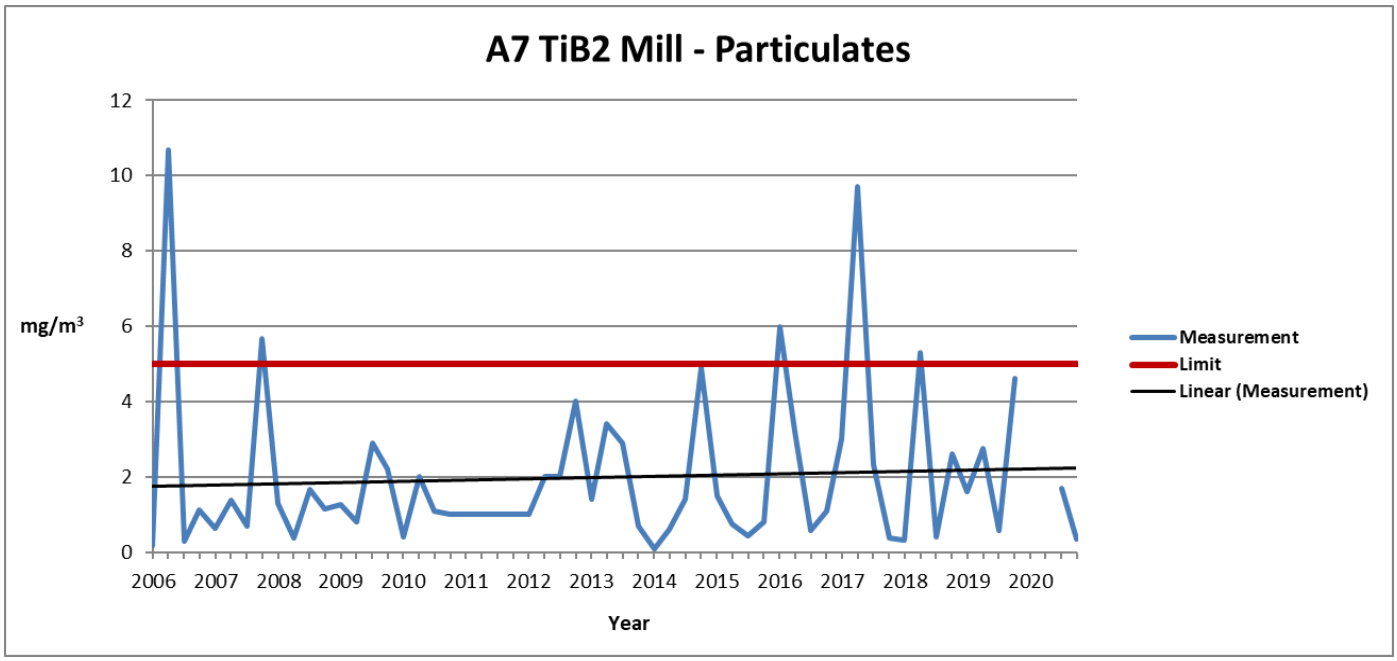
The monitoring for Q1 & Q2 were not compiled due to the Covid 19 crisis. Q3 result came in just under the.
On the advice of a reputable Industrial Environment Control company we introduced an additional air intake valve (Sept/2020) into the scrubber ducting system, one above each oven outlet instead of one after both ovens subsequently we had hoped to be able to see what effect this would have during Q4 testing, unfortunately a few days after the Q4 testing it was reported by the Maintenance Team that during a routine inspection the pump that supplies water to the shower head was not operating (Burnt out!). We strongly suspect that the pump had probably failed just before the testing was carried out and as a result it came as no surprise that there was such a large breach recorded in the Q4 report.

Figure 3.3



Emission Point A7 – TiB_2 Jet Mill

The monitoring for Q1 & Q2 were not compiled due to the Covid 19 crisis. The measured particulate at this emission point in Q3 & Q4 complied with the extremely low ELV during all monitoring periods in 2020. There is a slightly positive long term trend, however, the results in 2020 have produced a negative short term trend. (figure 3.4)



Emission Point A8

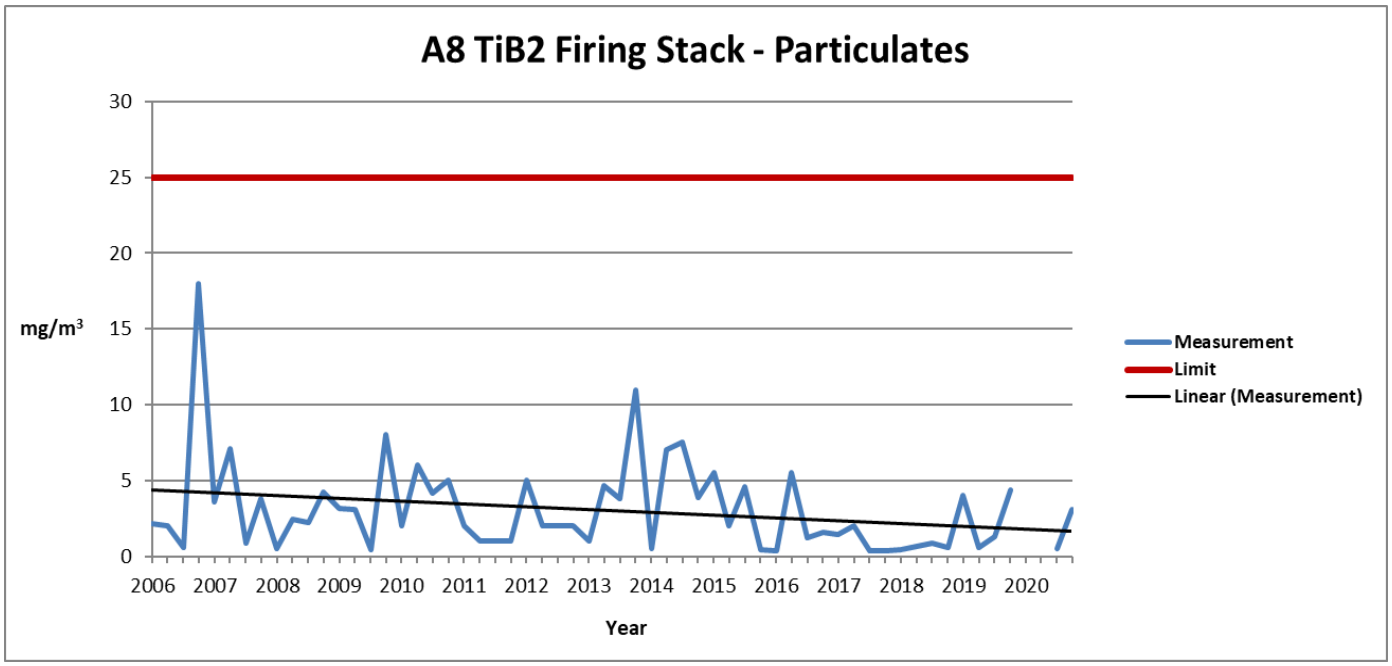
The monitoring for Q1 & Q2 were not compiled due to the Covid 19 crisis. The measured values of particulates and all gases at this emission point were lower than the respective ELV during 2020.

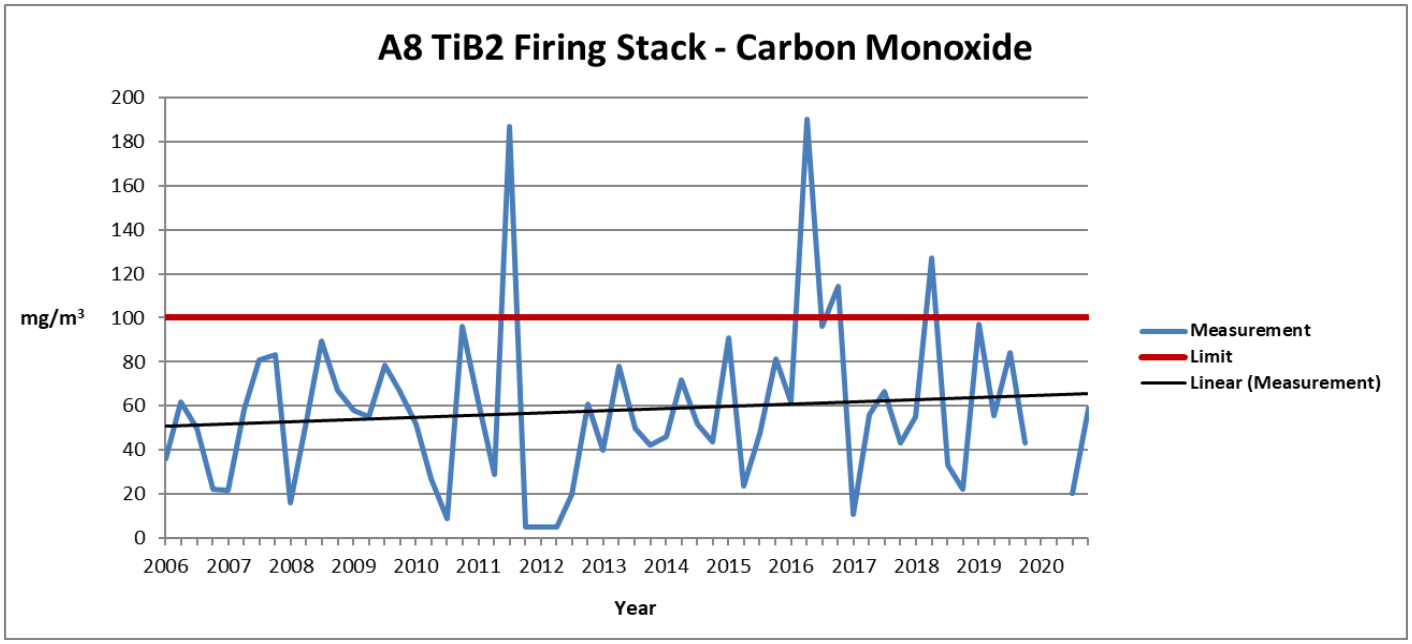
The long term trend for particulates continues to be a negative, which is most likely due to improvements in the maintenance regime over the years. The results were low throughout 2020.

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 - Particulates
mg/m³
30
25
20
15
10
5
0
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Year
Measurement
Limit
Linear (Measurement)


A8 TiB2 Firing Stack - Carbon Monoxide
mg/m³
200
180
160
140
120
100
80
60
40
20
0
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Year
Measurement
Limit
Linear (Measurement)

3.2 – Improvement Performance

3.2.1 Improvements in 2020

Increased energy efficiency

Installed a more efficient VIP unit on furnace 8 to improve energy efficiency on that furnace by ~10%.

During FY20 (Jul-Jun), the total energy usage was 7.7% less than in FY19. This is due to the production of 0.8% less product as well as an improvement in energy efficiency. Overall energy efficiency was 8.6% better than in FY19. Energy efficiency is improving year on year.

The improvements in energy efficiency are largely due to the pre-compaction of raw materials following purchase of a Tablet Press improving yields by 4%, and installation of a more efficient VIP (electrical induction control) unit on furnace 8 (TiB2).

For the first 6 months of FY21, the total energy usage was 4.9% less than the same period in FY20. This is with a 2.1% decrease in production, which translates as a 7.0% improvement in energy efficiency. This is in part due to the purchase of a 2nd Tablet Press giving further improved yields.

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

Reduction in waste

During FY20 (Jul-Jun) there was a 2.9% increase in waste produced compared to FY19. This was largely due to an increase 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 FY19 and the amount of waste produced per ton of product was similar.

For the first six months of FY21, there was a 16.6% increase in waste produced in compared to the same period in FY20. This is due to disposal of unusable ceramic offcut inventory

Recycling of customer waste

Used evaporator boats continue to be retrieved from the customer and sent to china for re-cycling. This is approximately 24 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.

- 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%).

- Find a solution to the issue with particulate emissions from A1 – **BN Furnace Exhaust Stack.**

  Increase the frequency of checking/cleaning during FY21 , this should hopefully reduce the particulate values in the short term. Also carry out a root cause analysis to determine why the powder is building up in the stack so much.

- Find a solution to the issue with particulate emissions from A6 – **BN Drying Ovens**

  Collate further results to determine if there is any benefit of adding the second air intake valve into the scrubber system.
  Explore 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 Q4 - FY21 (April to June) and then its effectiveness will be evaluated in Q1 FY22 Emissions monitoring cycle. Quote obtained ~£10k to install mist eliminator. (wire mesh filter pad already obtained £1.4k)