



Permit Number:- EPR/BP3532HX

End of Year Report 2021

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1 – Introduction

1.1 – General Introduction

This document represents Kennametal Manufacturing UK Ltd's performance report for the calendar year 2021 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, Owens Distribution (haulage) and a Volvo garage. To the east of the site boundary are Yummies Fast Food Supplies, JSG Self Storage and Deflecto (plastic fabricators). To the west of the site is Wild Water Group (temperature controlled storage). Immediately to the south of the site are Mechanica Ltd (mechanic) 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 2021 are tabled below.

Table 3.1 Emissions Monitoring Results for 2021

			2021					
			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	3.7	3.7	6.2	4.2	4.45	17.80
	Ammonia	30	0.1	0.03	665	8.6	168.43	673.73
	Carbon Monoxide	200	100	60	43.8	59	65.70	262.80
	NOx	100	67	32.7	17	58	43.68	174.70
	Sulphur Dioxide	20	8.9	6.9	9.9	0.9	6.65	26.60
	Total Cyanide	**	0.09	0.08	0.86	0.01	0.26	1.04
A3 BN Jet Mill	Particulates	5	1.5	28.1	1.12	0.46	7.80	31.18
A6 No2 Oven	Particulates	25	216	27	66.3	26.8	84.03	336.10
A7 TiB2 Mill	Particulates	5	1.65	0.86	1.02	3.1	1.66	6.63
A8 TiB2 Firing Stack	Particulates	25	1.6	0.82	4.9	6.5	3.46	13.82
	Ammonia	30	0.08	0.02	0.044	0.79	0.23	0.93
	Carbon Monoxide	100	52	53.4	53	62	55.10	220.40
	NOx	100	4.1	0.52	0.2	1	1.46	5.82
	Sulphur Dioxide	20	6.3	1.7	4.2	2.5	3.68	14.70
	Total Cyanide	**	0.04	0.04	0.05	0.01	0.04	0.14

** Currently no limit agreed

ELV Exceeded

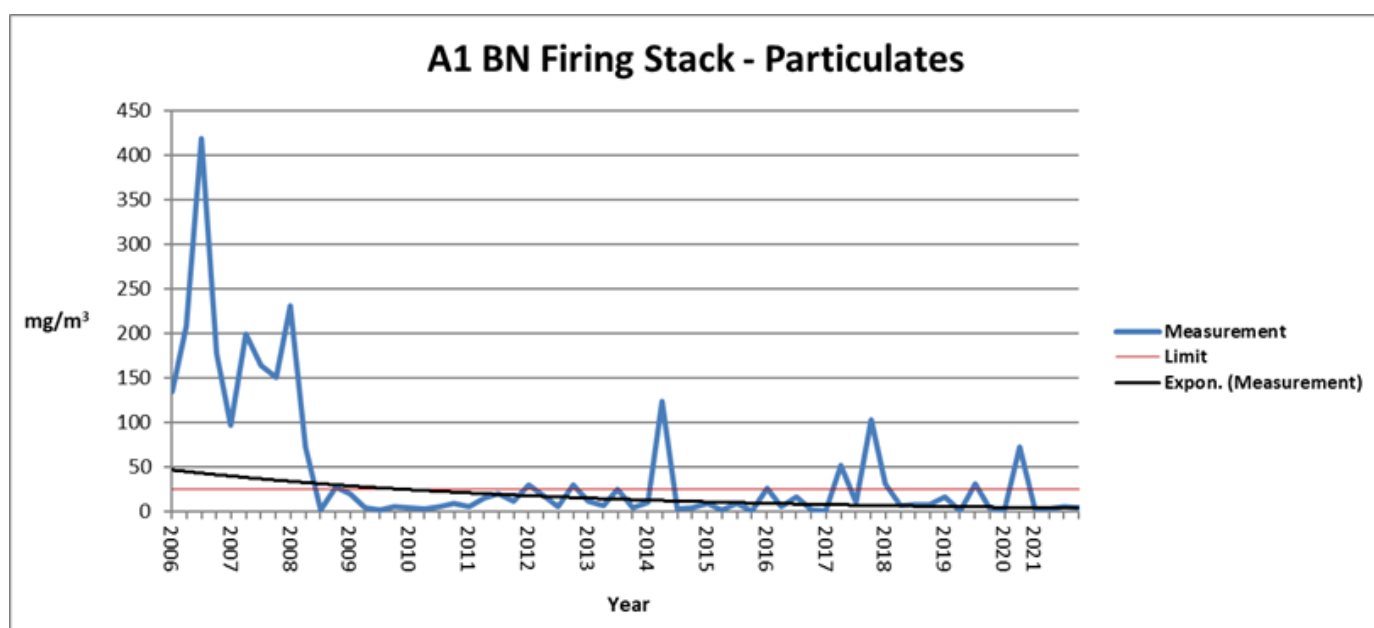
Emission Point A1 – BN Furnaces Exhaust Stack

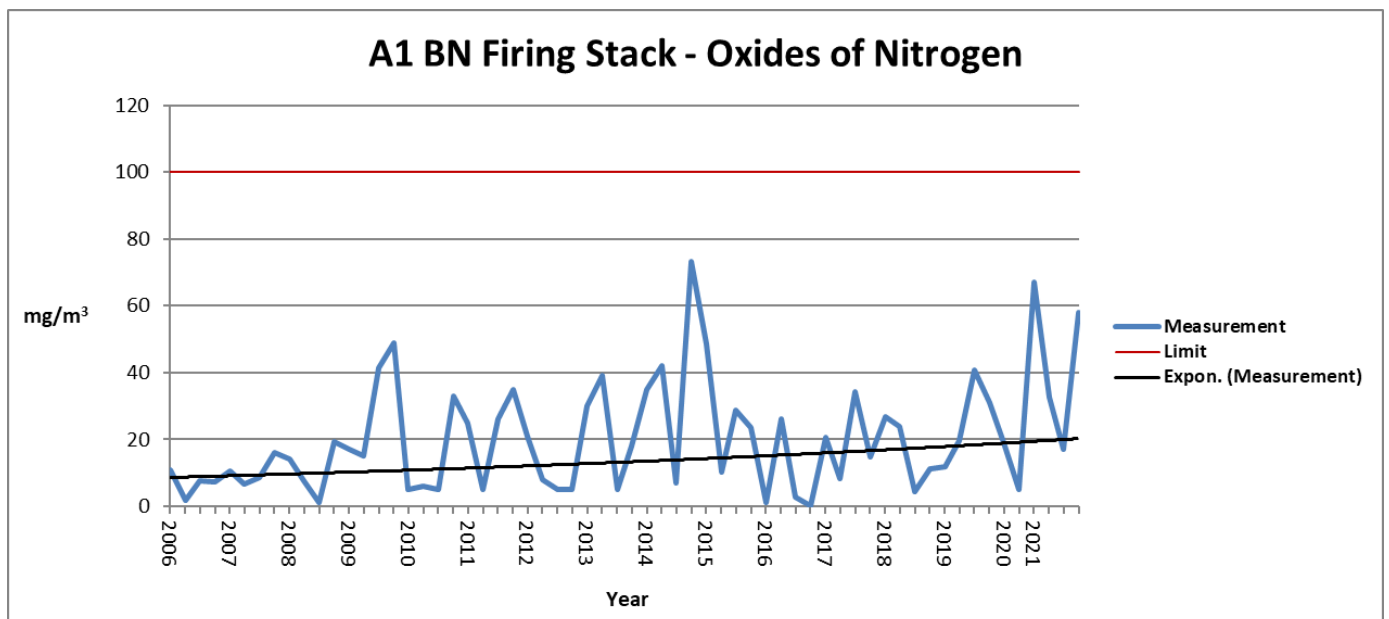
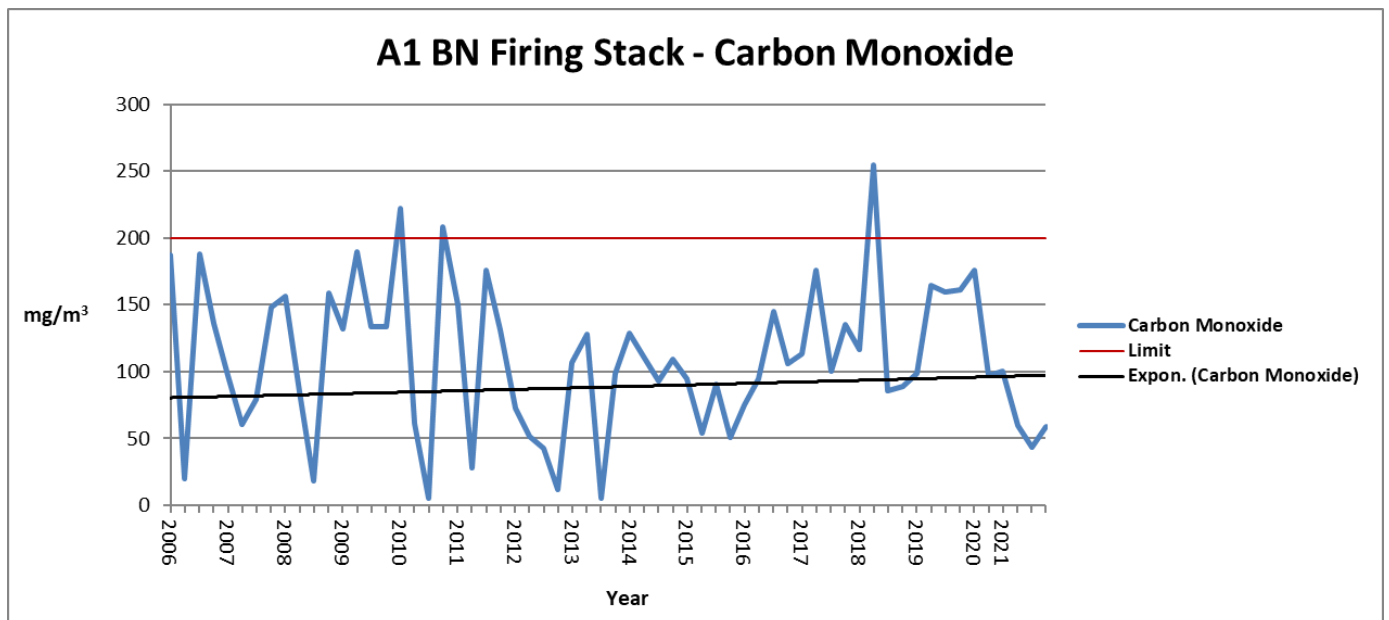
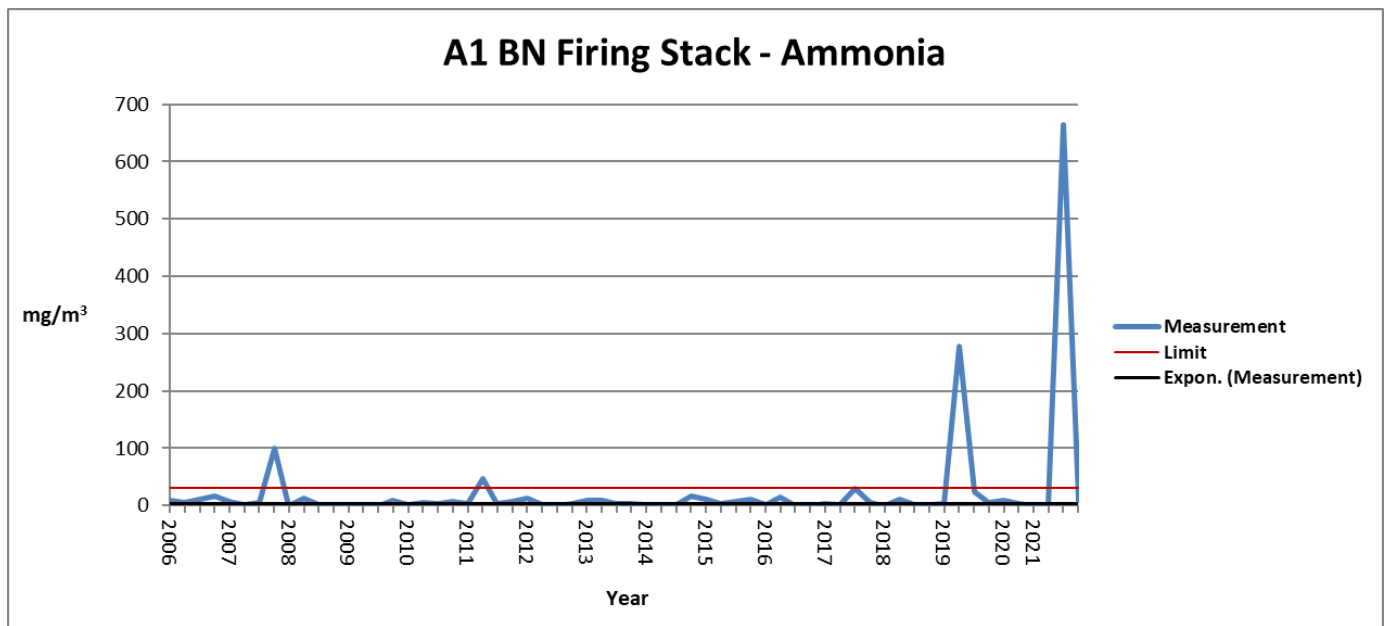
All of the monitoring results for this emission point were below the respective emission limit values (ELVs), with the exception of ammonia in Q3. Under normal operating conditions expectations would be for this to be well below the limit of 30mg/m³. This exceedance was most likely due to the furnaces being turned on simultaneously. A staggered start time has since been reinstated.

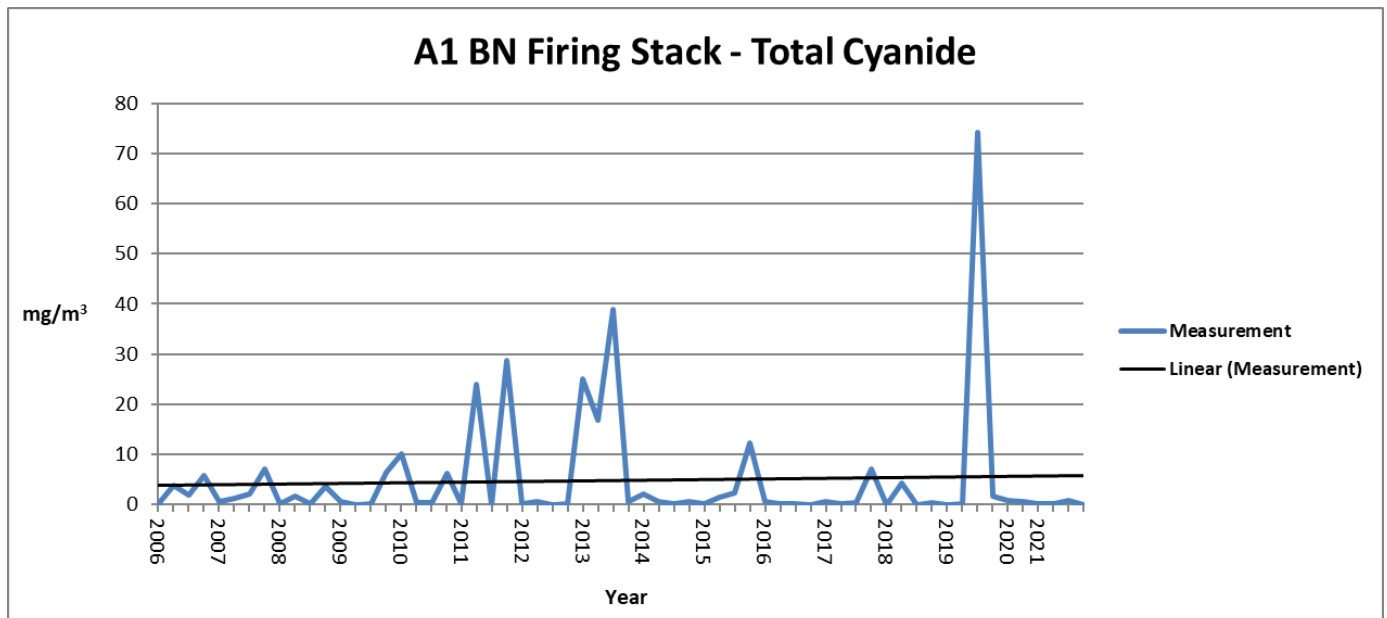
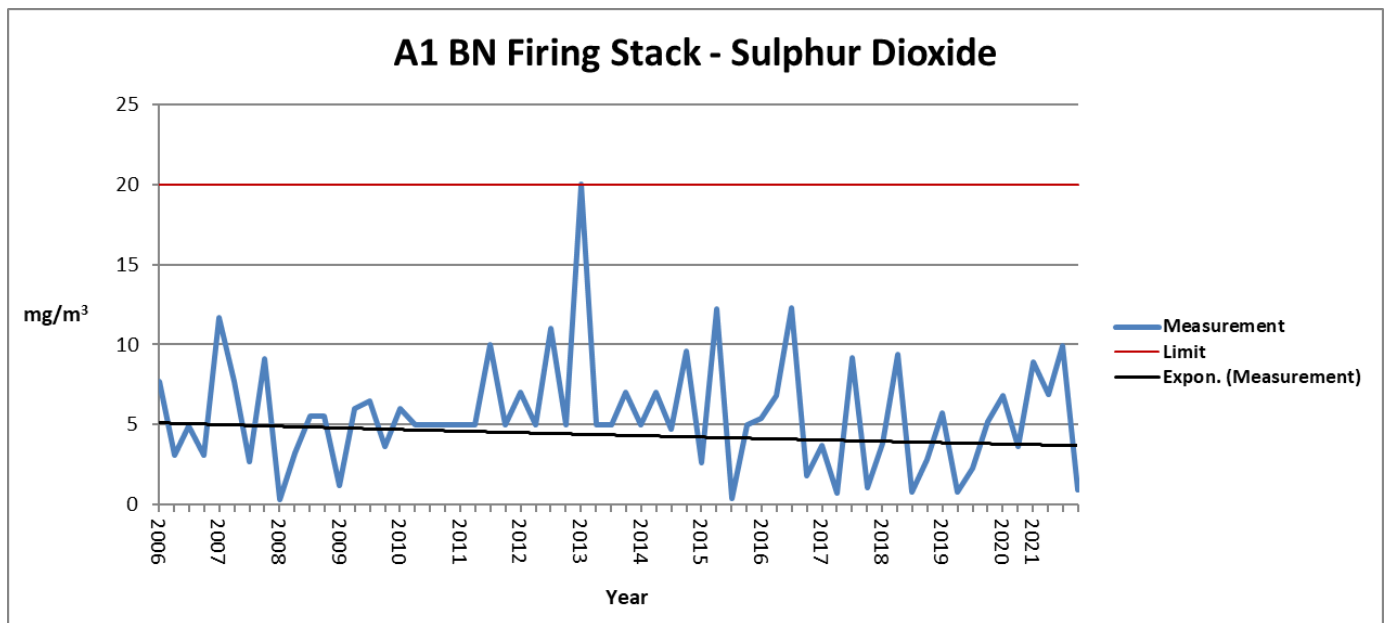
There remains a long-term negative trend for particulates and sulphur dioxide (figure 3.1). There is a long-term positive trend for oxides of nitrogen, carbon monoxide and cyanide (figure 3.1). There is a lack of a long-term trend for ammonia, largely due to the anomalous limit breach which occurred in 2021 (figure 3.1).

The general downward trend for particulate is due to improvements in the abatement equipment and its maintenance which has occurred over time. 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.

Figure 3.1







Emission Point A2

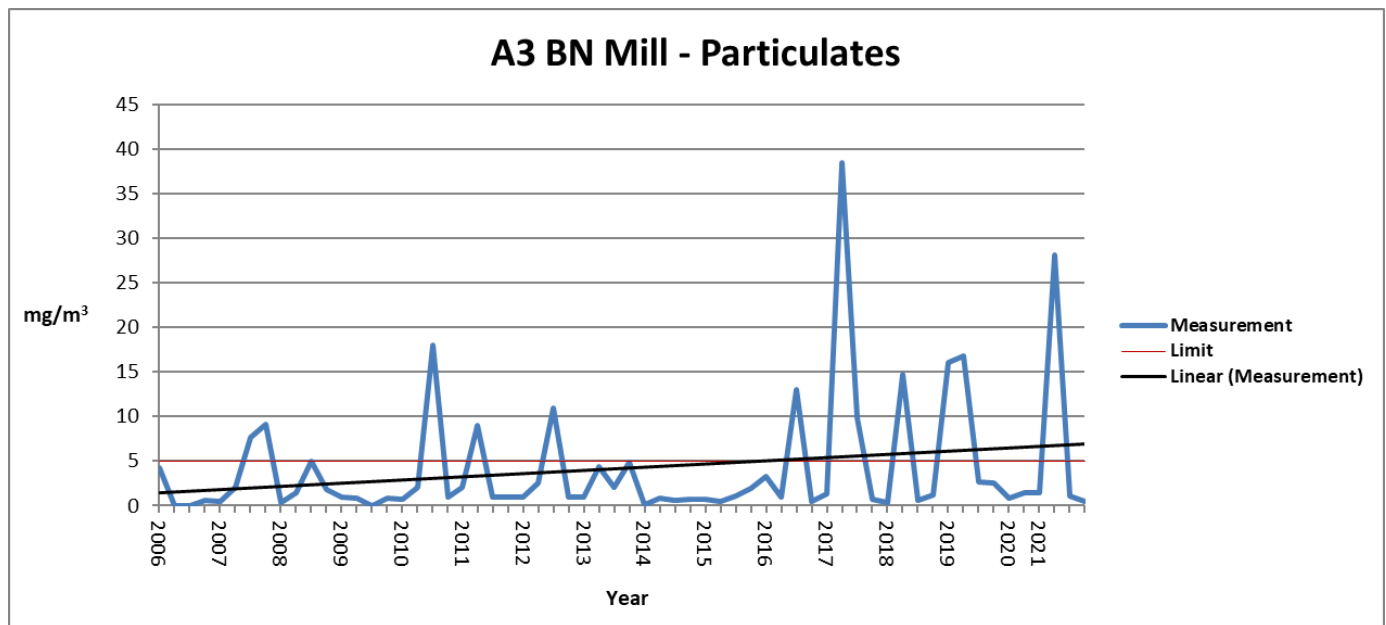
This emission point has not been in use since the third quarter of 2011.

Emission Point A3 – BN Jet Mill

There is a long-term positive trend for this emission point (figure 3.2)

Q2 did record an initial exceedance in particulates. Root cause analysis revealed that there had been maintenance and filter changes close to the day of sample taking, which left residual particulate in the system. A review and change in maintenance cleaning resulted in significantly lower emissions in the retest and in Q3.

Figure 3.2



Emission Point A6 – BN Drying Ovens

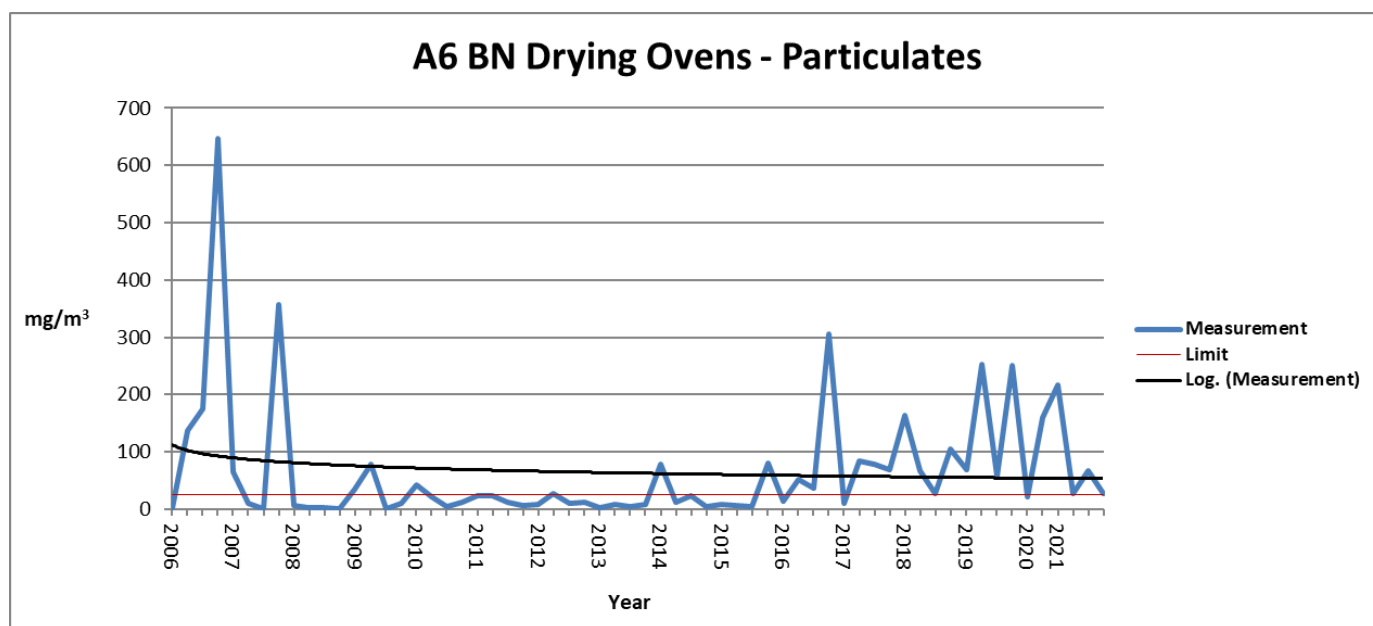
The particulate emissions limit for A6 (BN drying ovens) is still being breached but we are continuously working on resolving this.

Additional full cycle monitoring took place to gain an accurate profile of the emissions.

Kennametal engaged with a number of 3rd party contractors in an effort to resolve particulate emission breaches on A6. Only one company was willing to put forward a solution with a guarantee.

An order has been placed with this company for the purchase of a new wet scrubber system with in-line filter. This is due to be installed in April 2022.

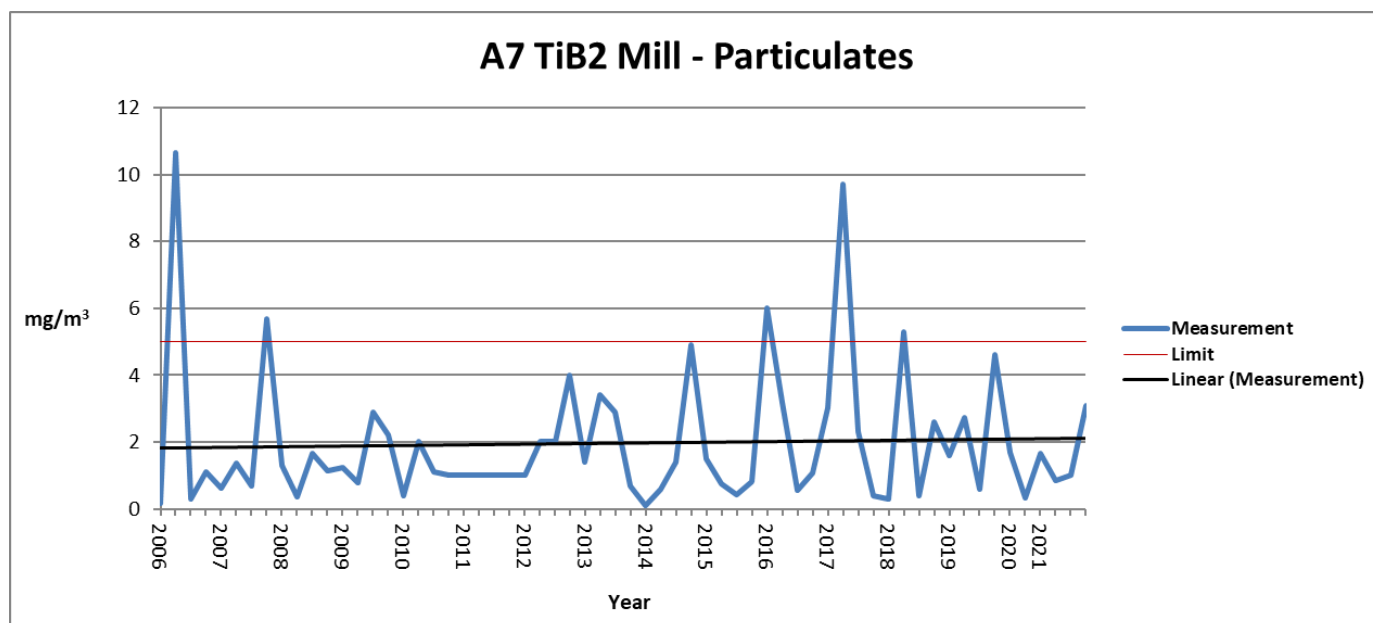
Figure 3.3



Emission Point A7 – Tib₂ Jet Mill

The measured particulate at this emission point was consistently below the ELV during all monitoring periods in 2021.

Figure 3.4



Emission Point A8

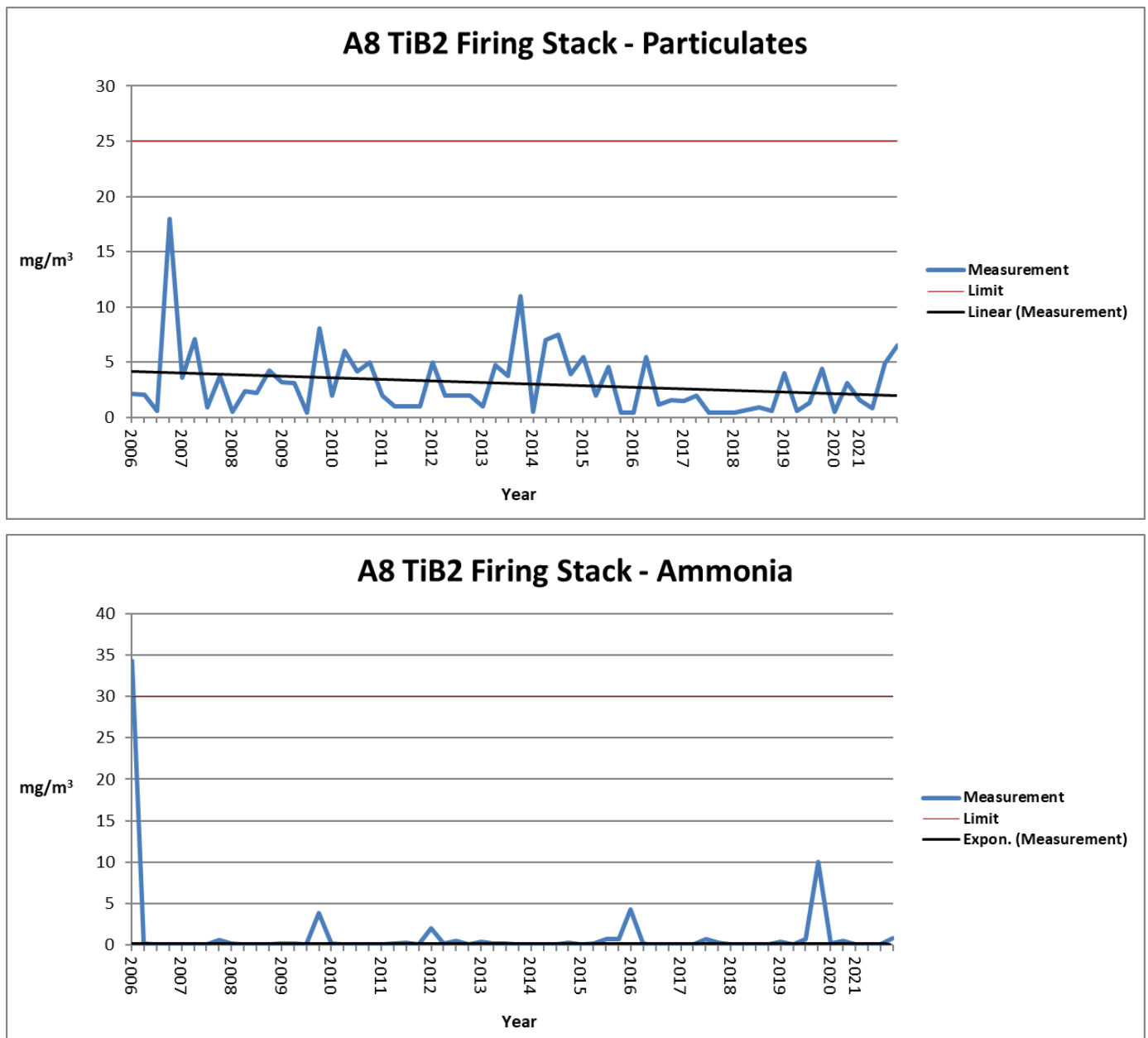
The measured values of particulates and all gases at this emission point were lower than the respective ELV during 2021.

The long-term trend for particulates continues to be a negative, which is most likely due to improvements in the maintenance regime that has occurred over the years. The results were low throughout 2021.

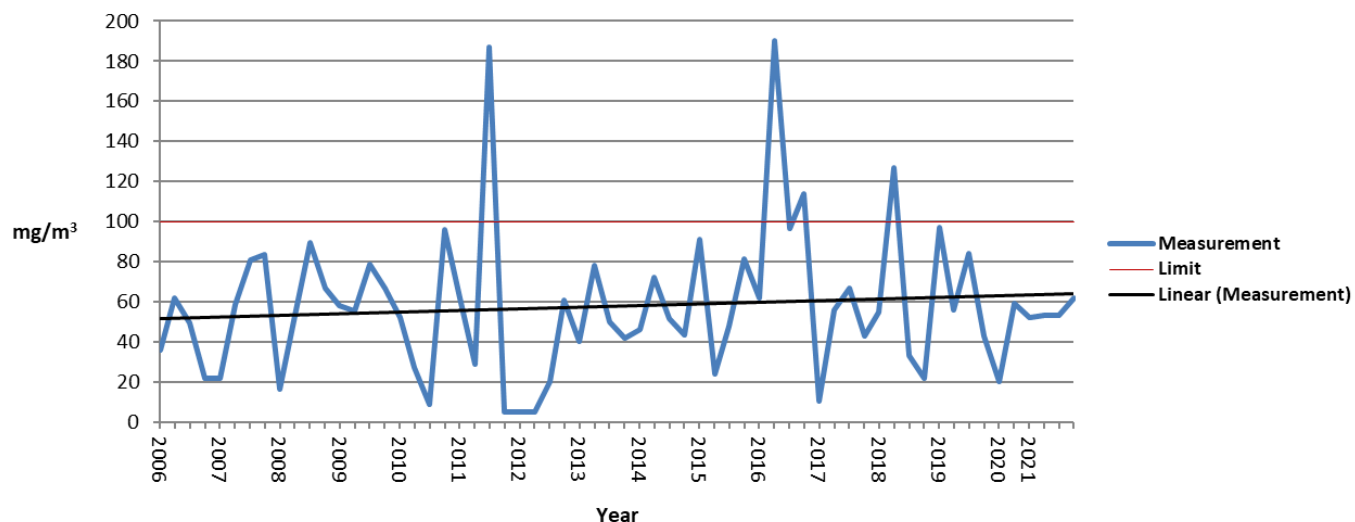
Carbon monoxide has a positive long-term trend but since 2016 a negative trend is evident.

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

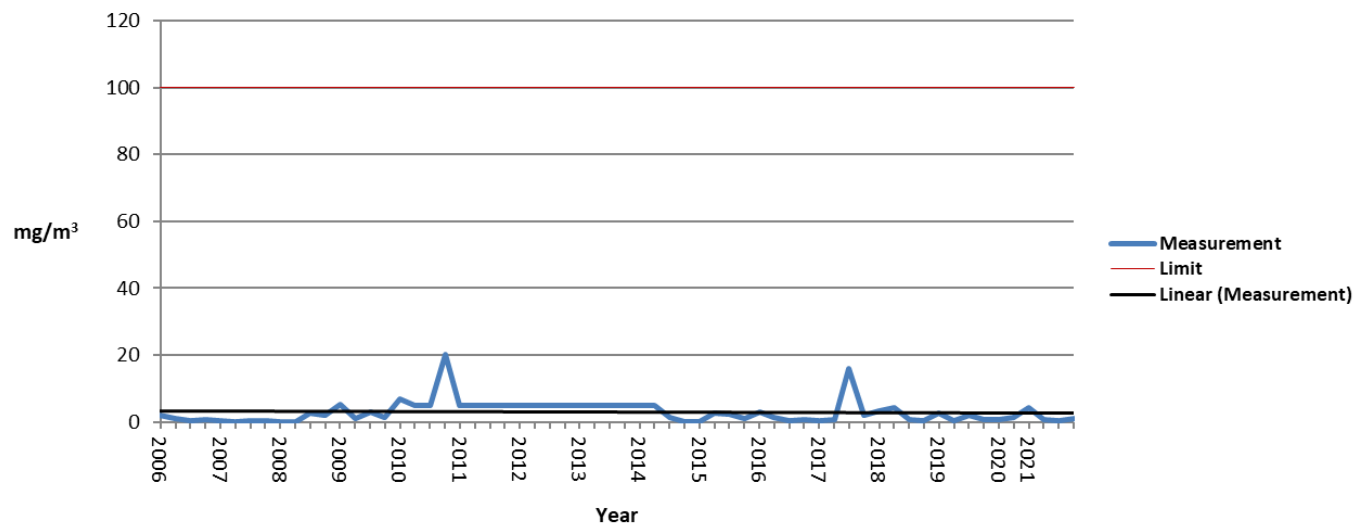
Figure 3.5



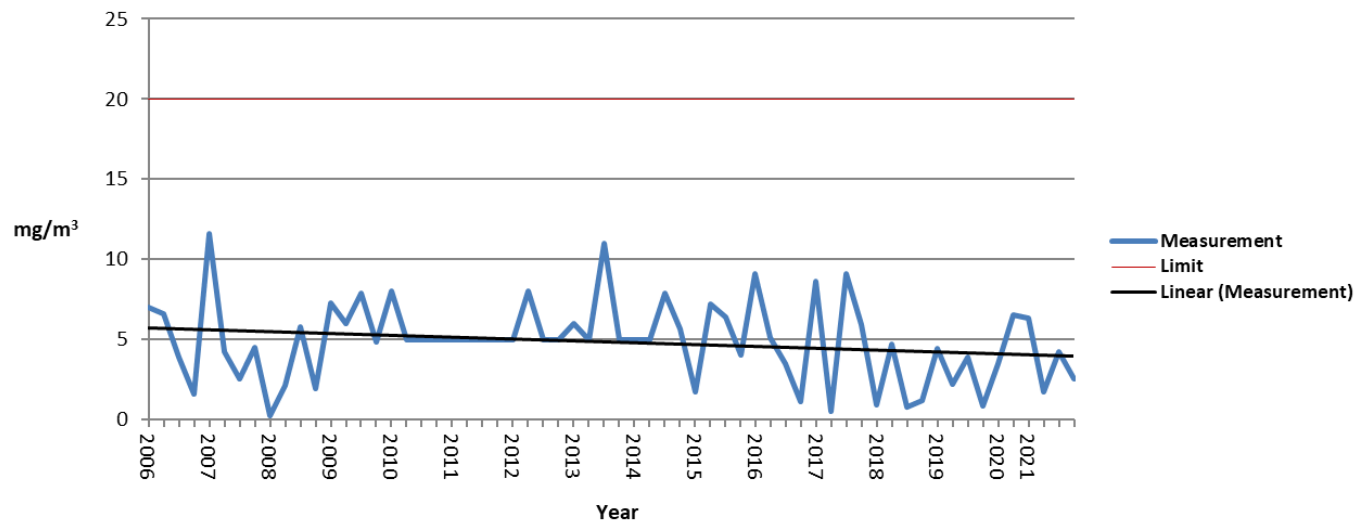
A8 TiB2 Firing Stack - Carbon Monoxide

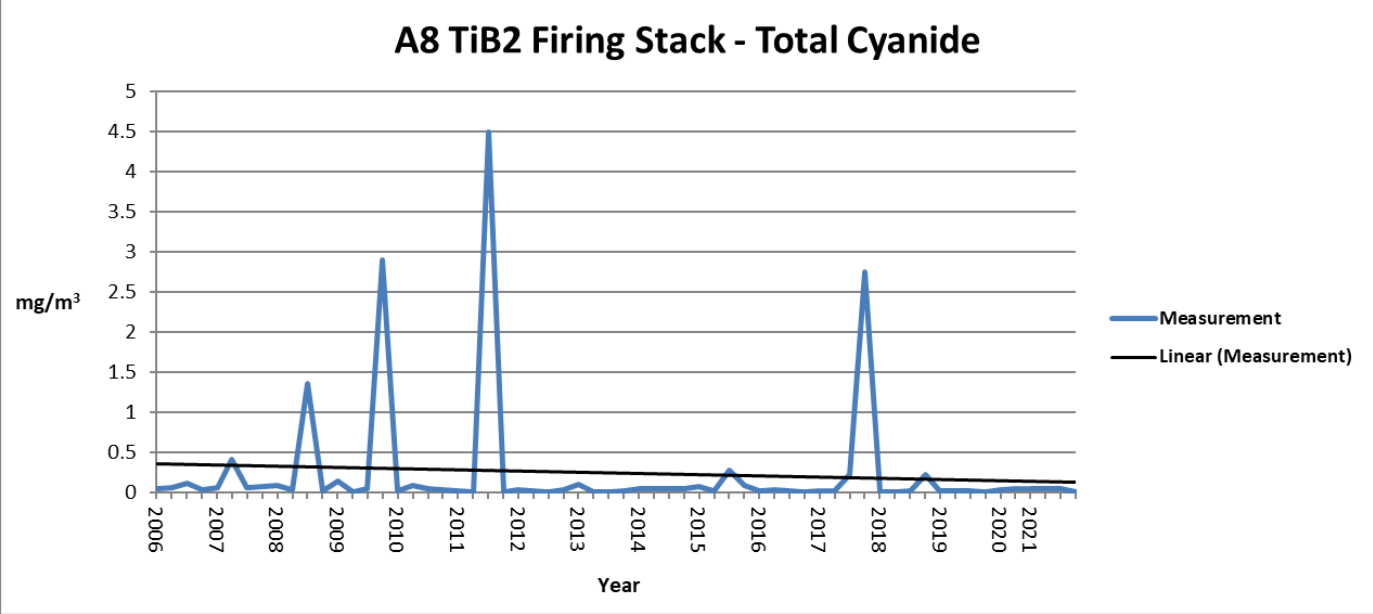


A8 TiB2 Firing Stack - Oxides of Nitrogen



A8 TiB2 Firing Stack - Sulphur Dioxide





3.2 – Improvement Performance

3.2.1 Improvements in 2021

Energy efficiency

During FY21 (Jul-Jun), the total energy usage was 4% less than in FY20. This is due to the production of 7% less product and the completion of energy reduction projects. Overall energy efficiency was 4% worse than in FY20 which is due to the production of less product, particularly Hot Pressing, which experienced a downturn in demand due to the Covid-19 pandemic. Overall energy efficiency has been improving year on year prior to FY21.

Although we didn't see an overall improvement in energy efficiency in FY21, various energy reduction projects have been completed including:

- the pre-compaction of raw materials following purchase of a Tablet Press improving yields by 4%.
- the installation of a more efficient VIP (electrical induction control) unit on furnace 8 (TiB2).
- completion of a compressed air leak survey and recommended remedial actions
- a reduction in firing times on our sinter furnaces.

For the first 6 months of FY22, the total energy usage was 3% more than the same period in FY21. This is with a 11.75% increase in production, which translates as a 7.5% improvement in energy efficiency. This will be due to the energy reduction projects mentioned above as well as an increase in Hot Pressing.

The final product continues to have 31% reclaim material included. Material that would otherwise, require consumption of more raw materials and energy for production.

Waste

During FY21 (Jul-Jun) there was a 13.66% reduction in waste produced compared to FY20. This was largely due to reduced production. There was also a slight reduction in waste produced per ton of product (7%).

For the first six months of FY22, the quantity of waste produced, was similar to the same period in FY20.

Material samples used in laboratory analysis were previously disposed of at landfill. These are now recycled back into the process, totaling 161kg since this began in May 2021.

Recycled filter dust continues to make up 5% of the raw materials used in Boron Nitride production. Dust that would otherwise go to landfill.

Used evaporator boats continue to be retrieved from the customer and sent to china for recycling. This is approximately 24 ton per year that would otherwise go to landfill.

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

- Installation of a new wet scrubber abatement system at emission point A6 to reduce particulate emissions to below the ELV.
- Installation of a new, more energy efficient air cooler for the TiB2 furnaces which will also result in reduced water usage.
- Installation of downflow extraction booths for loading and unloading furnace pots which will reduce the generation of airborne and fugitive dust.
- Installation of new, more energy efficient drying ovens.