Permit Number:- EPR/BP3532HX

End of Year Report 2022

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1 – Introduction

1.1 – General Introduction

This document represents Kennametal Manufacturing UK Ltd’s performance report for the calendar year 2022 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) 2016 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 2022 are tabled below.

Table 3.1 Emissions Monitoring Results for 2022

			2022					
			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	5.2	0.42	1.5	2.2	2.33	9.32
	Ammonia	30	3.1	0.02	0.62	147.4	37.79	151.14
	Carbon Monoxide	200	80	46.7	82	23.9	58.15	232.60
	NOx	100	40	34.5	26	43.6	36.03	144.10
	Sulphur Dioxide	20	10.1	14.6	4.1	13.6	10.60	42.40
	Total Cyanide	**	0.29	7.72	64	132.1	51.03	204.11
A3 BN Jet Mill	Particulates	5	3.6	1.06	0.48	0.8	1.49	5.94
A6 No2 Oven	Particulates	25	13	152.2	4	1.6	42.70	170.80
A7 TiB2 Mill	Particulates	5	3.7	1.12	0.29	1.54	1.66	6.65
A8 TiB2 Firing Stack	Particulates	25	3.4	1.75	1.62	1.56	2.08	8.33
	Ammonia	30	0.32	0.08	0.56	0.1	0.27	1.06
	Carbon Monoxide	100	51	49.2	82	53.1	58.83	235.30
	NOx	100	1.6	5.2	3.9	4.69	3.85	15.39
	Sulphur Dioxide	20	6.5	14.9	3.9	4.24	7.39	29.54
	Total Cyanide	**	0.01	0.08	0.065	0.09	0.06	0.25

** Currently no limit agreed

ELV Exceeded

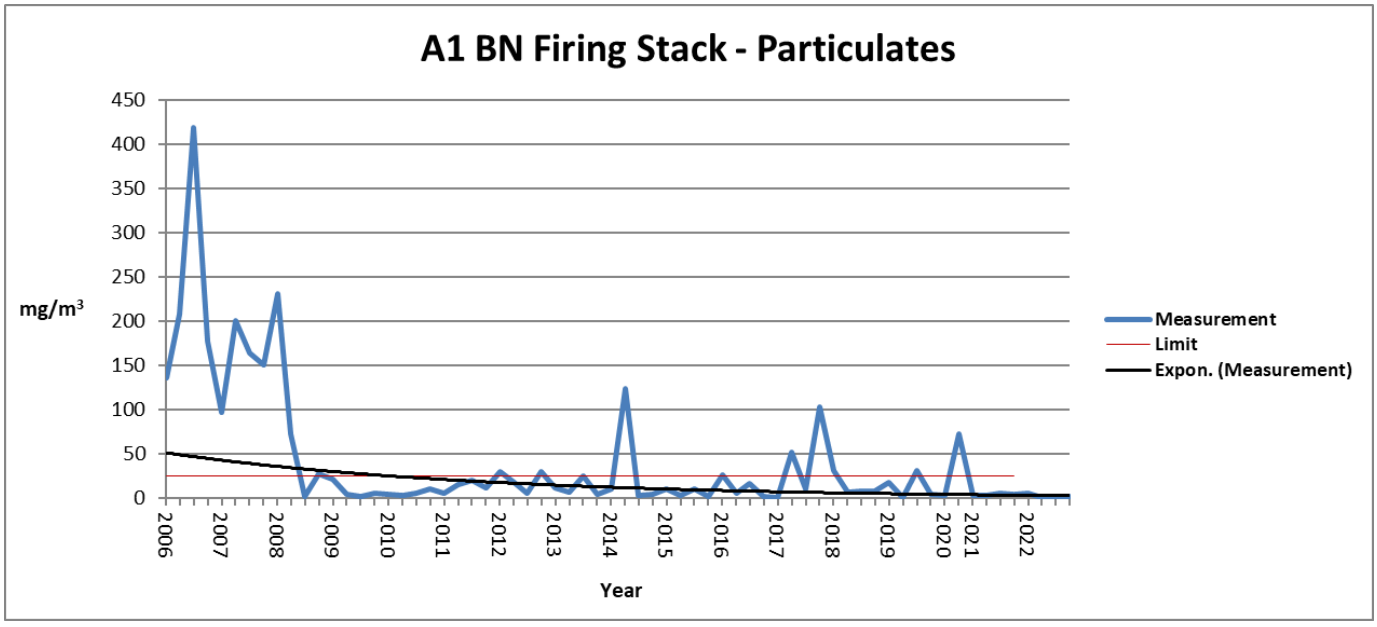
Emission Point A1 – BN Furnaces Exhaust Stack

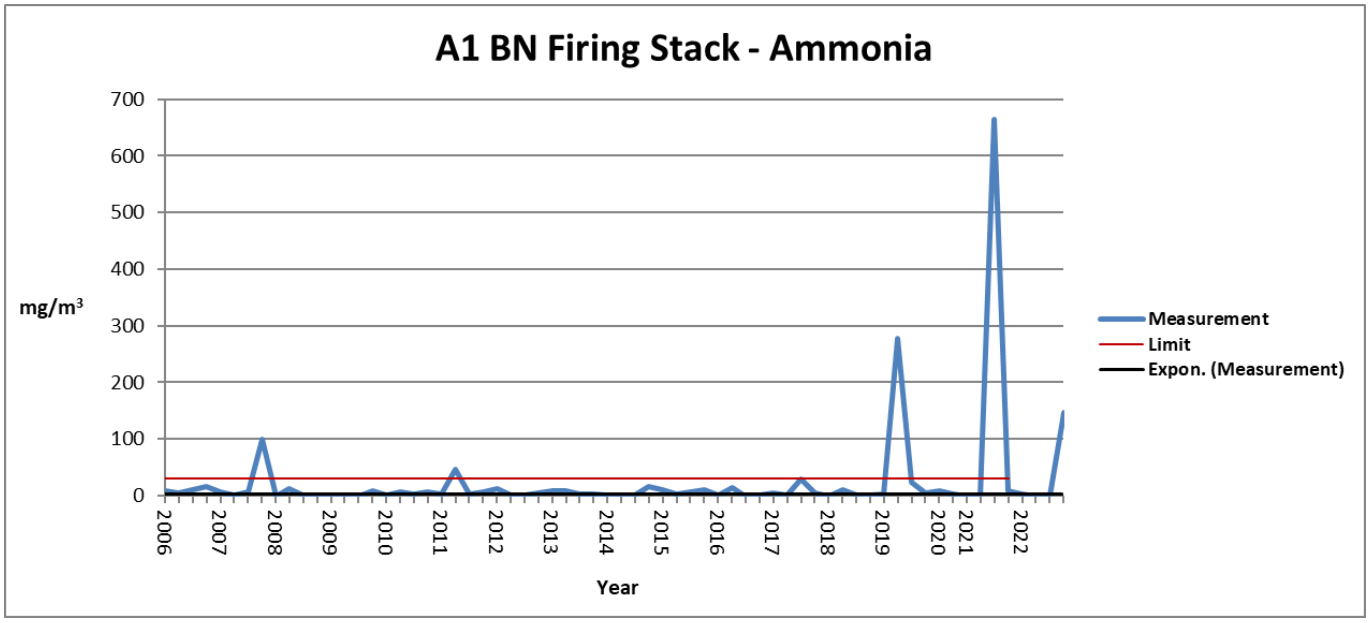
All of the monitoring results for this emission point were below the respective emission limit values (ELVs), with the exception of ammonia in Q4. Under normal operating conditions expectations would be for this to be well below the limit of 30mg/m3. This exceedance was most likely due to the improper use or condition of a propane afterburner lance. The investigation into this matter is ongoing.

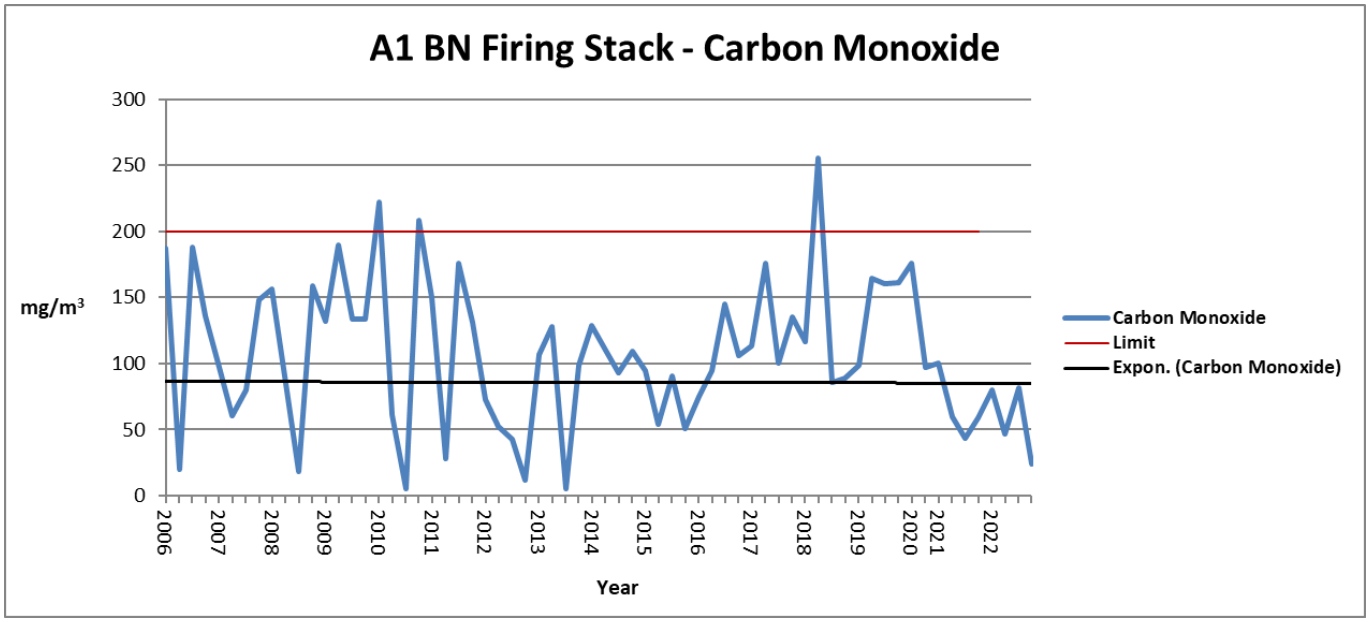
There remains a long-term downward trend for particulates (figure 3.1). There is a long-term upward trend for oxides of nitrogen and cyanide (figure 3.1). There is also an upward trend for ammonia, due to the anomalous limit breaches in 2021 and 2022 (figure 3.1).

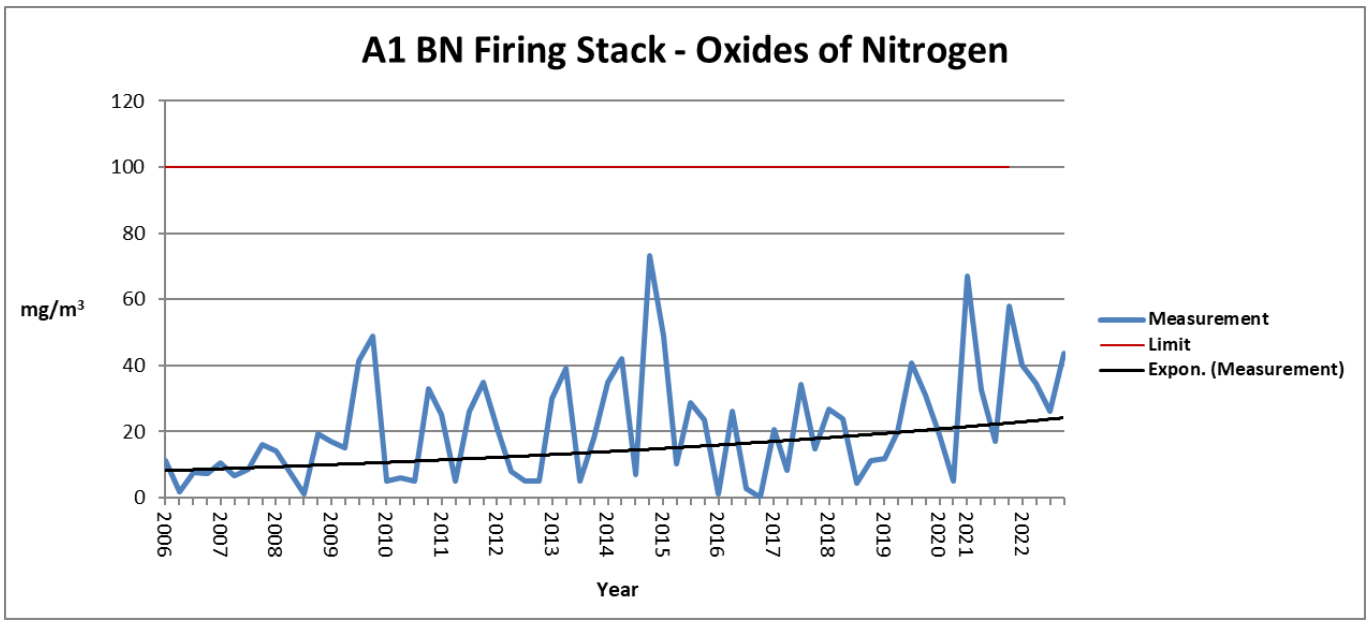
The general downward trend for particulate is due to improvements in the abatement equipment and its maintenance which has occurred over time. The mix of negative and positive trends for concentrations of gas emissions is likely to be due to the increase in throughput and/or changes to firing temperatures 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. The limit breaches responsible for the upward trend in ammonia emissions are under investigation.

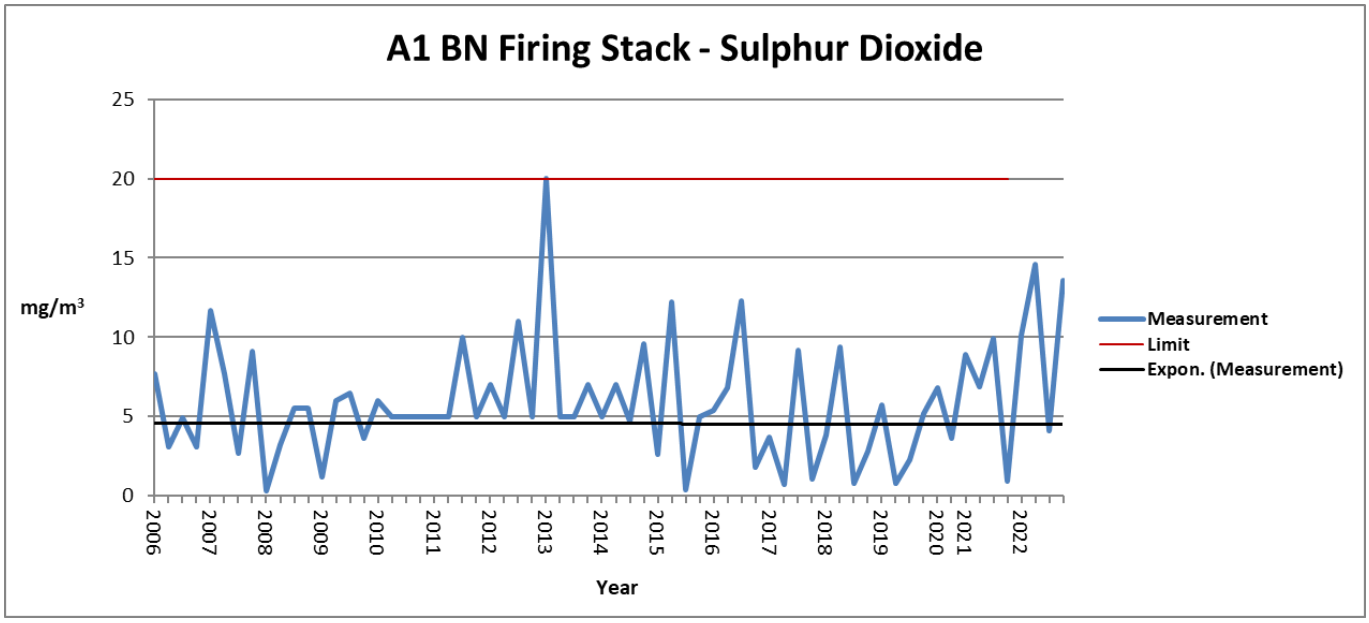
Figure 3.1

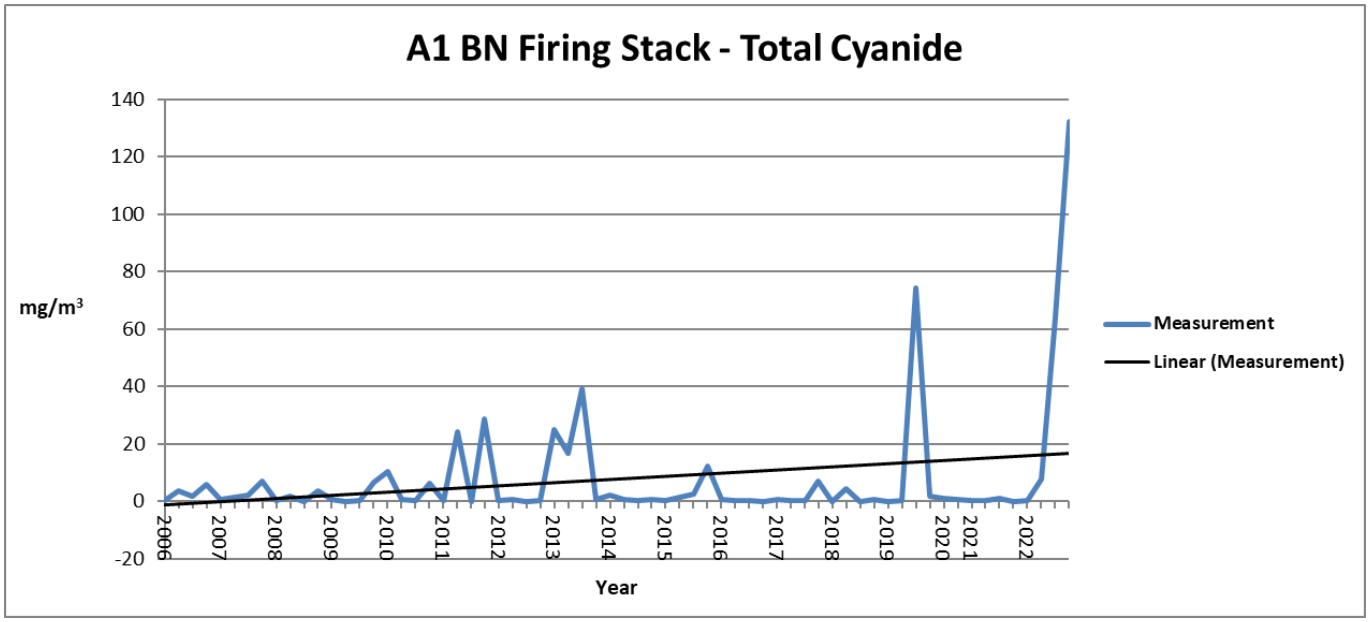



A1 BN Firing Stack - Ammonia
mg/m³
700
600
500
400
300
200
100
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
Measurement
Limit
Expon. (Measurement)


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
2021
2022
Year
Carbon Monoxide
Limit
Expon. (Carbon Monoxide)


A1 BN Firing Stack - Oxides of Nitrogen
mg/m³
120
100
80
60
40
20
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
Measurement
Limit
Expon. (Measurement)


A1 BN Firing Stack - Sulphur Dioxide
mg/m³
25
20
15
10
5
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
Measurement
Limit
Expon. (Measurement)


A1 BN Firing Stack - Total Cyanide
mg/m³
140
120
100
80
60
40
20
0
-20
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
Measurement
Linear (Measurement)

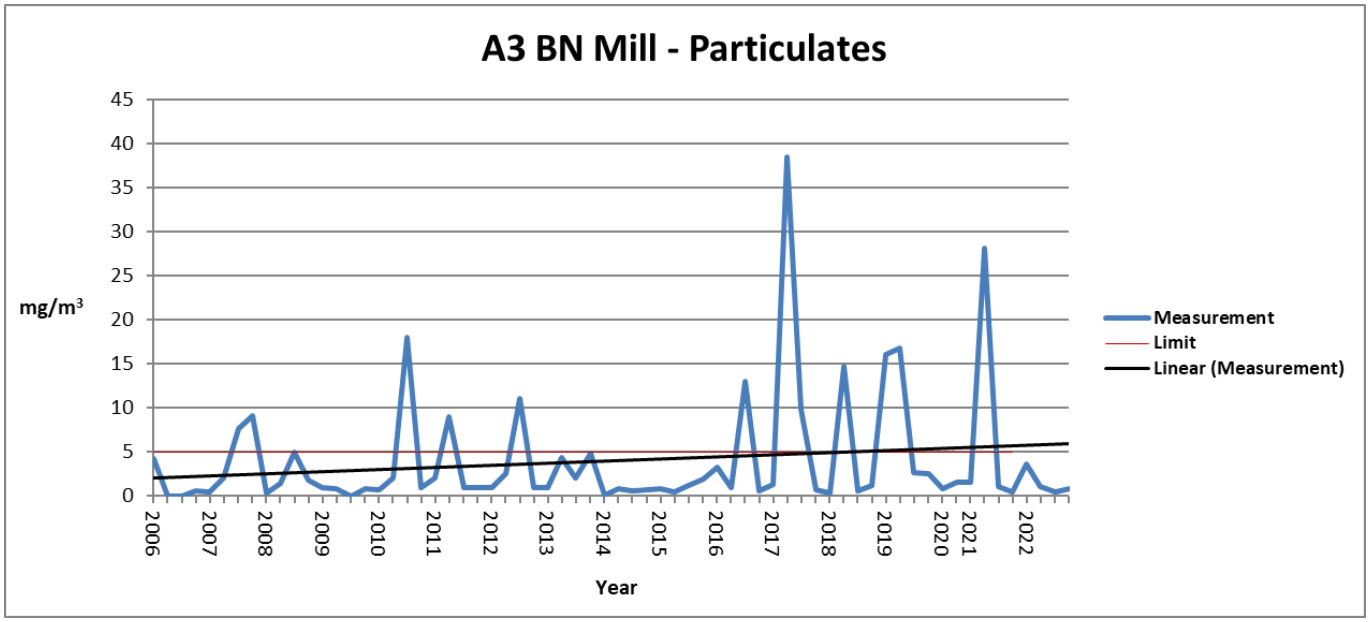
Emission Point A2

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

Emission Point A3 – BN Jet Mill

There is a long-term upwards trend for this emission point (figure 3.2) although all measurements taken in 2022 were below the limit.

Figure 3.2

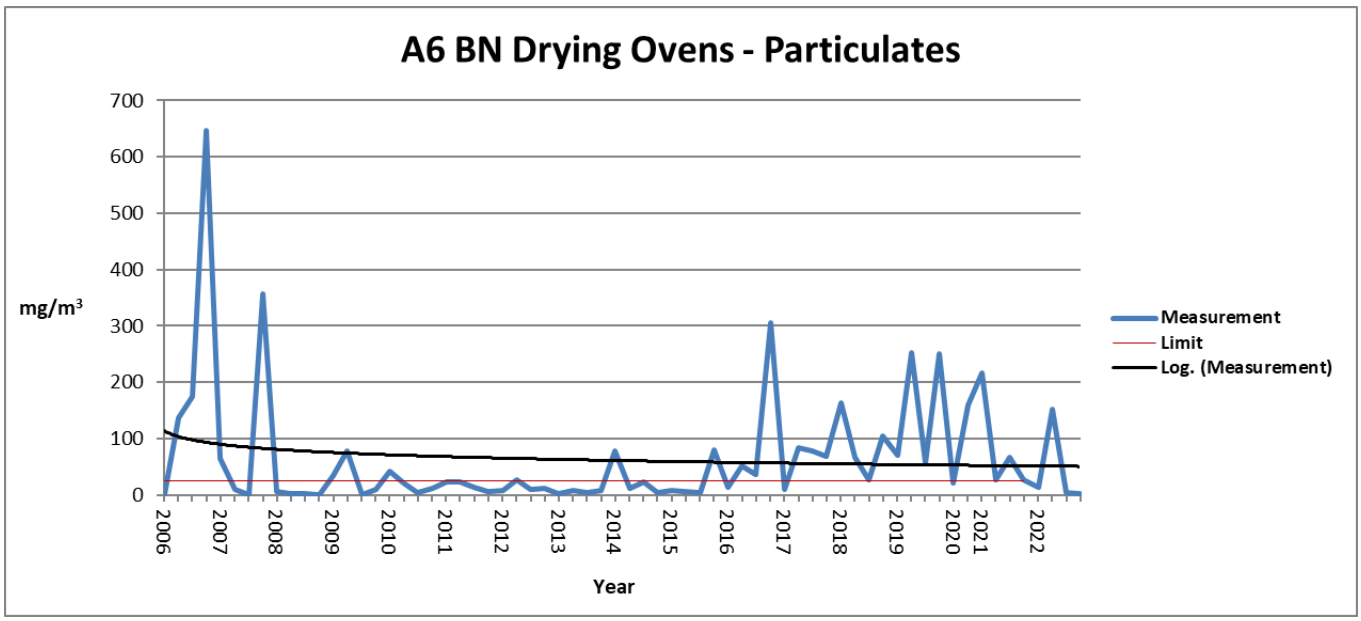


Emission Point A6 – BN Drying Ovens

A new wet scrubber abatement system was installed in August 2022 at this emission point due to frequent limit breaches occurring in recent years. The results of the subsequent monitoring completed in Q3 and Q4 were significantly lower than what we have previously achieved with results well below the limit.

Additional full cycle monitoring took place in Q4 to ensure that the emissions were being adequately abated throughout the oven drying cycle, as the concentration of particulate emitted fluctuates during the cycle, with peaks and troughs. All results were below the limit with the highest measurement being 2.98 mg/m3. We therefore expect that future results for particulate emissions from this emission point will be consistently below the ELV.

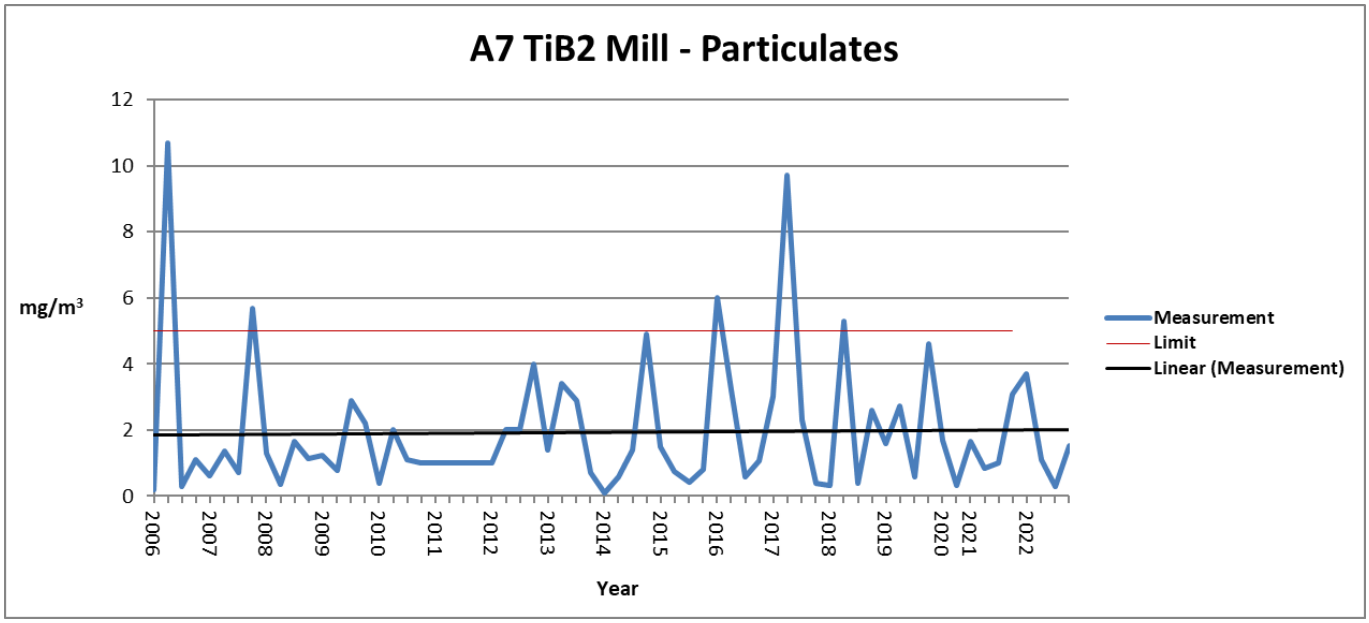
Figure 3.3



Emission Point A7 – TiB_2 Jet Mill

The measured particulate at this emission point was consistently below the ELV during all monitoring periods in 2022.

Figure 3.4



Emission Point A8

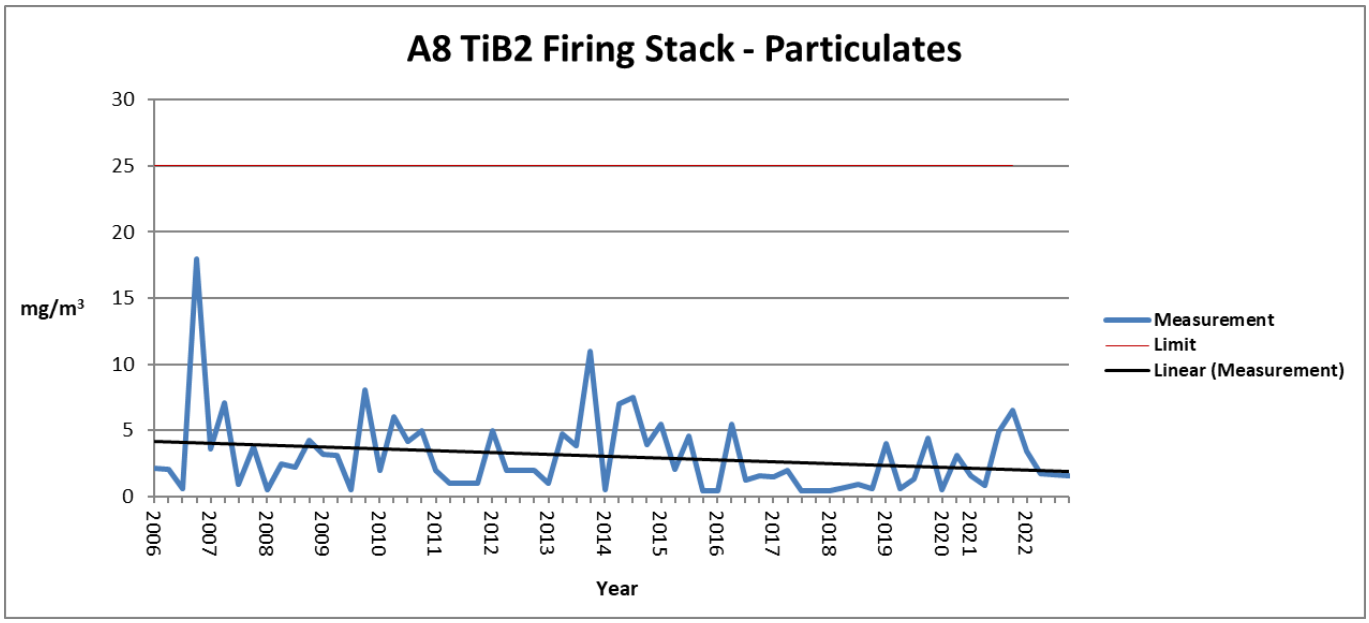
The measured values of particulates and all gases at this emission point were lower than the respective ELV during 2022.

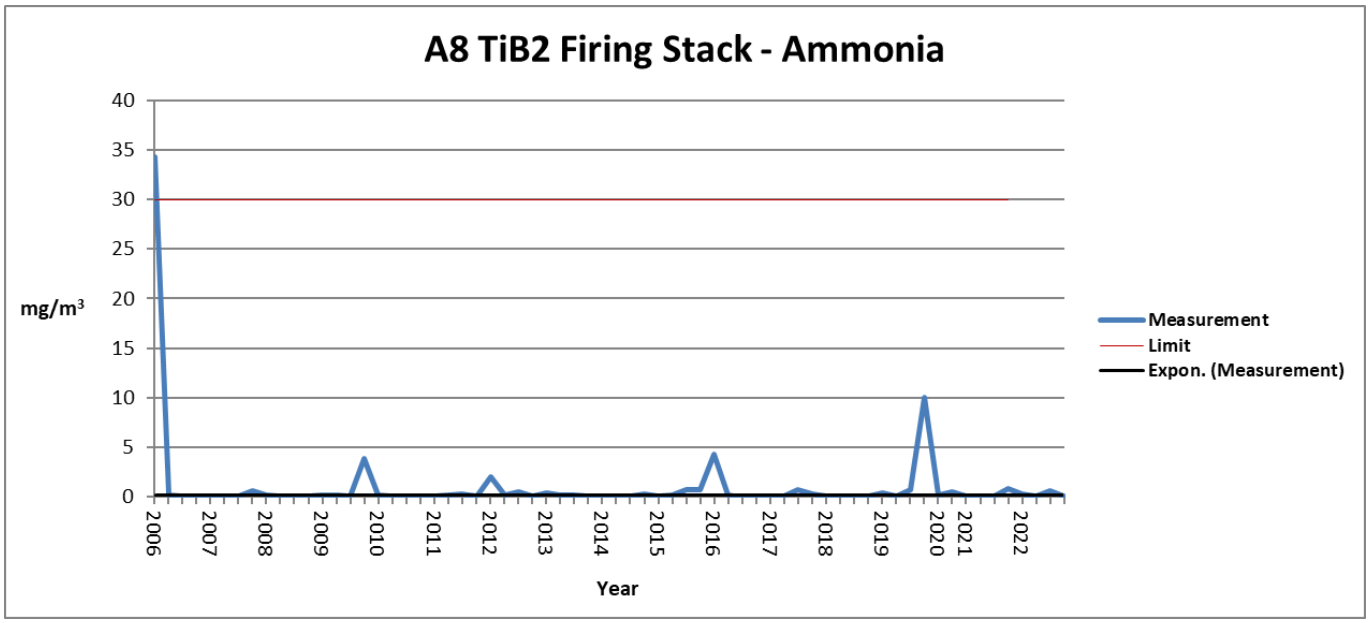
The long-term trend for particulates continues to be downward, which is most likely due to improvements in the maintenance regime that has occurred over the years. The results were low throughout 2022.

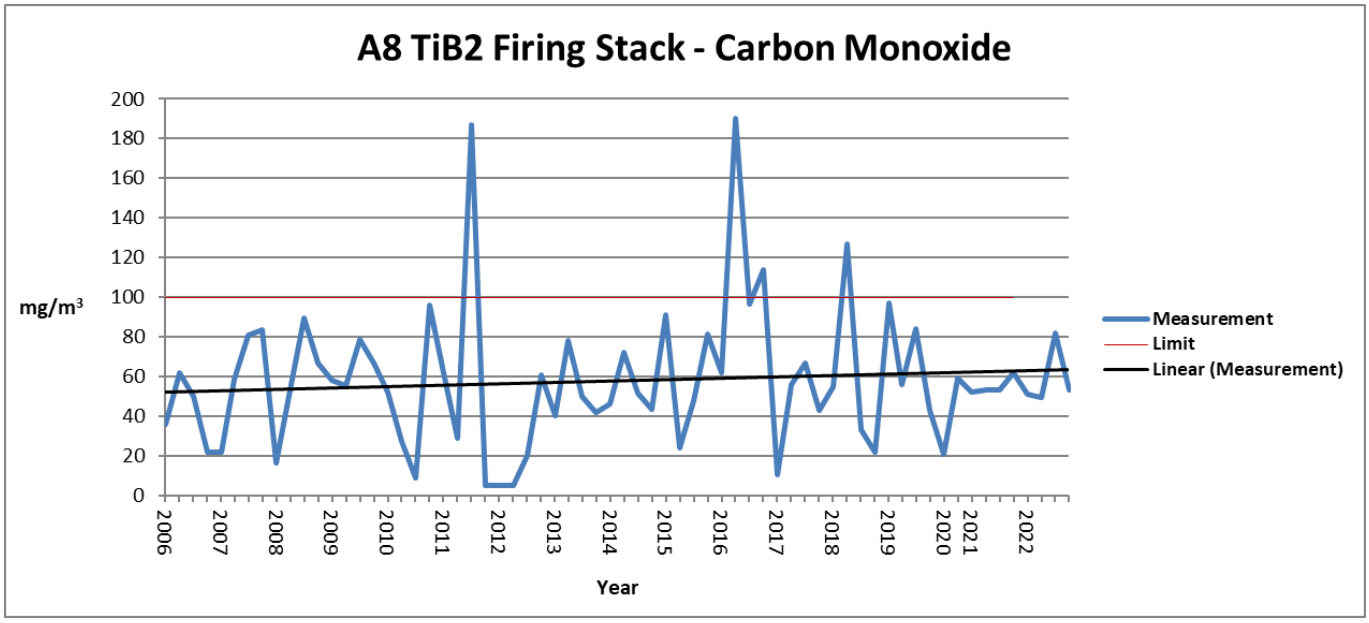
Carbon monoxide has a positive long-term trend but since 2016 a downward trend is evident.

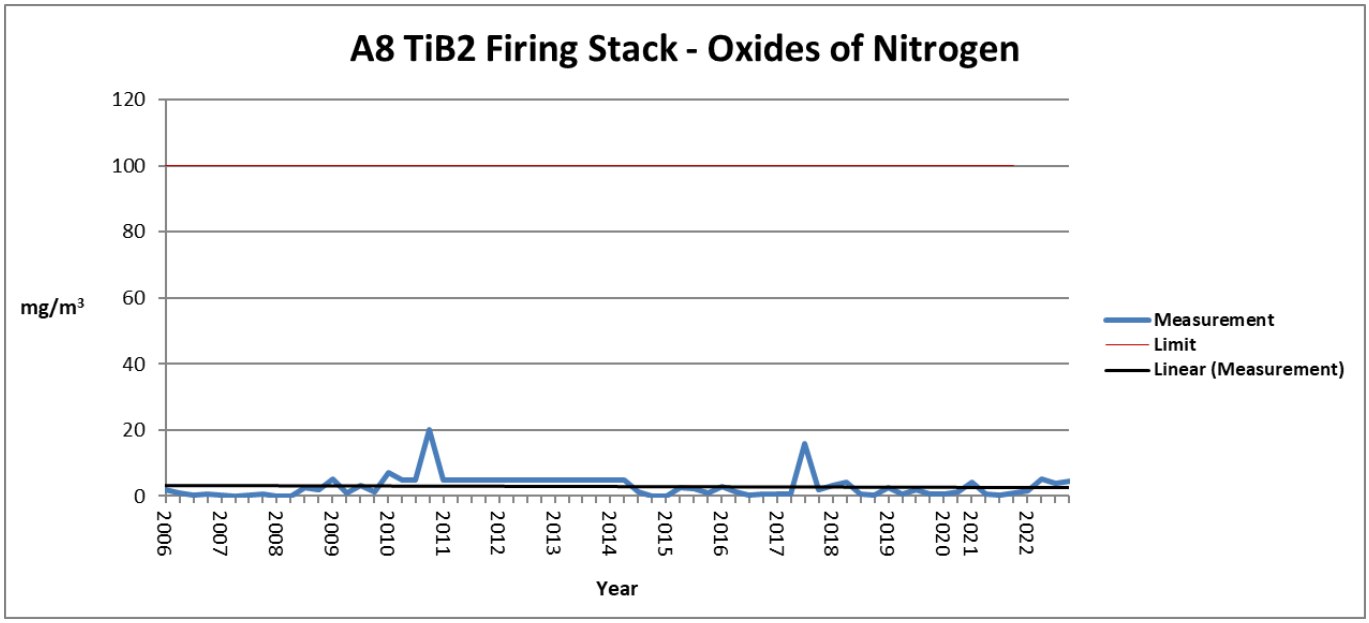
The other gases emitted from A8 are consistently low with no real long-term trends.

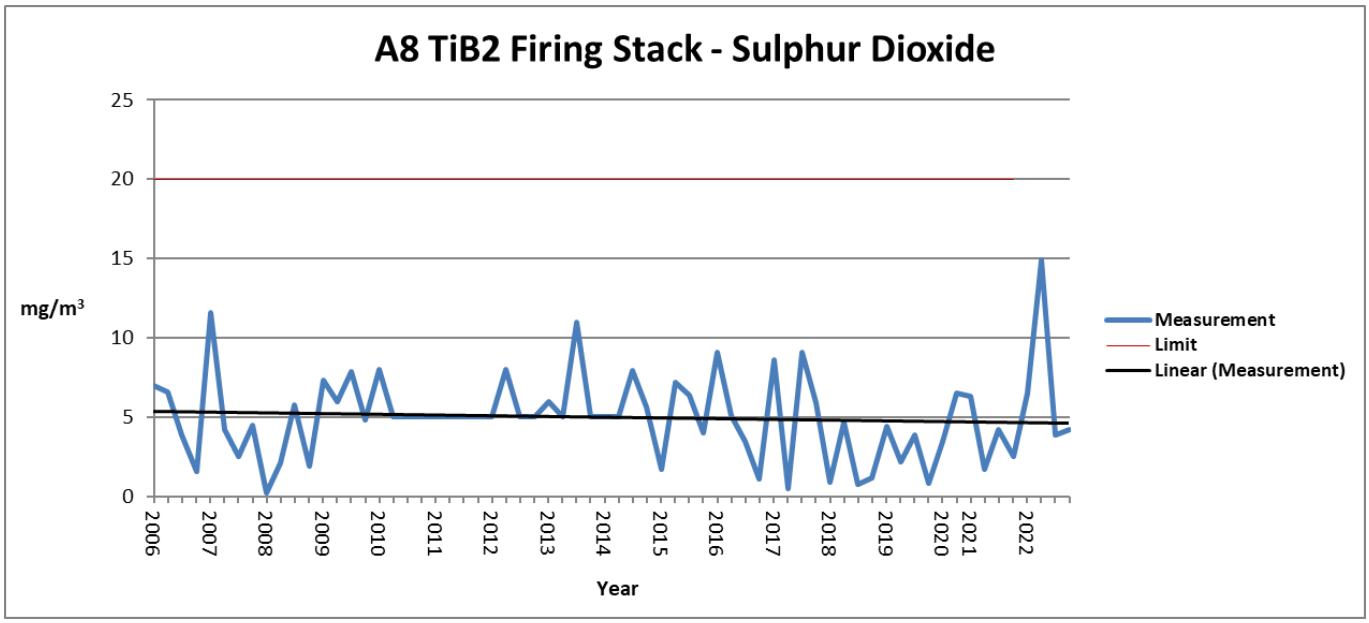
Figure 3.5

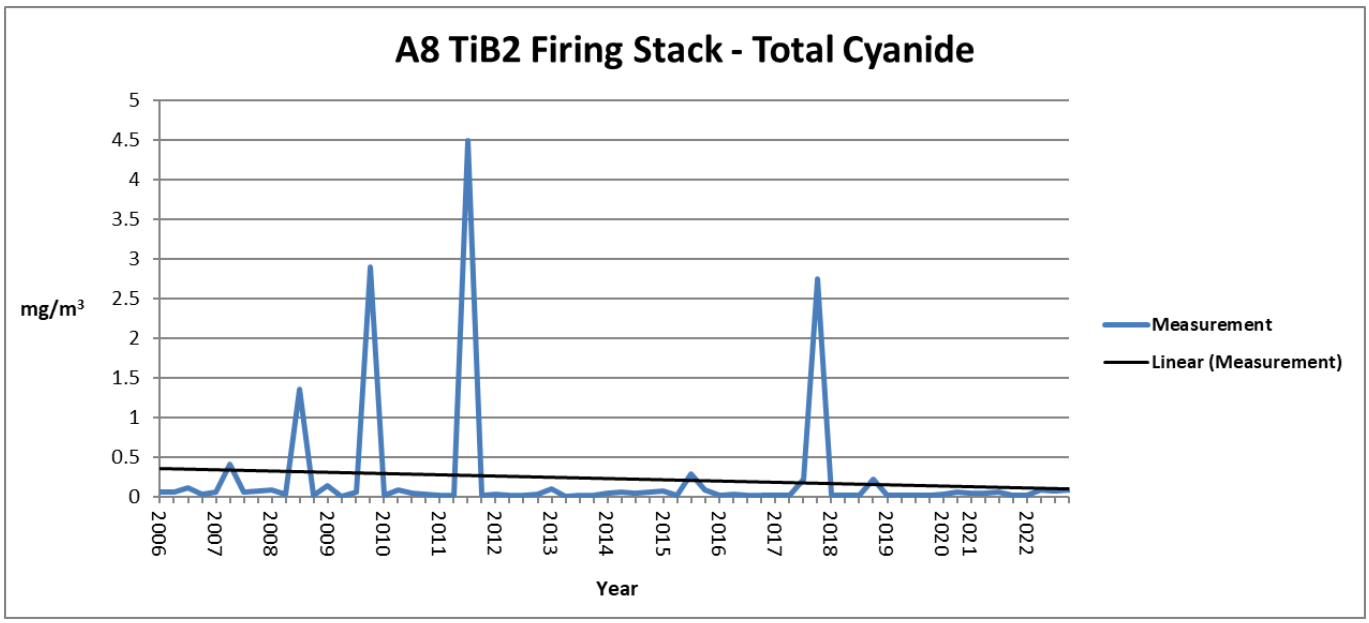





A8 TiB2 Firing Stack - Carbon Monoxide
mg/m³
200
180
160
140
120
100
80
60
40
20
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
Measurement
Limit
Linear (Measurement)


A8 TiB2 Firing Stack - Oxides of Nitrogen
mg/m³
120
100
80
60
40
20
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
Measurement
Limit
Linear (Measurement)


A8 TiB2 Firing Stack - Sulphur Dioxide
mg/m³
25
20
15
10
5
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
Measurement
Limit
Linear (Measurement)


A8 TiB2 Firing Stack - Total Cyanide
mg/m³
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
Measurement
Linear (Measurement)

3.2 – Performance Improvements

3.2.1 Improvements in 2022

Energy efficiency

Energy efficiency continues to improve year on year with a 7.87% increase in energy efficiency in 2022 compared with 2021.

Energy efficiency improvements made in 2022 include:

- installation of more energy efficient drying ovens
- the pre-compaction of raw materials
- replacement of a furnace VIP (electrical induction control) unit with more energy efficient version
- completion of a compressed air leak survey and recommended remedial actions
- a reduction in firing times on our sinter furnaces

Further opportunities to improve energy efficiency are being considered for 2023 which include:

- Recycling of machine shop offcuts
- Installation of more energy efficient furnace technology
- Replacing existing motors with more energy efficient type
- Further reduction in firing and drying process times

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

In 2022, the amount of waste (by weight) produced per ton of product was similar to that in the previous year (4% more).

Material from laboratory samples and filter dust continues to be recycled back into the process.

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 go to landfill.

The biggest opportunity for reducing the quantity of waste going to landfill would be to recycle the waste graphite from our powder production processes. Previous discussions with waste vendors have proved unsuccessful due to contamination concerns, however we are working with our current waste vendor to find a solution.

There is also an opportunity to recycle machine offcuts in the machine shop which will reduce raw material usage in that department if it proves to be successful. This is planned to start in 2022.

Raw Material Efficiency

A review of our raw material efficiency has been completed. There is a specific recipe required for producing our powder products which has been established for many years being determined by material engineers, therefore there is little scope to make changes to raw materials to improve raw material efficiency. Recycling of furnace filter dust, laboratory samples, and reclaimed material from our sister plant in Germany improves raw material efficiency as well as reducing waste. Modernisation of the raw material loading process has allowed us to better contain powder dust which helps to minimise raw material wastage as well as fugitive dust. The opportunity to recycle machine offcuts as mentioned above will also positively impact raw material efficiency.
In terms of water usage efficiency, this has improved by 46% in 2022 compared with 2021 as a result of more frequent meter readings being taken to identify and address excessive water usage more quickly. The wet scrubber tank is also being emptied less frequently which has reduced water usage. The frequency of flushing is currently being reassessed to determine the optimal frequency.

Accident Management Plan

Our emergency procedures (accident management plan) have been reviewed with only minor changes required and made to emergency contact details.