



Permit Number:- EPR/BP3532HX

## End of Year Report 2023

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# **1 – Introduction**

## **1.1 – General Introduction**

This document represents Kennametal Manufacturing UK Ltd's performance report for the calendar year 2023 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' reën 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 2023 are tabled below. All of the monitoring results in 2023 were below the respective emission limit values (ELVs), except for ammonia from emission point A1 in Q4.

Table 3.1 Emissions Monitoring Results for 2023

|                          |                           |                              | 2023                               |                                    |                                    |                                    |                        |               |
|--------------------------|---------------------------|------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------|---------------|
|                          |                           |                              | 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                           | 6.5                                | 2.5                                | 1.77                               | 5.6                                | 4.09                   | 16.37         |
|                          | Ammonia                   | 30                           | 9.8                                | 0.98                               | 0.21                               | 151                                | 40.50                  | 161.99        |
|                          | Carbon Monoxide           | 200                          | 54.6                               | 65                                 | 98.5                               | 64.7                               | 70.70                  | 282.80        |
|                          | NOx                       | 100                          | 25                                 | 84                                 | 14                                 | 15                                 | 34.50                  | 138.00        |
|                          | Sulphur Dioxide           | 20                           | 12.2                               | 3.3                                | 7                                  | 7.6                                | 7.53                   | 30.10         |
|                          | Total Cyanide             | **                           | 0.02                               | 0.41                               | 0.99                               | 8.2                                | 2.41                   | 9.62          |
| A3 BN Jet Mill           | Particulates              | 5                            | 3.17                               | 1.54                               | 1.09                               | 1.41                               | 1.80                   | 7.21          |
| A6 No2 Oven              | Particulates              | 25                           | 7.7                                | 2                                  | 11.1                               | 1.9                                | 5.68                   | 22.70         |
| A7 TiB2 Mill             | Particulates              | 5                            | 1.38                               | 3.4                                | 2.22                               | 2.3                                | 2.33                   | 9.30          |
| A8 TiB2 Firing Stack     | Particulates              | 25                           | 12.5                               | 0.47                               | 2.65                               | -                                  | 5.21                   | 15.62         |
|                          | Ammonia                   | 30                           | 0.13                               | 0.007                              | 1.96                               | -                                  | 0.70                   | 2.10          |
|                          | Carbon Monoxide           | 100                          | 21.9                               | 82                                 | 75.71                              | -                                  | 59.87                  | 179.61        |
|                          | NOx                       | 100                          | 1.18                               | 2.6                                | 3.06                               | -                                  | 2.28                   | 6.84          |
|                          | Sulphur Dioxide           | 20                           | 12.7                               | 0.8                                | 6.5                                | -                                  | 6.67                   | 20.00         |
|                          | Total Cyanide             | **                           | 0.01                               | 0.05                               | 0.11                               | -                                  | 0.06                   | 0.17          |

\*\* Currently no limit agreed

ELV Exceeded

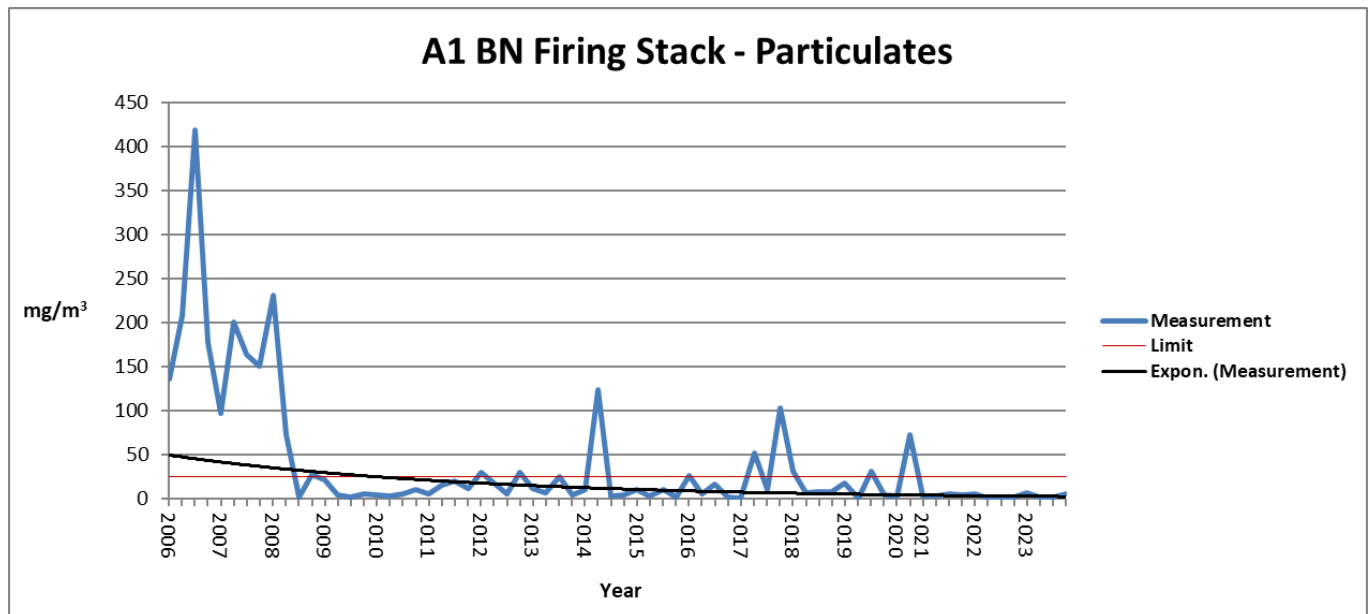
## Emission Point A1 – BN Furnaces Exhaust Stack

All of the monitoring results for this emission point were below the respective 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/m<sup>3</sup>. The cause of this exceedance is currently under investigation. A similar exceedance occurred in 2022 for which action was taken to improve the cleaning regime on the propane afterburner lances. All subsequent testing in 2023 (excluding Q4), produced results which were significantly below the ELV. This included additional testing, carried out in January, over an 8 hour period covering all parts of the process. This latest exceedance is not thought to be in relation to the condition and/or operation of the propane afterburner lances.

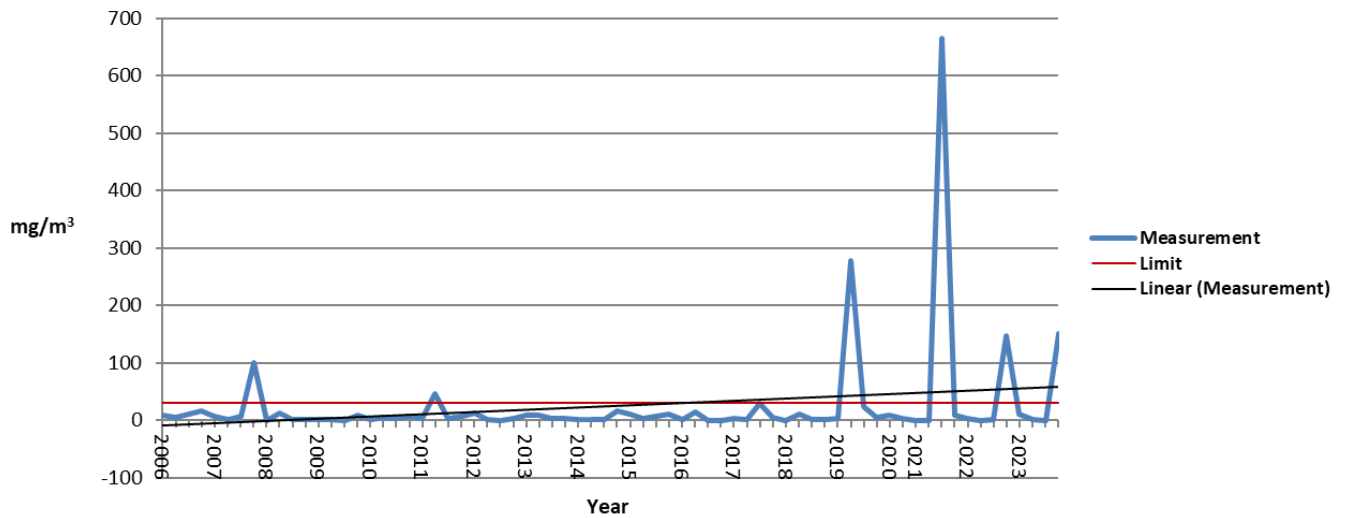
There remains a long-term downward trend for particulates (figure 3.1). There is a long-term upward trend for oxides of nitrogen and cyanide (figure 3.1). There is also an upward trend for ammonia, due to the limit breaches in 2021, 2022 and 2023 (figure 3.1).

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 downward and upward 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.

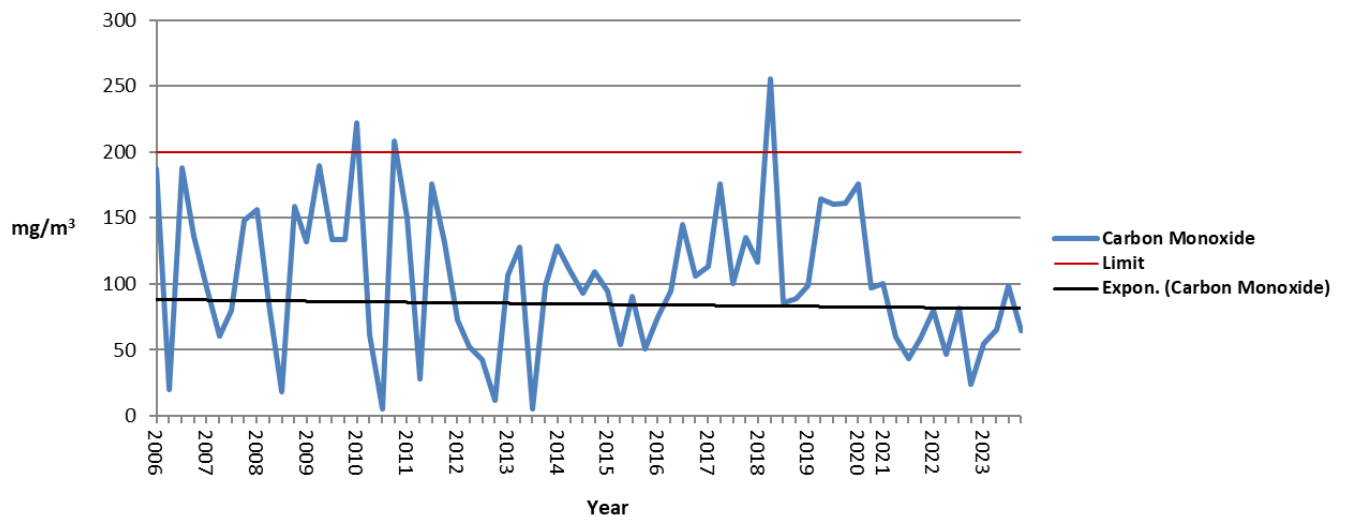
Figure 3.1



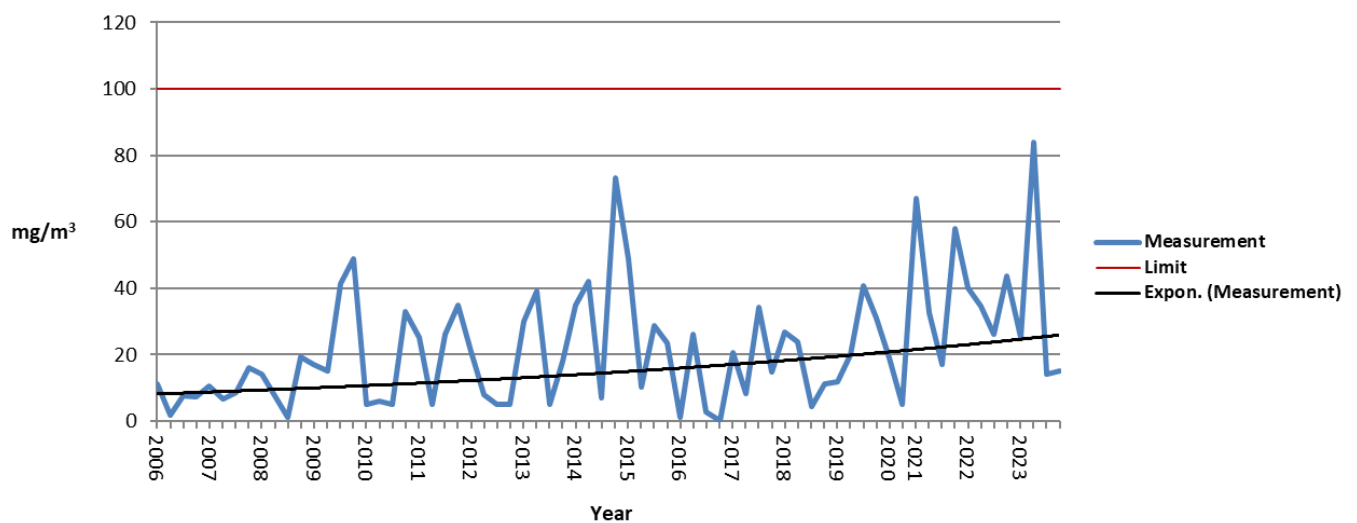
### A1 BN Firing Stack - Ammonia

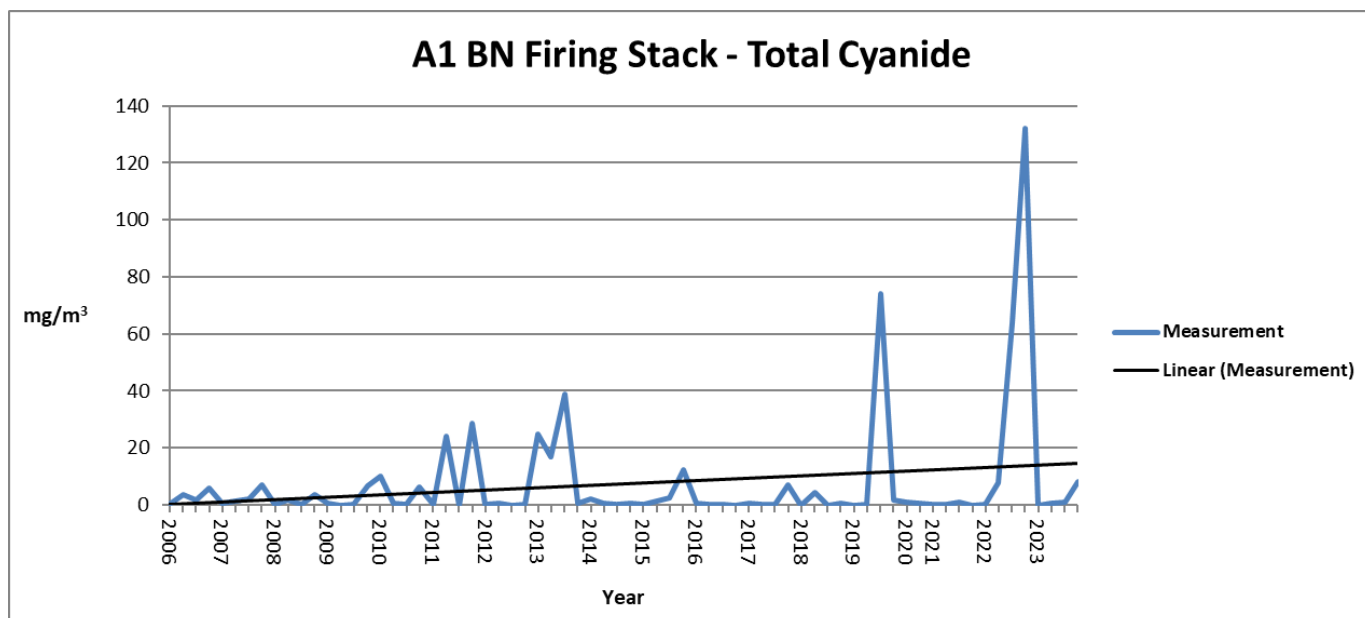


### A1 BN Firing Stack - Carbon Monoxide



### A1 BN Firing Stack - Oxides of Nitrogen





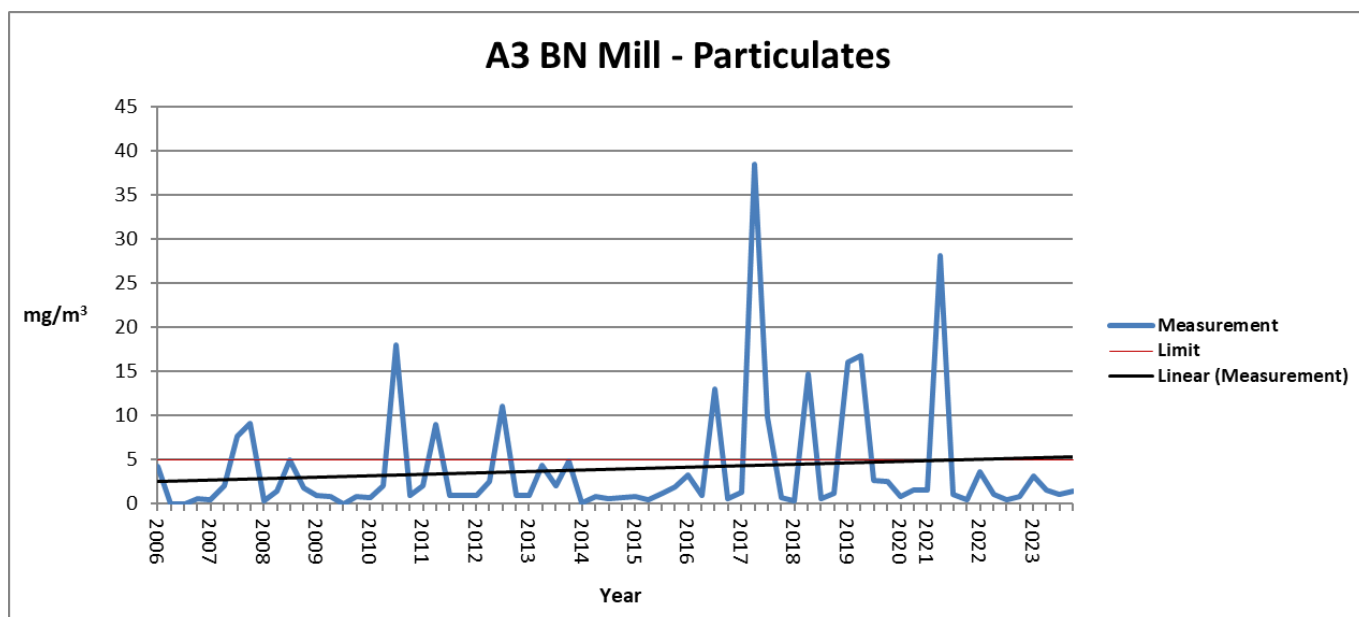
## Emission Point A2

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

## Emission Point A3 – BN Jet Mill

There is a long-term upwards trend for this emission point (figure 3.2) although the short-term trend is downwards and all measurements taken in 2023 were below the limit.

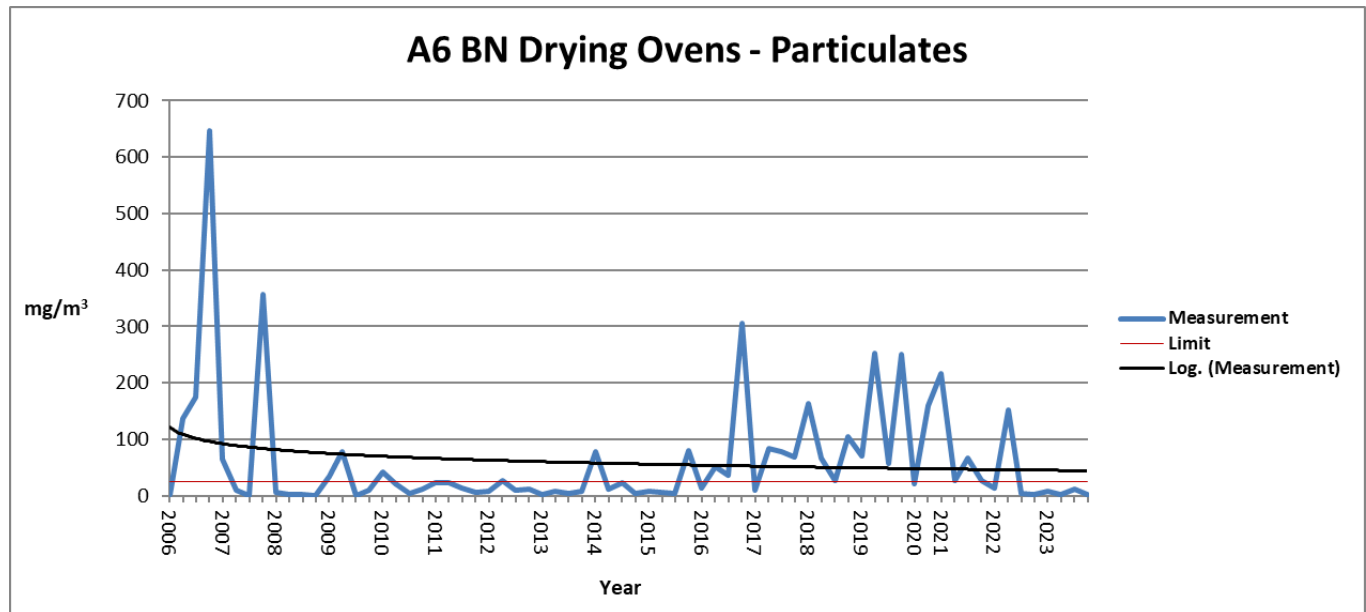
Figure 3.2



## 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. This system continues to effectively remove the particulate emitted from the process. All results in 2023 were significantly lower than those experienced in previous years and comfortably below the limit with an average result of 5.68 mg/m<sup>3</sup> for the year. This has therefore resulted in a downtrend (figure 3.3) in particulate emissions.

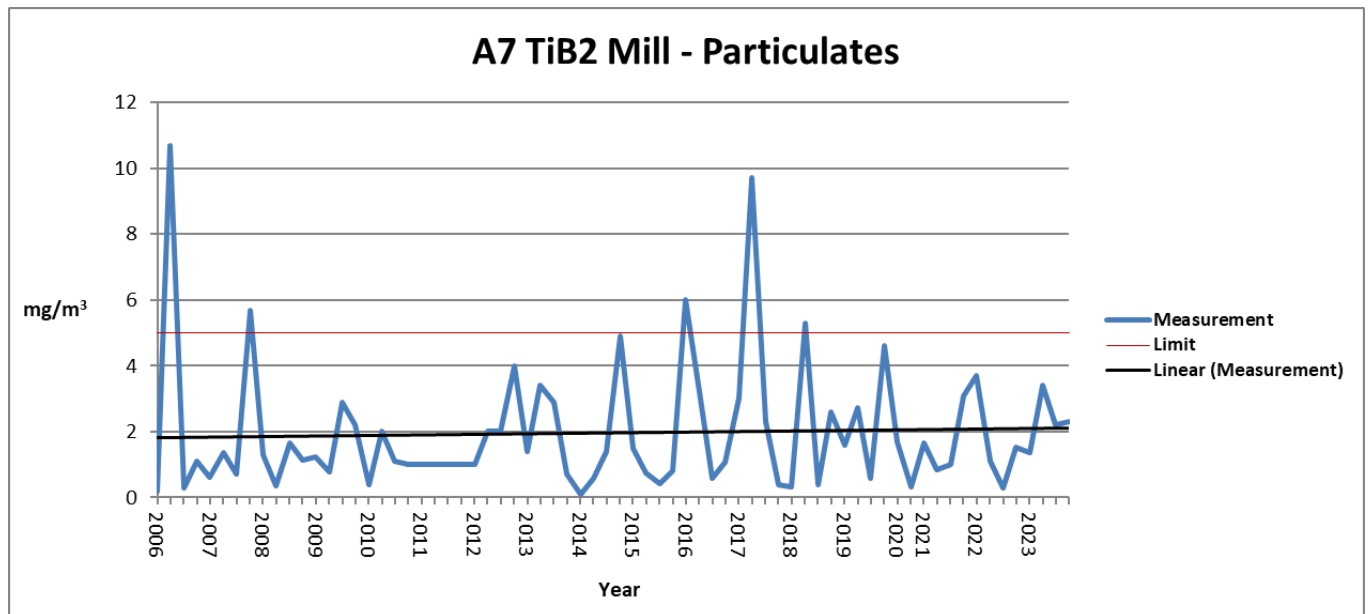
Figure 3.3



## Emission Point A7 – Tib<sub>2</sub> Jet Mill

The measured particulate at this emission point was consistently below the ELV during all monitoring periods in 2023.

Figure 3.4



### Emission Point A8

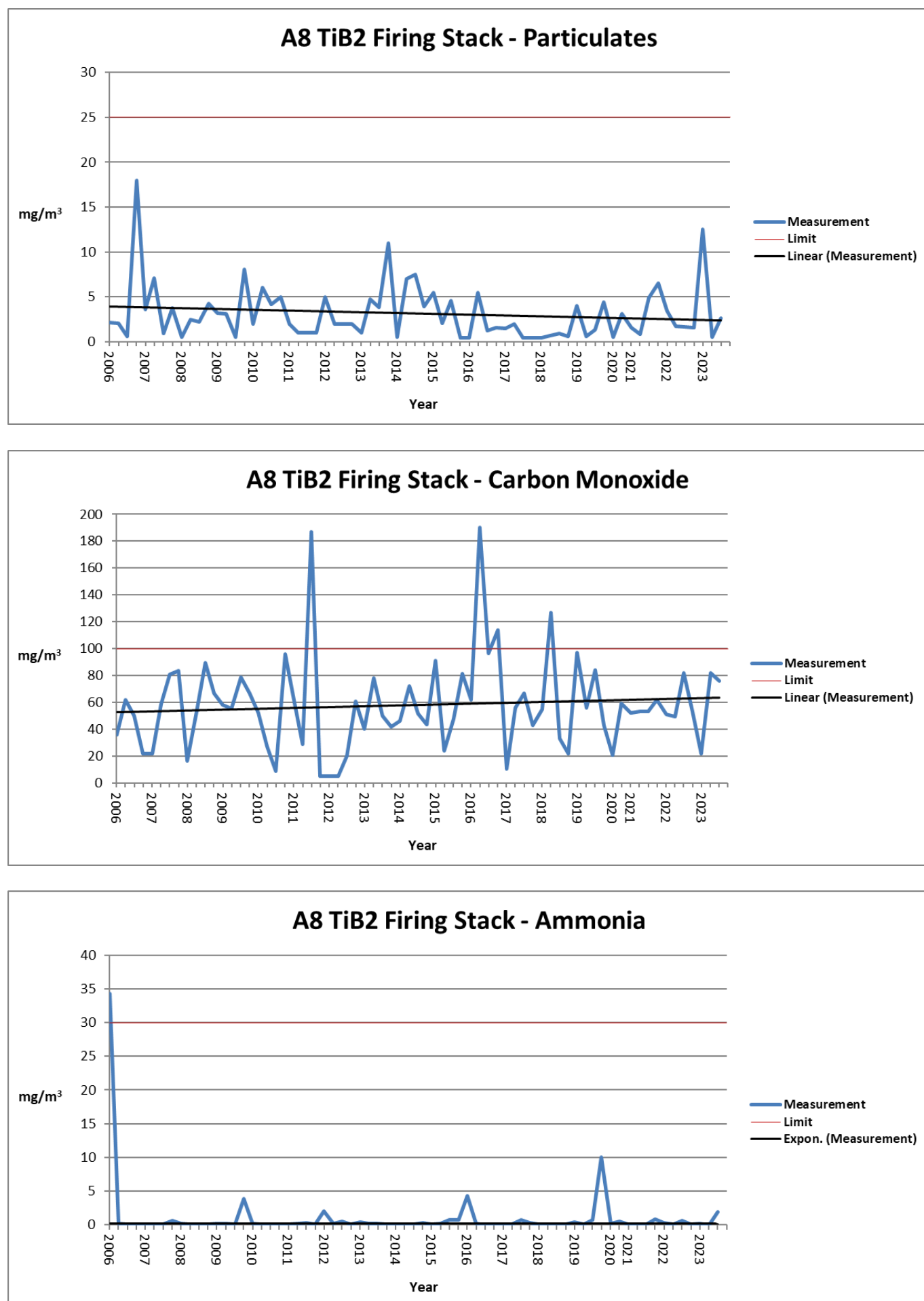
The measured values of particulates and all gases at this emission point were lower than the respective ELV during 2023. No monitoring was carried out in Q4, however, as prior to Q4's emissions monitoring, the TiB2 firing operations responsible for the emissions at emission point A8, had ceased. There are currently no plans to resume TiB2 firing operations, therefore, emissions monitoring will not take place at this emission point for the foreseeable future.

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 2023.

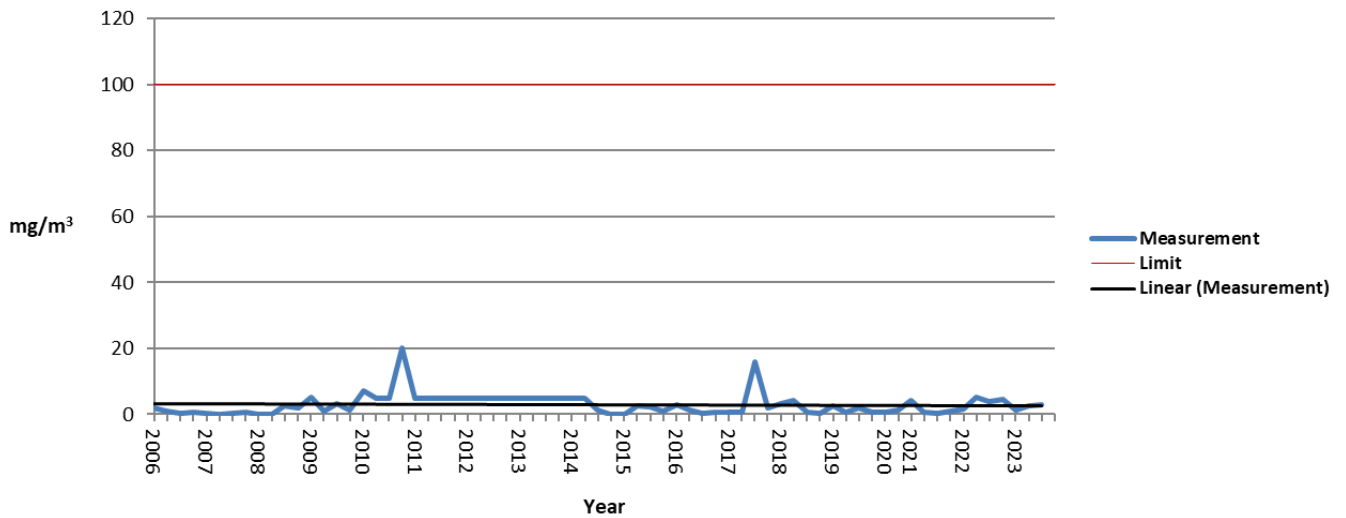
Carbon monoxide has a positive long-term trend but since 2016 a downward trend is evident.

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

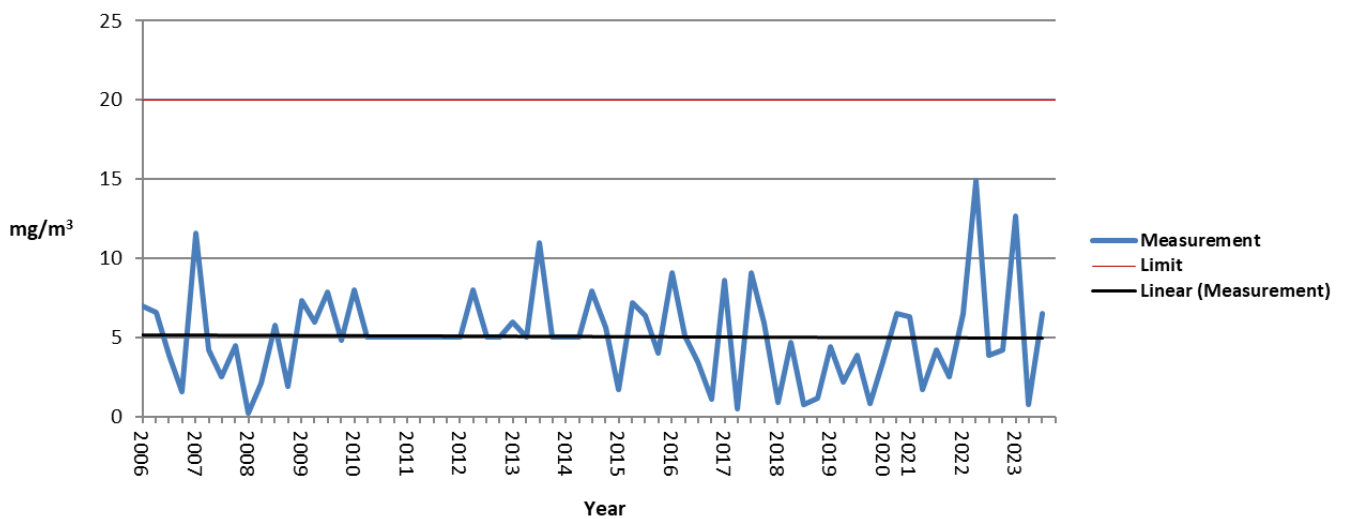
Figure 3.5



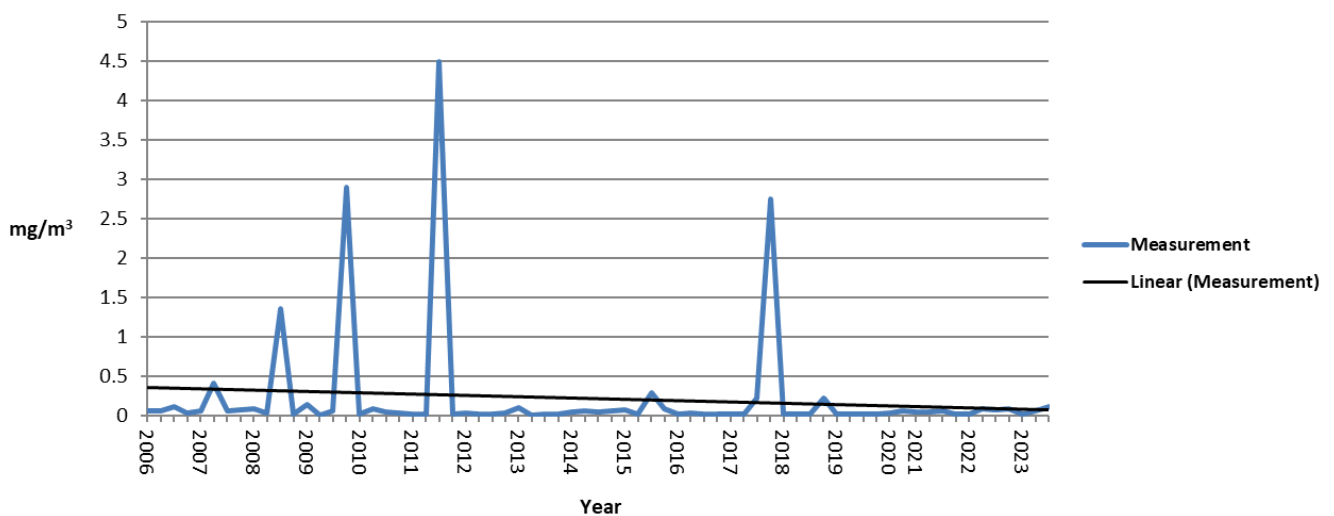
### A8 TiB2 Firing Stack - Oxides of Nitrogen



### A8 TiB2 Firing Stack - Sulphur Dioxide



### A8 TiB2 Firing Stack - Total Cyanide



## **3.2 – Performance Improvements**

### **3.2.1 Improvements in 2023**

#### **Energy efficiency**

Energy efficiency continues to improve year on year with a 14% increase in energy efficiency in 2023 compared with 2022. Note that the decline and eventual stop in production of TiB<sub>2</sub> material during 2023 would have some impact on this figure as it is calculated based on total tonnage of material produced.

Energy efficiency improvements made in 2023 include:

- replacement of a furnace VIP (electrical induction control) unit with more energy efficient version
- a reduction in firing times on our sinter furnaces
- installation of more energy efficient extraction motors
- removal of water-cooling system in the Hot Pressing department as it provided no significant benefit to cooling times

Further opportunities to improve energy efficiency are being considered for 2024 which include:

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

The final product continues to have 28-31% reclaim material included. Material that would otherwise, require consumption of more raw materials and energy for production.

#### **Waste**

In 2023, the amount of waste (by weight) produced per ton of product was 7% less than in 2022.

Material from laboratory samples continues to be recycled back into the process however, this is unfortunately no longer the case for filter dust as this was causing quality issues with the product.

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.

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. We are yet to find a solution to this but potential solutions continue to be explored.

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. Trials are ongoing.

## **Site Protection & Monitoring Programme (SPMP)**

The Site Protection and Monitoring Programme has been reviewed. No changes to the plan have been made as the plan remains adequate and applicable to current circumstances. There have been no significant changes to our operations over the years which would require any changes to the plan.