



Permit Number:- EPR/BP3532HX

End of Year Report 2018

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1 – Introduction

1.1 – General Introduction

This document represents Kennametal Manufacturing UK Ltd's performance report for the calendar year 2018 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 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), 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' rean 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 2018 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 2018

			2018					
			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	31.3	7	8.2	7.9	13.6	54.4
	Ammonia	30	0.04	0.4	0.77	0.43	0.41	1.64
	Carbon Monoxide	200	116.2	255	85.8	89	136.42	545.7
	NOx	100	26.67	24	4.4	11.1	16.54	66.17
	Sulphur Dioxide	20	3.82	9.4	0.8	2.8	4.2	16.82
	Total Cyanide	**	0.013	4.2	0.01	0.44	1.17	4.66
A3 BN Jet Mill	Particulates	5	0.35	14.7	0.61	1.2	4.21	16.86
A6 No2 Oven	Particulates	25	163.5	66.9	26.7	105	90.53	362.1
A7 TiB2 Mill	Particulates	5	0.31	5.3	0.4	2.6	2.15	8.61
A8 TiB2 Firing Stack	Particulates	25	0.45	0.66	0.9	0.58	0.65	2.59
	Ammonia	30	0.09	0.11	0.01	0.07	0.07	0.28
	Carbon Monoxide	100	55.1	127	33.4	22	59.38	237.5
	NOx	100	3.2	4.1	0.6	0.21	2.03	8.11
	Sulphur Dioxide	20	0.9	4.7	0.8	1.2	1.9	7.6
	Total Cyanide	**	0.01	0.01	0.02	0.22	0.065	0.26

** 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 2018, except for particulates in Q1 and carbon monoxide in Q2.

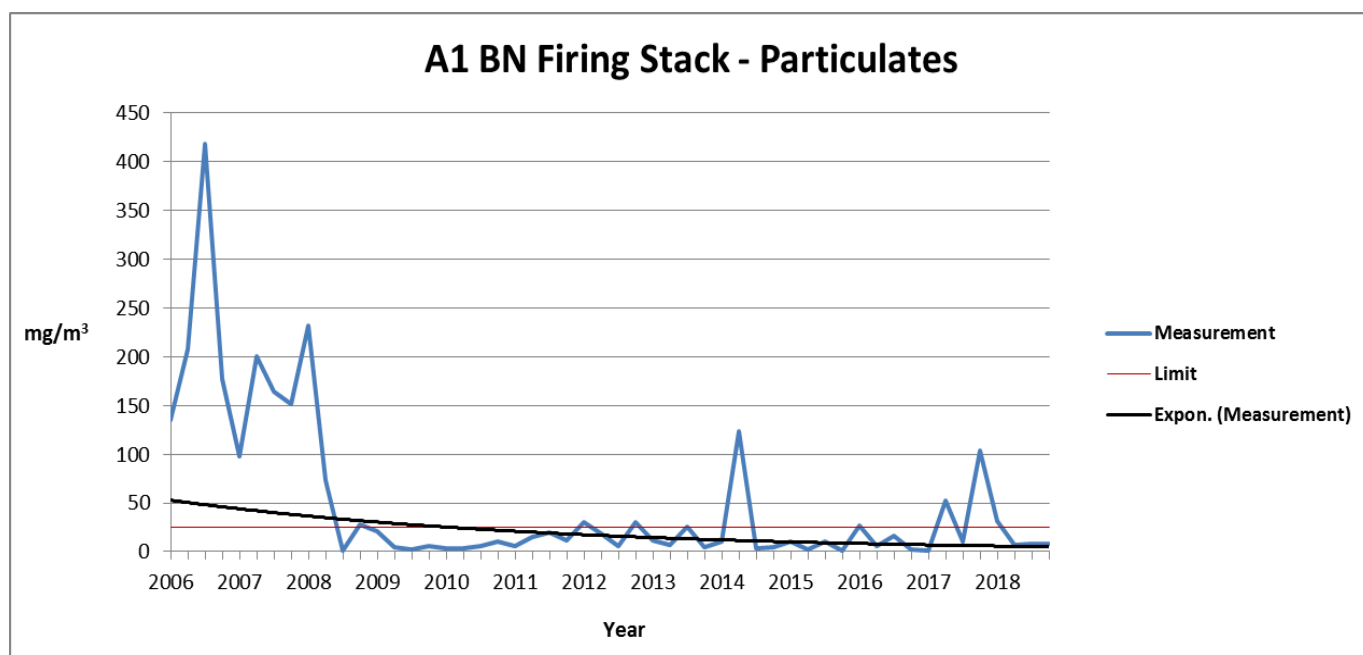
The particulate exceedance was most likely due to one or more damaged filter socks. A rigorous maintenance regime is already in place but unfortunately, due to the number of filter socks involved (384), it is impossible to ensure that all socks are in good condition all of the time. The other two measurements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

The carbon monoxide exceedance, which was anomalously high, was most likely due to a peak in the process.

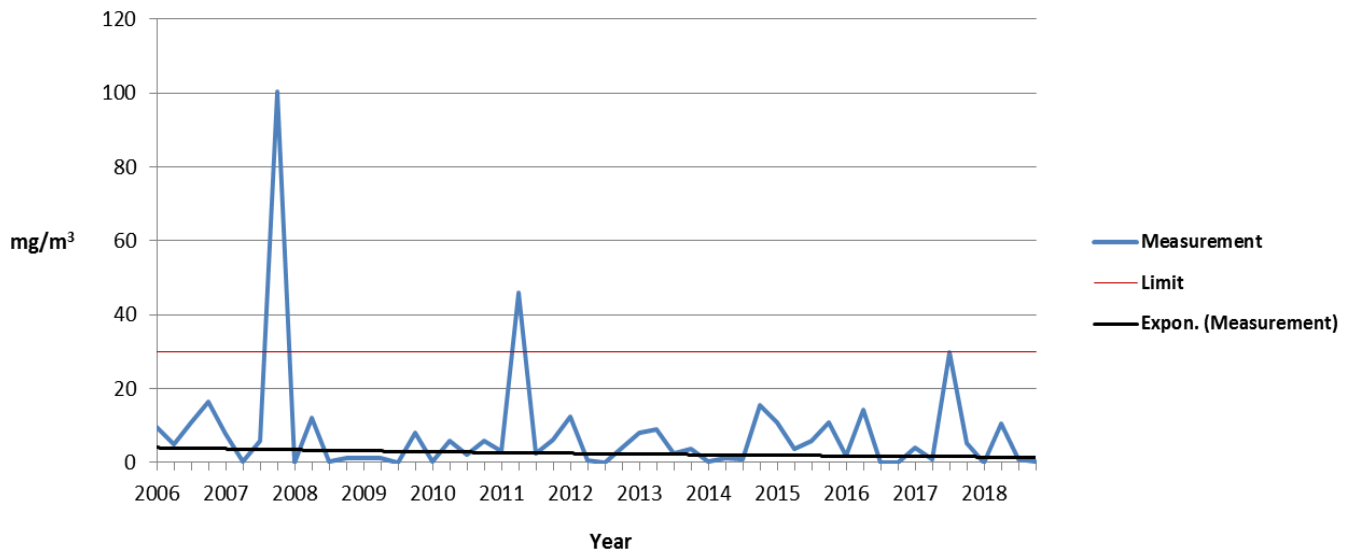
There remains a long term negative trend for particulates, ammonia, sulphur dioxide and total cyanide (figure 3.1). There is a long term positive trend for oxides of nitrogen and carbon monoxide (figure 3.1). The positive trend for carbon monoxide is largely due to the anomalously high reading in Q2.

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.

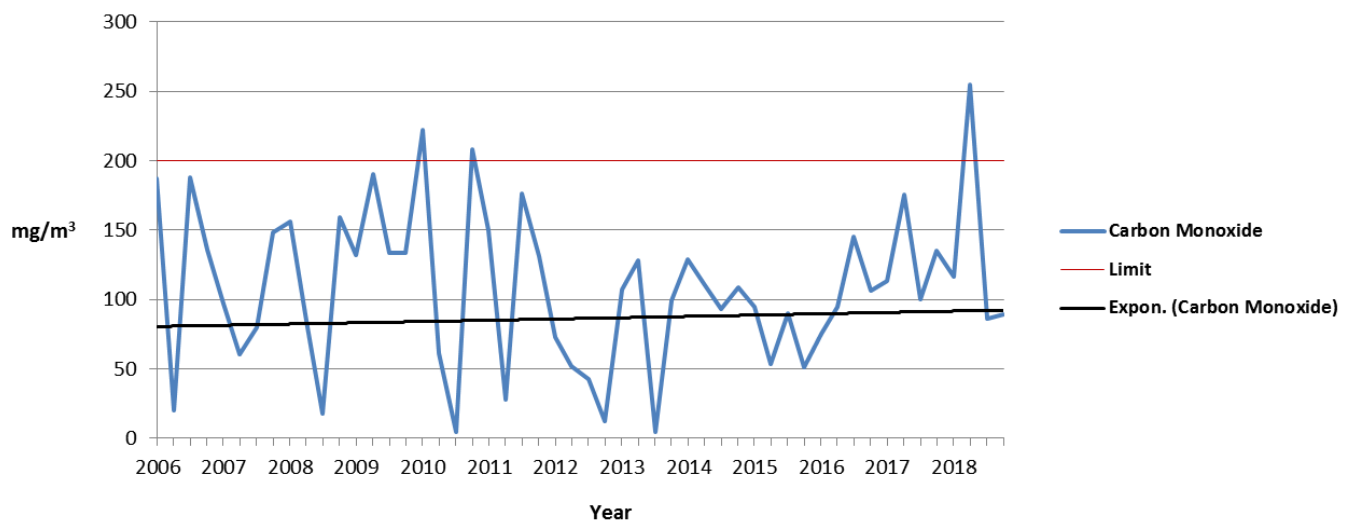
Figure 3.1



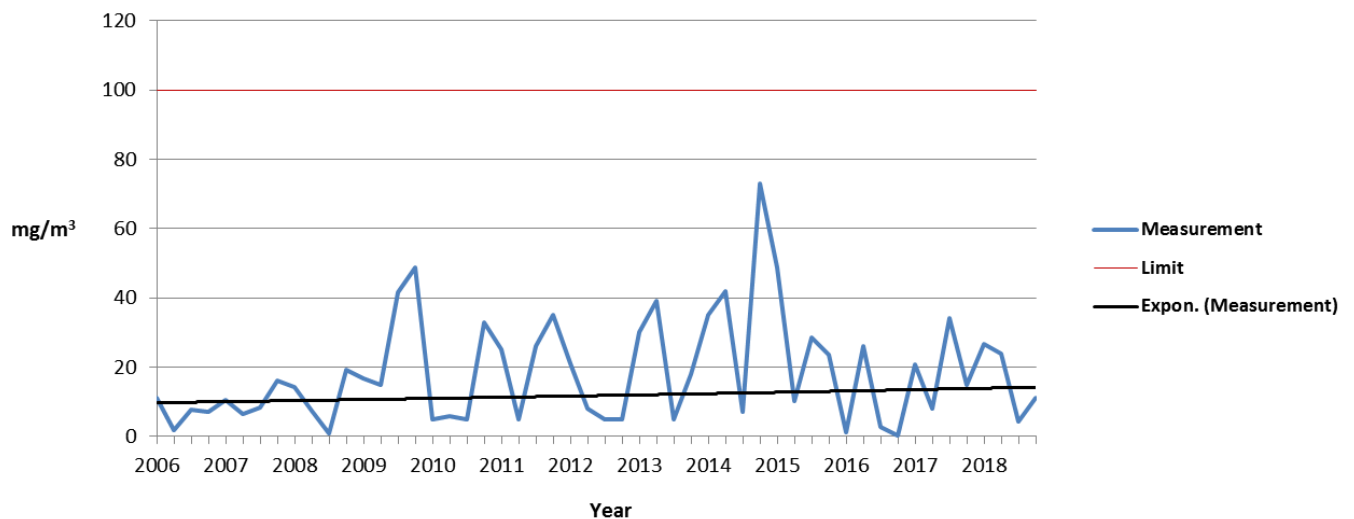
A1 BN Firing Stack - Ammonia

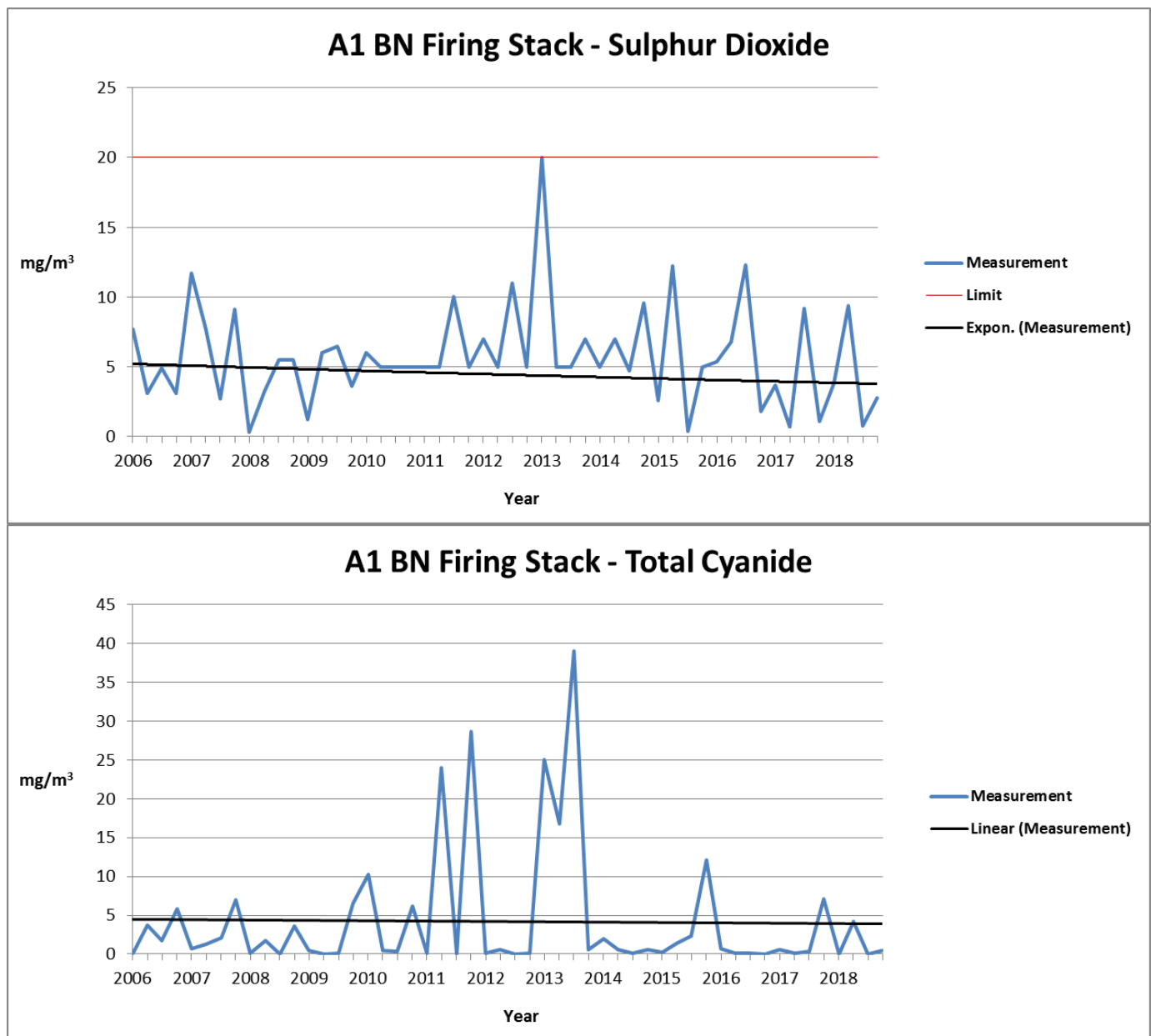


A1 BN Firing Stack - Carbon Monoxide



A1 BN Firing Stack - Oxides of Nitrogen





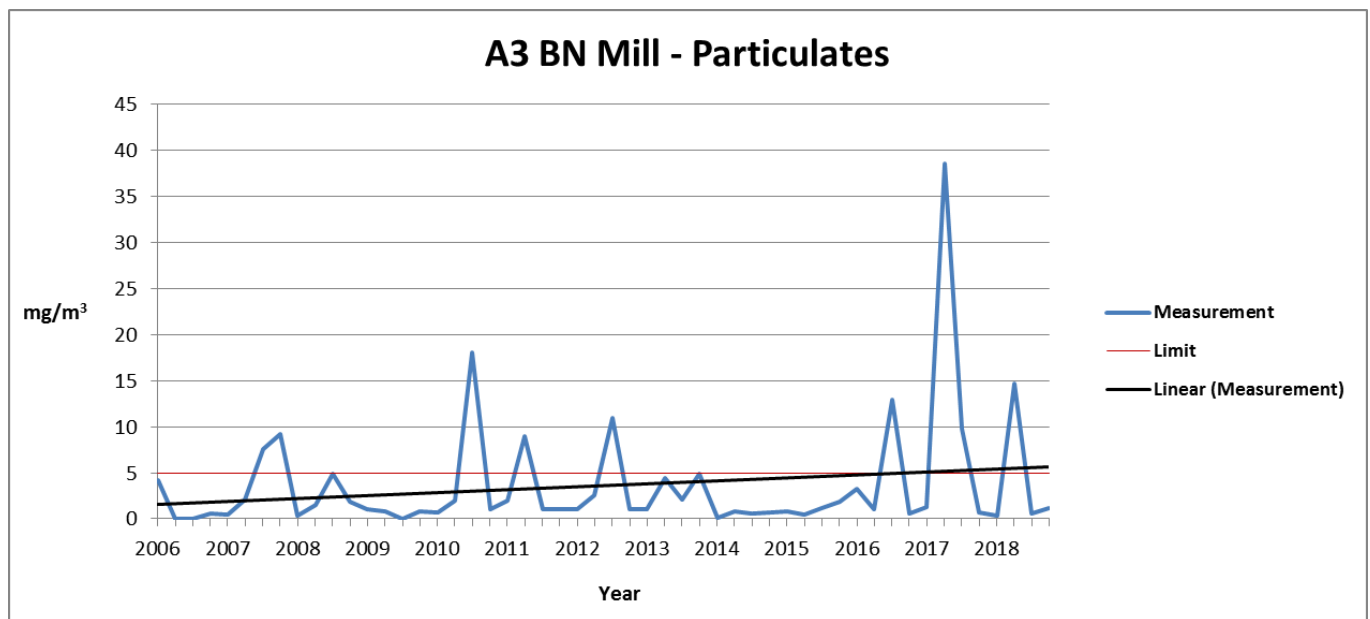
Emission Point A2

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 during all monitoring periods in 2018, except for Q2. The cause of this exceedance was found to be a damaged HEPA filter. This damage occurred between the weekly maintenance inspections (previously monthly). There is a long term positive trend for this emission point (figure 3.2) due to occasional high results, but Q1, Q3 and Q4 results were comfortably below the limit.

Figure 3.2



Emission Point A6 – BN Drying Ovens

There is an ongoing issue with this emission point and we are working closely with NRW to address this.

The limit is being exceeded frequently.

Numerous unsuccessful attempts have been made to reduce the concentration of particulate being emitted from the oven.

It has been determined, however, through analysis of the monitoring data obtained since 2011 and production records, that whether or not the limit has been exceeded has been entirely down to the stage in the process at which the sample was taken. Limit exceedances have always coincided with sampling undertaken during peak emissions (figure 3.4). This tells us that the scrubber has always been unable to adequately abate particulates during times of peak emissions. It also tells us that this gave the impression that the concentration of particulate increased post 2014, where in fact more of the sampling was undertaken during the period of peak emissions.

Emissions data obtained to date, shows that there is a peak in emissions towards the beginning of the process cycle, normally between one and six hours. This is followed by a large period of time (several hours) where emissions are significantly lower and comfortably below the limit. Therefore the high measurements are not representative of the entire cycle.

The suitability of continuous emissions monitoring equipment (CEM) is currently being evaluated. This CEM equipment will allow us and NRW to better understand how the concentration of particulates changes through the process cycle. This equipment would also enable us to quickly see how changes to the process and abatement affect the emission of particulates over the entire oven cycle.

Figure 3.3

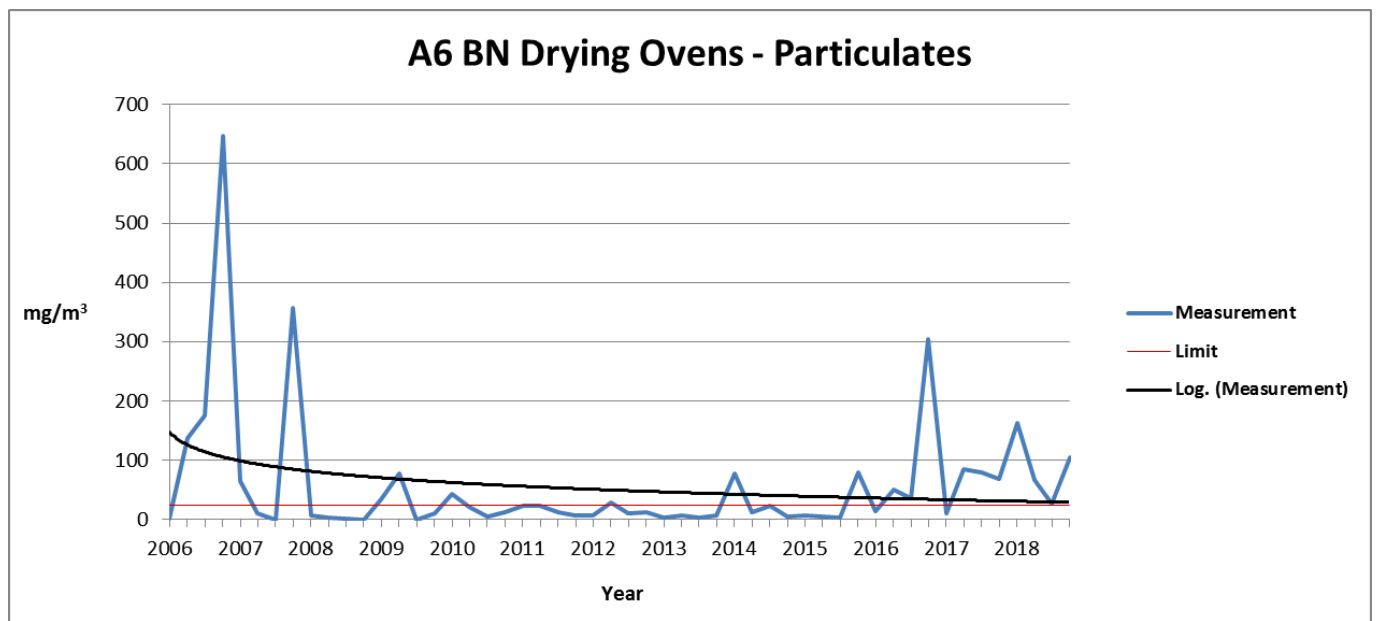
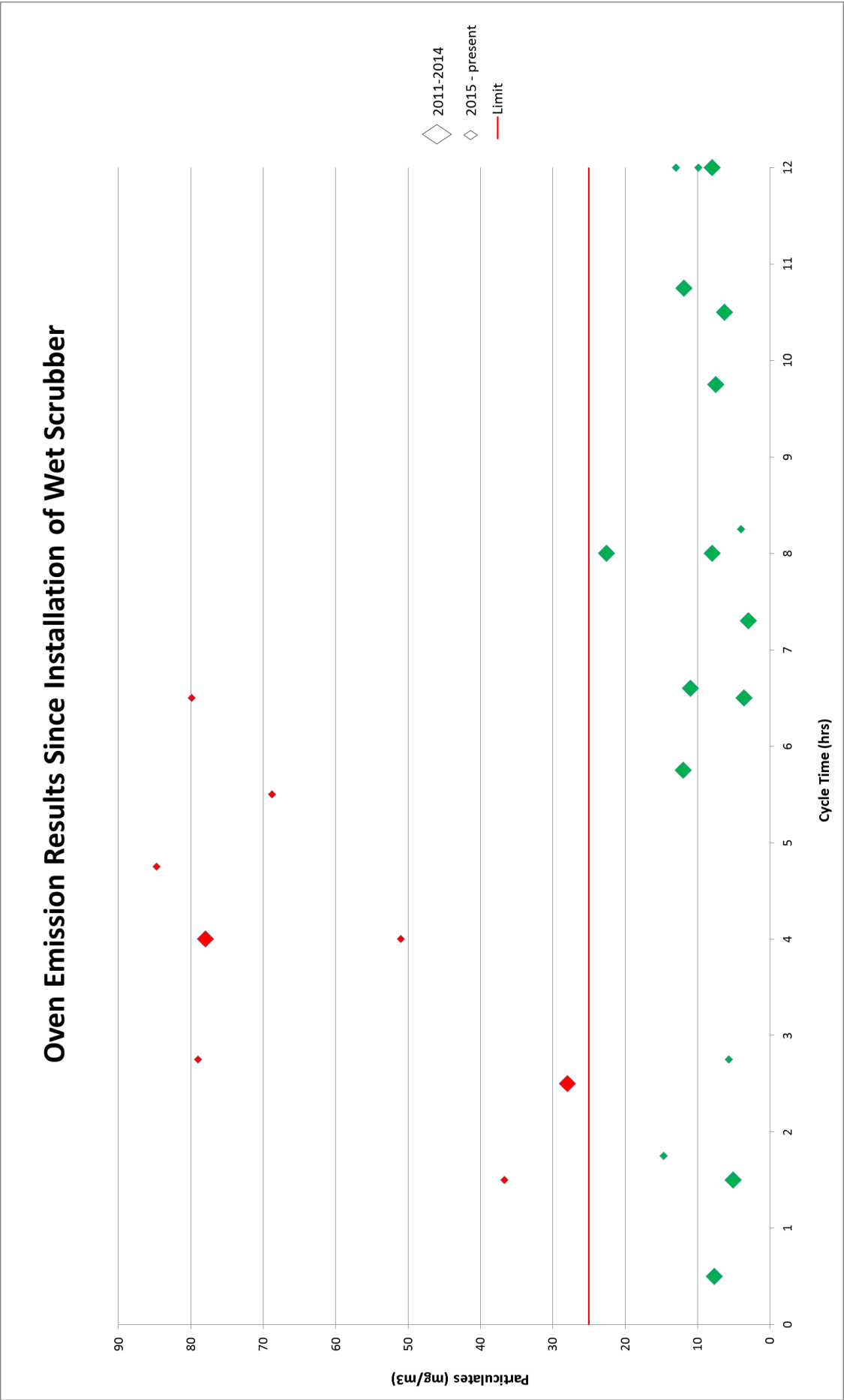


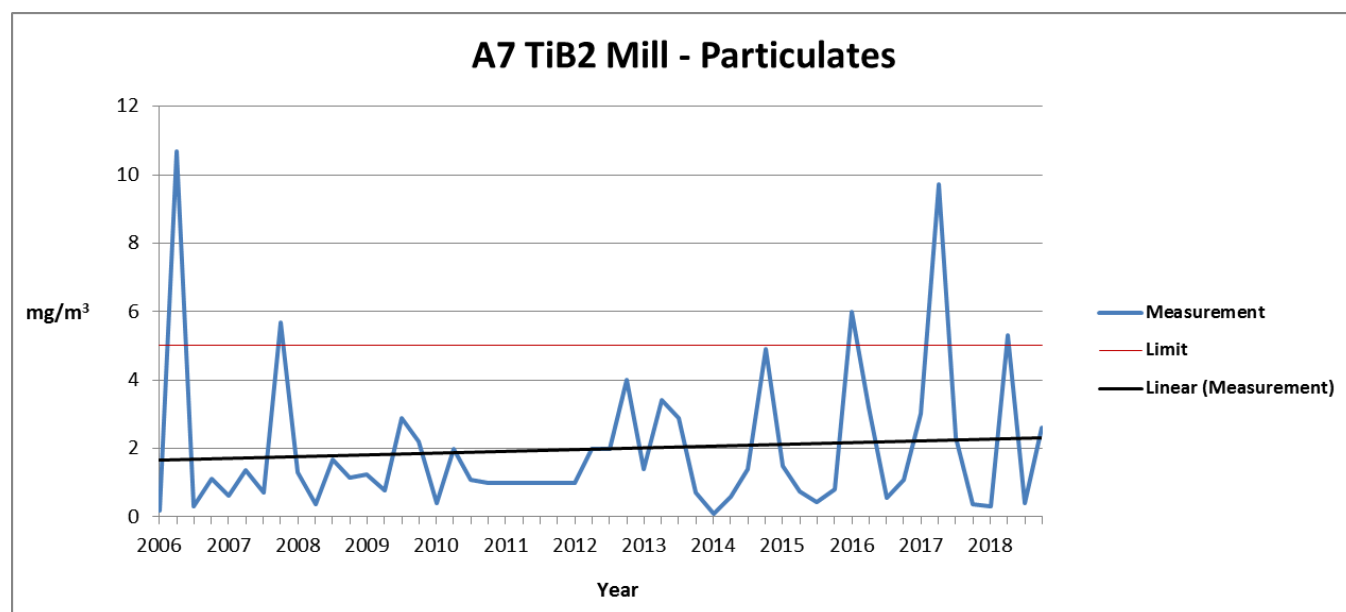
Figure 3.4



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 2018, except for Q2, where the limit was exceeded by a mere 0.3 mg/m³. The cause of this exceedance was found to be a damaged HEPA filter which occurred between the weekly maintenance inspections (previously monthly). The results for Q1, Q3 and Q4 were significantly below the limit. Due to a limit exceedance in each of the last four years, the long term trend is now slightly positive (figure 3.5).

Figure 3.5



Emission Point A8

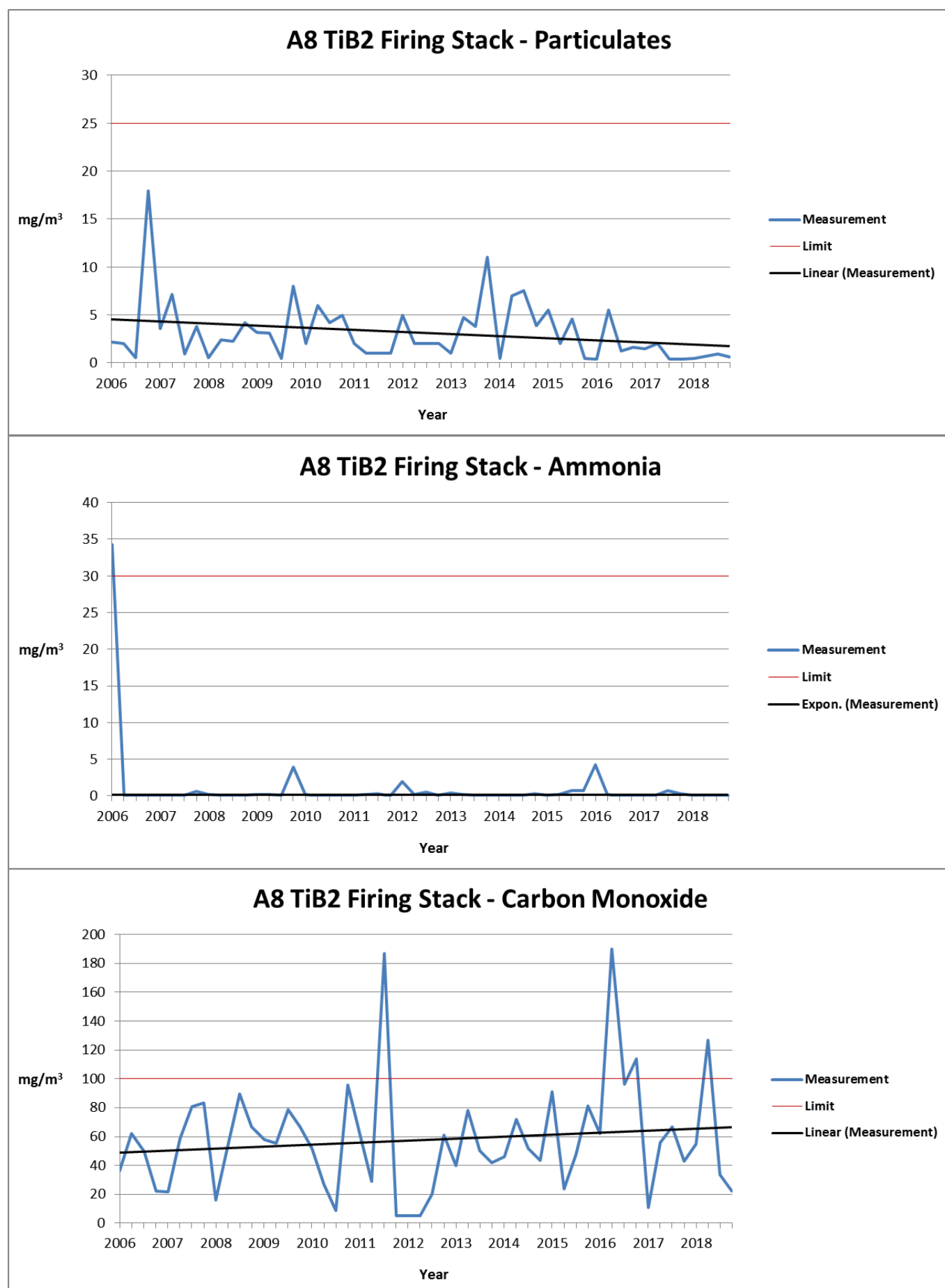
The measured values of particulates and all gases at this emission point were lower than the respective ELV during 2018 except for carbon monoxide in Q2.

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 very low throughout 2018.

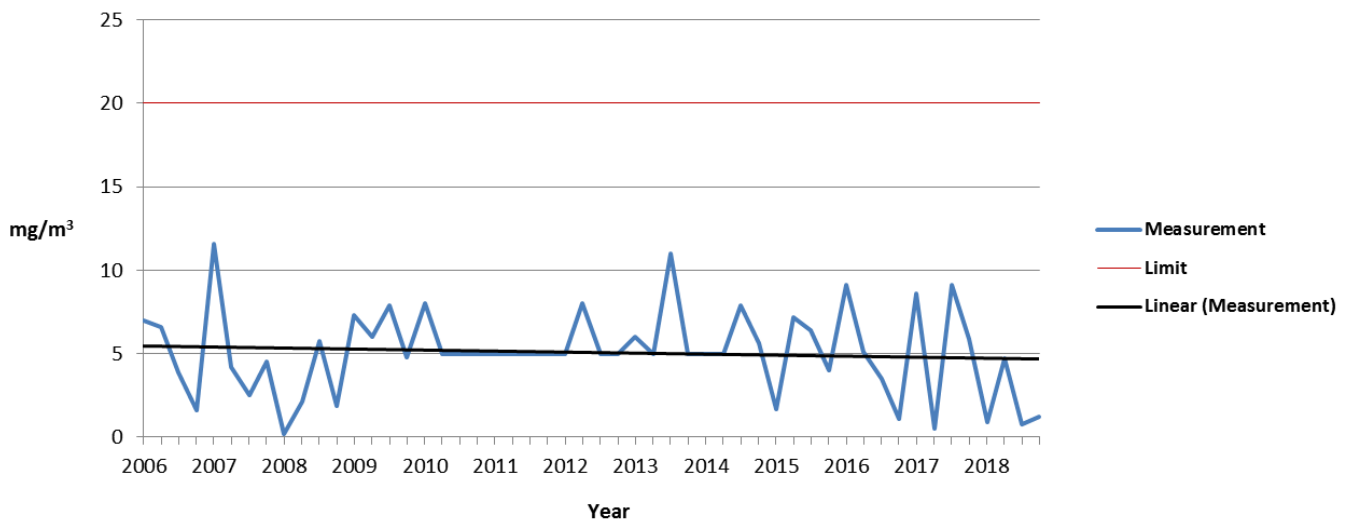
Carbon monoxide has a positive long term trend which is largely due to anomalously high readings that have occurred occasionally over the last few years including one in 2018.

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

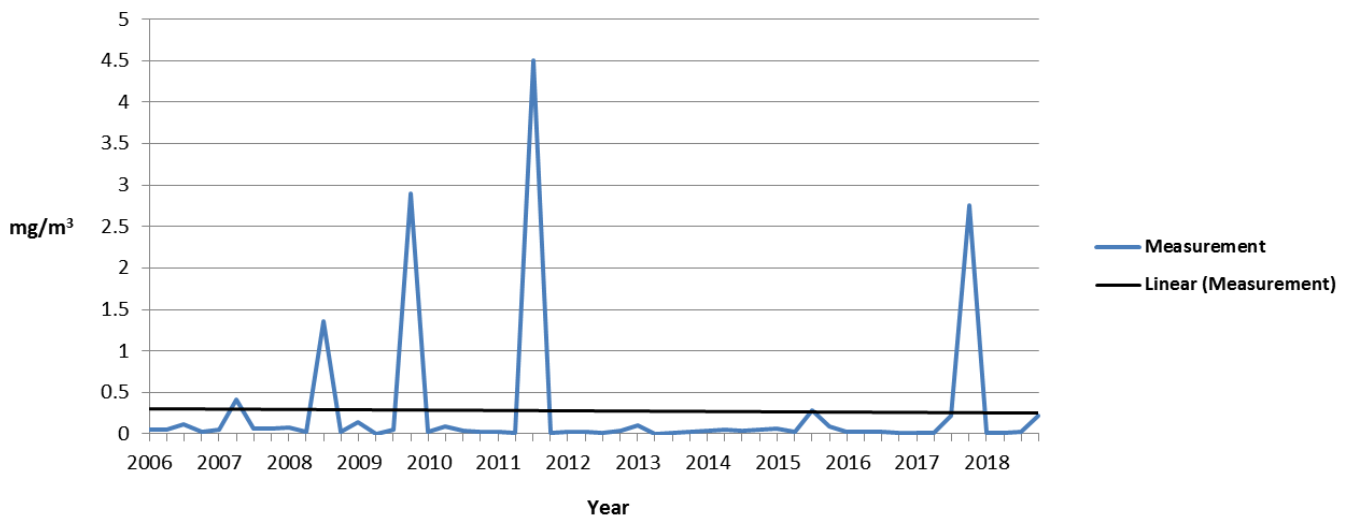
Figure 3.6



A8 TiB2 Firing Stack - Sulphur Dioxide



A8 TiB2 Firing Stack - Total Cyanide



3.2 – Improvement Performance

3.2.1 Improvements in 2018

Increased energy efficiency

During FY18 (Jul-Jun) 12.73% more electricity was used in comparison to the previous year, however, energy efficiency improved by 10.08%.

For the first 6 months of FY19 our overall electricity usage was 9.53% lower than the same period in the previous year. Energy efficiency was also 8.39% higher.

Improvement actions that have contributed to the improvement in energy efficiency include reducing the firing time for TiB2 firing from 27.5 hours to 27 hours, upgrading lighting to LED and pro-actively fixing compressed air leaks.

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

Reduction in waste

During FY18 (Jul-Jun) there was a 23.22% increase in total waste produced compared to FY17. However this was due to an increase in production. Waste efficiency was similar to FY17, with a slight improvement of 1.71%.

For FY19 to date there has been a 21.7% reduction in total waste produced compared with the same period in FY18. Waste efficiency has improved by 23% compared with the same period. This is largely due to a reduction in the amount of metal waste being generated as fewer projects have been undertaken which generate this type of waste.

Reduction in landfill waste

Further unsuccessful attempts have been made to prevent the graphite waste produced from our firing process from going to landfill. Three companies who specialise in the manufacture and trading of graphite have declined to recycle our graphite due to concerns regarding contamination. We have offered to clean the graphite before collection, however, this is not considered adequate. This waste stream continues to have the biggest potential to further reduce our landfill disposed waste.

Recycling of customer waste

Used evaporator boats continue to be retrieved from the customer and sent to china for recycling. 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)

- To maintain the performance levels achieved so far this year with regards to the aforementioned improvements.
- Improve energy efficiency for our BN powder firing process by using compacted raw materials to increase the charge size.
- To find a solution to the issue with particulate emissions from A6 – drying ovens.