

Tata Steel Strip Products UK Port Talbot Steelworks Environmental Improvement

Quarterly On-site Ambient PM₁₀ Monitoring Report for Quarter 1 2014

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1 Introduction

This report is written to meet commitments made in the response from Tata Steel, Strip Products UK (TSSP UK) business in October 2010 to Improvement Condition 9.8 within Permit BL7108IM/V009. The Improvement Condition states:

“The Operator shall develop a reporting framework for assessing and reporting annually and quarterly the data produced from the on site ambient air quality monitoring network. A copy of the assessment and reporting framework shall be submitted to the Environment Agency at the Reporting Address”.

This report will cover the period 1st January to 31st March 2014 (Q1) and will:

- outline monitor deployment and data capture over the course of the monitoring period;
- describe the trends in monitored data with reference to any changes that occurred over the course of the monitoring period; and
- present and interpret rose diagrams for data recorded over the course of the monitoring period.

Conclusions relating to the above points are presented in section 5.

Over the course of the monitoring period there were 13 breaches of the daily mean PM₁₀ air quality objective in Port Talbot. Ten of the breach days were attributable to localised events and the remaining three breaches were national events i.e. attributable to trans-boundary pollution. The breaches have been investigated and corresponding reports have been submitted to Natural Resources Wales. A summary of the breach days recorded at the Margam Firestation monitor (AURN) during Q1 2014 is shown in Table A. This information will be considered when undertaking the analysis outlined above.

Table A – Summary of breach days from 1st January to 31st March 2014

Count	Breach Date	PM10 Daily Mean at AURN	Trans-boundary Influence (based on Narberth) ^{*1}	AURN Normal Background ^{*1}	Trans-boundary influence removed	Local Influence Above Norm	PM2.5 Fraction (%)	Wind direction towards town from site? ^{*2}	National Event?
1	02/01/2014	52.9	5.1	24.3	47.8	23.5	28	Yes	No
2	03/01/2014	93.5	7.6	24.3	85.9	61.6	27	Yes	No
3	06/01/2014	93.6	18.6	24.3	75.0	50.7	35	Yes	No
4	07/01/2014	83.4	5.3	24.3	78.1	53.8	30	Yes	No
5	15/01/2014	53.8	1.8	24.3	52.0	27.7	28	Yes	No
6	01/02/2014	51.5	5.0	24.3	46.5	22.2	30	Yes	No
7	08/02/2014	56.1	9.0	24.3	47.1	22.8	48	Yes	No
8	22/02/2014	66.5	5.0	24.3	61.5	37.2	35	Yes	No
9	25/02/2014	61.9	8.0	24.3	53.9	29.6	36	Yes	No
10	12/03/2014	52.7	26.6	24.3	26.1	1.8	83	No	Yes
11	13/03/2014	74.3	30.7	24.3	43.6	19.3	84	No	Yes
12	14/03/2014	50.9	27.1	24.3	23.8	0	86	No	Yes
13	20/03/2014	56.5	4.8	24.3	51.7	27.4	47	Yes	No

^{*1} AURN and Narberth normal background calculated as an average of 2009 to 2013 data (all available data).

^{*2} Based on the daily mean wind direction recorded at the AURN, Port Talbot.

In addition, three near miss days were recorded during the quarter, on the 8th, 17th and 25th January. Near miss days occur when the daily average PM₁₀ concentration is between 45 and 50 µg/m³.

2 Monitor Deployment and Data Capture

Since the October 2010 response to Improvement Condition 9.8, the locations of monitors in the monitoring network have changed. The current locations of the monitors are illustrated in Figure 1 in Appendix A. Figure 2 in Appendix A illustrates the future on-site monitoring network as planned in January 2013. Figure 3 in Appendix A illustrates the future on-site monitoring network as planned in March 2014.

Table B shows the monitors deployed during Quarter 1 2014, their data capture and the reasoning for any failure to capture data.

Table B – Summary of TOPAS monitors in operation between 1st January and 31st March (Q1) 2014

Monitor	% PM ₁₀ data capture over entire monitoring period*	Reason for failure to capture PM ₁₀ data (if <90% data capture)	% Wind data capture over entire monitoring period	Reason for failure to capture wind data (if <90% data capture)	Date of last calibration	Start date of operation
CS&I Admin	99.9	N/A	48.3	N/A	17/09/2013	18/02/2014
Centre	98.1	N/A	98.1 (wind direction only)	Zero data capture for wind speed due to connection issues **	27/03/2013	24/10/2013
Fines Bed	98.8	N/A	98.8	N/A	25/07/2013	07/11/2013
Harbour	23.3	Unable to download data due to date and time fault. Also, no PI data due to failure of output module.	22.9 (wind direction only)	Unable to download data due to date and time fault. Also, no PI data due to failure of output module. Zero data capture for wind speed due to connection issues **	10/12/2013	31/03/2014
Chief Engineers	99.5	N/A	99.5	N/A	03/05/2013	18/07/2013

Monitor	% PM ₁₀ data capture over entire monitoring period*	Reason for failure to capture PM ₁₀ data (if <90% data capture)	% Wind data capture over entire monitoring period	Reason for failure to capture wind data (if <90% data capture)	Date of last calibration	Start date of operation
West End	98.9	N/A	98.9	N/A	05/06/2013	21/10/2013
Harsco	98.7	N/A	98.7	No wind vane connected.	14/05/2013	02/07/2013
Penrhyn	0	Monitor failed on 09/11/13. No access to replace monitor due to road construction.	0	Monitor failed on 09/11/13. No access to replace monitor due to road construction.	12/04/2010	09/01/2013
AURN Co-located	0	Monitor failed on 12/09/12.	0	Monitor failed on 12/09/12.	01/06/2011	24/06/2011
Average	68.6%					

*Data downloaded from the monitor when possible, however, PI system data used when access to the monitor is not possible or if the monitor is removed for servicing without a download completed beforehand.

** Several attempts have been made to connect the wind speed on the Centre and Harbour monitors. New wind vanes will be installed during Q2 2014.

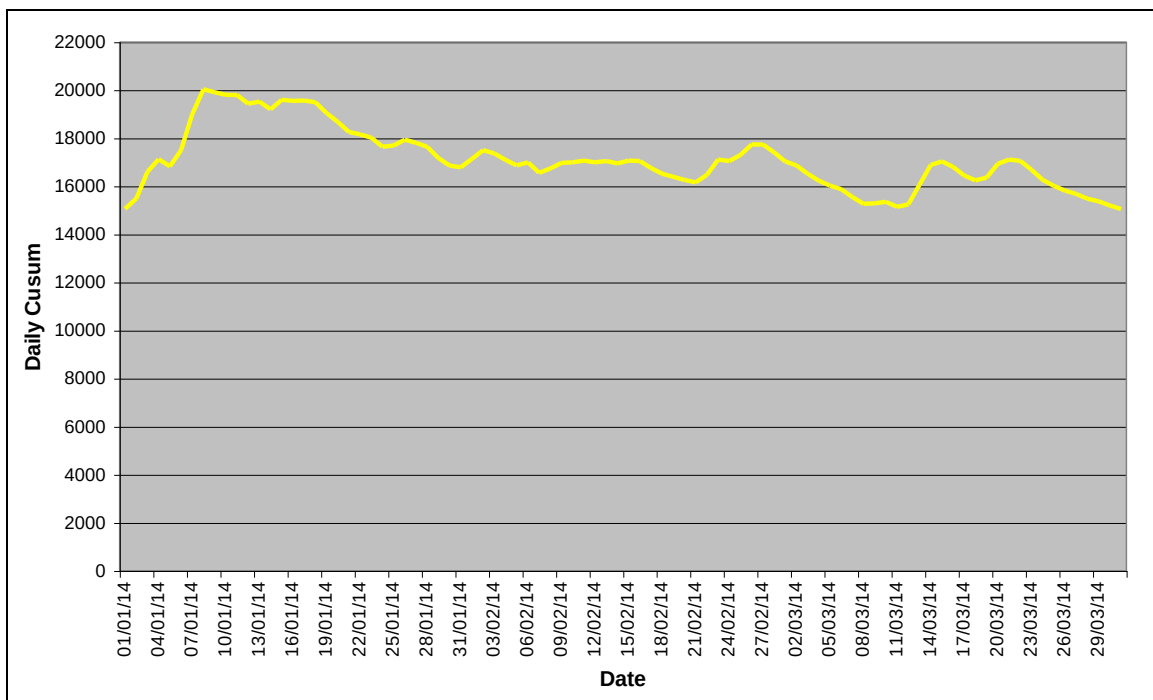
An average data capture of around 69% has been achieved by the TOPAS monitors during Quarter 1 2014. The TOPAS monitor data capture was lower than that achieved during Quarter 4 2013 (75%). The lower percentage data capture is predominantly due to the Penrhyn and AURN Co-located monitors recording zero data capture. The TOPAS monitor Co-located with the NPTCBC council operated AURN monitor has not been operational since September 2012. A review of the monitor network carried out in March 2014 (see Figure 3, Appendix A) concluded that this monitor would not be re-installed at this location. The main reason for this is that the TOPAS monitor is not an equivalent measurement technique to the AURN FDMS monitor and therefore cannot be used to compare with data from the AURN monitor. The original purpose for deploying a TOPAS monitor at the AURN site was to provide data during periods when the AURN monitor was unavailable, however the AURN monitor had a good availability during 2013.

The review of the monitor network carried out in March 2014 also concluded that the TOPAS monitor replacing a failed TEOM unit at the Beach will be deployed at a new location on the unloader jetty rather than at the original Beach location. The location has been changed because there is no longer a constant electricity supply at the Beach location. The unloader jetty location was deemed to be a suitable alternative for measuring PM₁₀ at the coast.

3 Monitored Data Trends

Cusum plots are used to illustrate the trends in PM₁₀ concentrations recorded at the Margam Firestation monitor (AURN) and site monitors over the course of the monitoring period. These trends are then analysed against changes that occurred at the Steelworks to determine if the changes impacted ambient PM₁₀ concentrations. Monitored PM₁₀ concentration data trends for the AURN monitor are presented as a daily cusum plot in Figure A.

Figure A – Daily cusum for the AURN monitor from 1st January to 31st March 2014

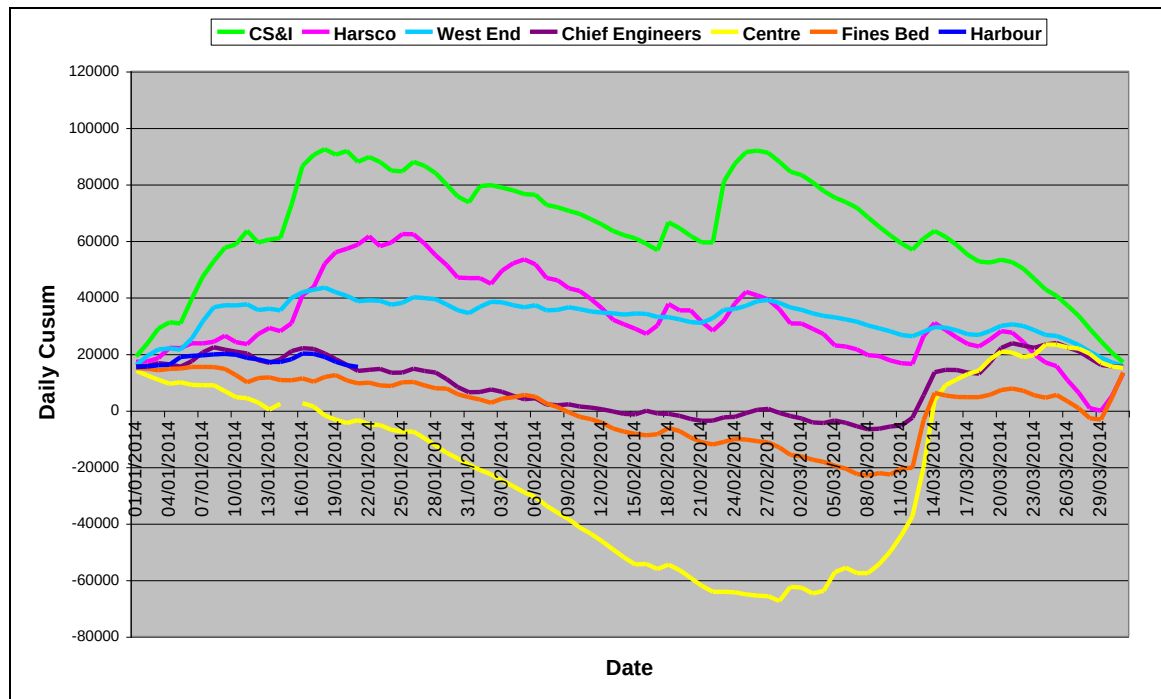


The daily cusum plot for the AURN (Figure A) has been included because comparisons can be made with some of the Steelworks' monitor plots (Figure B) over the monitoring period. However, some of the Steelworks' monitor plots are very different to the AURN plot. This indicates that these Steelworks' monitors are being impacted by different sources to the AURN monitor, which are possibly in the vicinity of the monitors.

The AURN cusum plot increases from the beginning of January until the 8th January. During this period there were four breach days recorded at the AURN, on the 2nd, 3rd, 6th and 7th January. Also, a near miss day was recorded on the 8th January, just after these four breach days. The cusum plot generally decreases throughout the remainder of the quarter. However, there are small increases in the plot from the 22nd to 26th February and the 12th to 15th March. These increases coincide with breach days recorded at the AURN on the 22nd and 25th February, and the 12th, 13th and 14th March. Very small increases can also be observed to correspond with the other breach days recorded by the AURN monitor, on the 15th January, 1st and 8th February, and the 20th March. Therefore, the cusum graph shows that the trend does not significantly increase during any period after the 8th January.

Monitored PM₁₀ concentration data trends for the CS&I, Harsco, West End, Chief Engineers, Centre, Fines Bed and Harbour monitors are presented as daily cusum plots in Figure B.

Figure B – Daily cusums for the CS&I, Harsco, West End, Chief Engineers, Centre, Fines Bed and Harbour TOPAS monitors from 1st January to 31st March 2014



The Cusum trends for the CS&I and Harsco monitors were both fairly similar and the monitors are located in fairly close proximity to each other. The CS&I monitor plot predominantly increases very steeply from the beginning of the quarter until the 18th January. Four breach days and two near miss days were recorded at the AURN during this period (see introduction for dates). The plot then decreases, followed by another steep increase in the trend between the 22nd and 25th February, which also corresponded with breach days recorded at the AURN on the 22nd and 25th February. The plot steeply decreases for the remainder of the quarter.

The trend for the Harsco monitor increases from the beginning of the quarter until the 14th January and then increases more steeply until the 22nd January. Five breach days and one near miss day were recorded at the AURN during these periods (see introduction for dates). The plot then decreases for the rest of the quarter, apart from slight increases from the 2nd to 5th, 16th to 18th and 22nd to 25th February, and the 12th to 14th and 18th to 20th and 29th to 31st March. Breach days were recorded at the AURN, which correspond with some of these increases, however no breach or near miss days were recorded during the increases observed on the 2nd to 5th and 16th to 18th February, and the 29th to 31st March.

The Harsco monitor is located in fairly close proximity to the Blast Furnaces, Ironmaking Raw Materials Handling (RMH) area, Sinter Plant and the Burdening Stockyards. An Environment Incident Form (EIF) was issued for emissions from the casthouse roof on Blast Furnace No.5 on the 31st March. No EIFs were issued from these areas to correspond with the other slight increases in the trend, on the 2nd to 5th and 16th to 18th February. There were no other significant changes to processes within close proximity to the Harsco monitor that can explain the increases in trends during the quarter.

The West End monitor trend increases from the beginning of the quarter to the 3rd January, from the 5th to the 8th January and from the 14th to the 18th January. Five breach days and two near miss were recorded at the AURN monitor during the aforementioned periods (see introduction for dates). The plot then decreases gradually from the 18th January to the end of the quarter,

apart from a slight increase from the 21st to the 27th February. This small increase corresponds to breach days recorded at the AURN on the 22nd and 25th February.

The Cusum trends for the Chief Engineers and Fines Bed monitors are both very similar even though the monitors are not located in close proximity to each other. Also, the plots are very different to the AURN cusum graph. The cusum plot for the Chief Engineers monitor is fairly stable from the beginning of the quarter to the 16th January and then gradually decreases until the 11th March. There is an increase in the trend from the 11th to 14th March, which coincides with three trans-boundary breach days recorded at the AURN on the 12th, 13th and 14th March. A final increase in the trend can be seen from the 18th to the 21st March before the plot stabilises for the remainder of the quarter. A localised breach day was recorded at the 20th March to correspond with this final increase in the Chief Engineers trend. However, the increase started on the 18th March, which is two days prior to the 20th March breach day.

The Chief Engineers monitor is located in close proximity to the BOS Plant and Concast. Two EIFs were issued on the 18th March and another two EIFs were issued on the 19th March, all from the Concast plant. Three of the EIFs were issued due to dust entering the casting area from the BOS Plant. The other EIF (on the 18th March) was issued due to dust created by kress carriers when entering the Concast receiving bay. The Chief Engineers monitor is also located fairly close to the Plating Pits at Harsco's MR Plant. However, no EIFs were issued for emissions from plating processes during the period when the increases occurred on the 18th and 19th March. One of the two hot metal bay fume extraction fans was not operational during this period. However the failure occurred at the beginning of February, several weeks prior to the increase in cusum trend. There were no other significant changes to processes within close proximity to the Chief Engineers monitor that can explain the increases in trends during the quarter.

The Fines Bed monitor plot is stable throughout most of January followed by a decreasing trend from the 26th January to the 12th March. The plot then increases to coincide with the trans-boundary breach days recorded at the AURN on the 12th, 13th and 14th March. This is followed by a relatively stable trend until a final increase is observed between the 29th and 31st March. No breach or near miss days were recorded at the AURN between the 29th and 31st March.

The Fines Bed monitor is located in very close proximity to the Burdening Stockyard. However no EIFs were issued from the Burdening area and there were no significant changes to processes within close proximity to the Fines Bed monitor that can explain the increases in trends during the quarter.

The Centre monitor cusum plot appears to follow a different pattern to the other on-site monitor cusum plots and to the cusum plot of the AURN monitor. The plot decreases from the start of the quarter until the 28th February, which does not correspond with the nine breaches that occurred at the AURN during this period (See Table A for breach dates). There is an increase in the trend until the 8th March followed by a very steep increase from the 8th to the 15th March and then finally a smaller increase until the 20th March. These increases coincide with breach days recorded at the AURN on the 12th, 13th, 14th and 20th March. However, the increases in the trend are observed from the 28th February, which is several days prior the breaches recorded at the AURN. The plot then stabilises for the remainder of the quarter.

The Centre monitor is located in close proximity to the Ironmaking Raw Materials Delivery area, which includes the Raw Materials Handling (RMH) area (Blast Furnace stockhouses and sinter reclaiming) and the Granulated Coal Injection (GCI) Plant. No EIFs were raised from the Ironmaking Raw Materials Delivery area during the period of increasing trend after the 28th February and prior to the 12th March breach day. The Centre monitor is also located in fairly close proximity to the Blast Furnaces. EIFs were raised on the 2nd and 7th March for Blast

Furnace casthouse emissions caused by taphole issues. In response to the taphole issues, checks were carried out and the taphole was plugged as soon as possible, following safe working procedures. An EIF was also issued on the 3rd March due to casthouse emissions on Blast Furnace No.5. Casting of hot metal was not being carried out at the time. An investigation concluded that the emissions were caused by water ingress into one of the troughs. A series of recommendations were produced from the investigation in order to prevent this event occurring again in the future.

On the 7th March an EIF was issued due to the Blast Furnace No.4 fume extraction plant (FEP) fans tripping, which was caused by high differential pressure in the bag filters. The hot metal tapping volume was immediately reduced and the FEP fans were then both restarted in manual. An EIF was also raised on the 11th March in relation to emissions from the Blast Furnace No.5 FEP Stack exceeding the limit of 25mg/m³ per hour between the hours of 02:00 and 03:00. Immediate action was taken to check the monitor and it was found to be in full working order. A Part A notification was then sent to NRW. The causes of the increased readings are still under investigation. There were no other significant changes to the processes in the vicinity of the Centre monitor that can explain the increases in trends.

The Harbour monitor was only operating from the start of the quarter until the 21st January. The trend was fairly stable during the period of operation.

4 Monitored Data Rose Diagrams

Rose diagrams for data from all of the Tata owned monitors (and one monitor owned by Harsco) are presented as Figures 4 and 5 in Appendix A. The rose diagrams illustrate the predominant wind directions that impact each monitor with PM₁₀. If wind data is not available from a monitor (see Table B), then data has been substituted from the Margam AURN monitor wind vane. Also, data wind from the AURN monitor was used for the West End monitor because the data was inconsistent with wind vanes on other monitors. Maintenance will be carried out on the West End wind vane in order to rectify these issues. Potential sources of PM₁₀ that may impact the site monitors are discussed below. The potential sources discussed are not necessarily the same as those that impact the monitors located in the town.

Table E - Summary of potential sources impacting the TOPAS monitors between January 1st and March 31st 2014

Monitor	Predominant Wind directions impacting the monitor	Potential sources in close proximity to the monitor	Potential sources further away from the monitor
CS&I Admin	SE to SW (130° to 220°)	Blast Furnaces, Granulated Coal Injection (GCI) Plant, Raw Materials Handling (RMH), Lafarge Tarmac Slag Pools and Slag Granulation Plant.	Lafarge Tarmac's Slag Handling Plant, Steel & Slab (S&S), Harsco Briquetting and Metal Recovery (MR) Plants, Slab Yards, Rolling Mills, Coke Ovens and other off-site sources.
Centre	ESE (100°) and WSW (250°)	GCI, RMH, Blast Furnaces and Lafarge Tarmac's Slag Granulation Plant	Lafarge Tarmac's Slag Handling Plant and other off-site sources.
Fines Bed	NE (30° to 60°), SE (120° and 150°) and WNW to NNW (260° to 350°)	Fines Bed, Reverts Stockyard, Primary Stockyard, Hanson's Slag Plant and the Sinter Plant.	Lafarge Tarmac's Slag Granulation Plant and Slag Handling Plant, Harsco's MR Plant, S&S, the Rolling Mills and other off-site sources.
Harbour	WNW (280°), NW (310° and 330°) and SSE to S (170° to 180°)	The Harbour and the Coast.	Sandfields residential area and other off-site sources.
West End	SSE to S (150° to 180°) and SSW to SW (200° to 220°)	Road construction (Costain) in the Penrhyn area, Power Plant, Lafarge Tarmac Slag Pools and Slag Granulation Plant, Blast Furnaces, RMH and GCI.	Lafarge Tarmac's Slag Handling Plant, Harsco's Briquetting and MR Plants, S&S, Slab Yards, the Rolling Mills, Coke Ovens and other off-site sources.
Harsco	NW (310°)	Blast Furnaces, RMH, GCI, Hanson's Slag Plant and the Docks.	Road construction (Costain) in the Penrhyn area, Rolling Mills, Harsco's Briquetting Plant, S&S, Sandfields residential area and other off-site sources.
Chief Engineers	SE (130°), SSE to WSW (170° to 260°) and NW to N (320° to 0°)	Lafarge Tarmac's Slag Pools and Slag Granulation Plant, Blast Furnaces, RMH, GCI, S&S, Harsco's MR and Briquetting Plants.	Lafarge Tarmac's Slag Handling Plant, Power Plant, road construction (Costain) in the Penrhyn area, Coke Ovens, Rolling Mills and other off-site sources.

In summary, the site monitors were impacted by PM₁₀ from a wide range of wind directions and therefore were not predominantly impacted by any one potential source. Tata will use the above information presented above to further the understanding of potential sources that may have an impact on off-site receptors and to develop a targeted improvement programme.

5 Conclusions

- During Q1 2014 there were 13 breach days recorded at the AURN monitors. Ten of the breach days were attributable to localised events and the remaining three breaches were national events i.e. attributable to trans-boundary pollution.
- The TOPAS monitors achieved an average data capture of 69% during Q1 2014. The data capture for the TOPAS monitors was lower than that achieved during Q4 2013 (75%).
- A review of the TOPAS monitor network carried out in March 2014 concluded that the TOPAS monitor co-located with the NPTCBC council operated AURN monitor would not be re-installed at this location. The review also concluded that the TOPAS monitor replacing a failed TEOM unit at the Beach will be deployed at a new location on the unloader jetty rather than at the original Beach location.
- The daily cusum plot for the AURN (Figure A) has been included because comparisons can be made with some of the Steelworks' monitor plots over the monitoring period.
- The Centre, Chief Engineers and Fines Bed monitor cusum trends are very different to the AURN trend. This indicates that these monitors are being impacted by different sources to the AURN monitor, which are possibly in the vicinity of the monitors.
- Five EIFs were issued from the Ironmaking area during March that could possibly explain some of the increases in the Centre monitor trend that did not mirror the AURN or other on-site monitors.
- Site monitors were impacted by PM₁₀ from a wide range of wind directions and therefore were not predominantly impacted by any one potential source.

- Appendix A

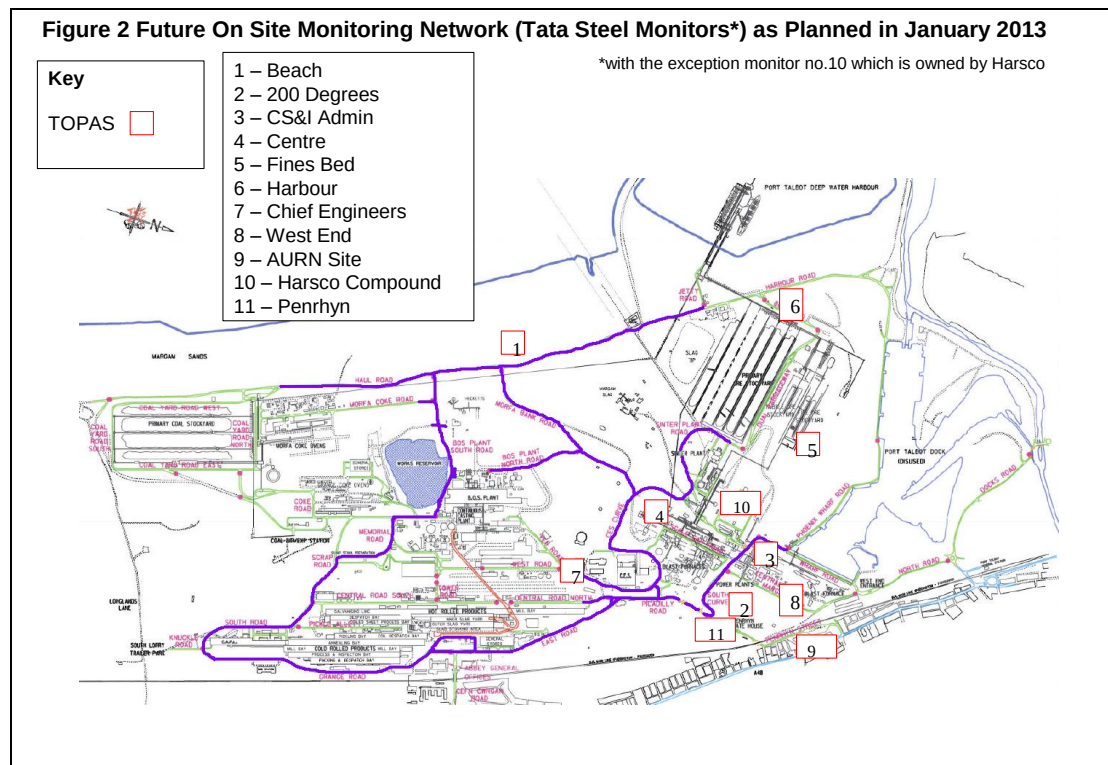
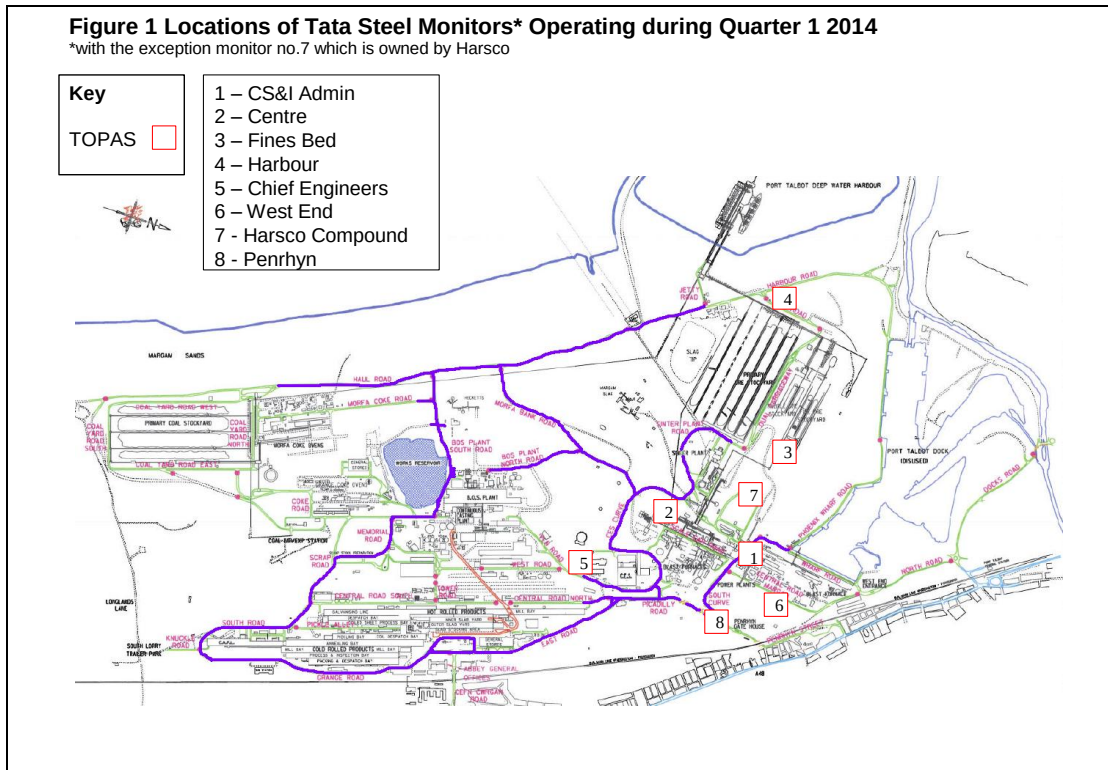
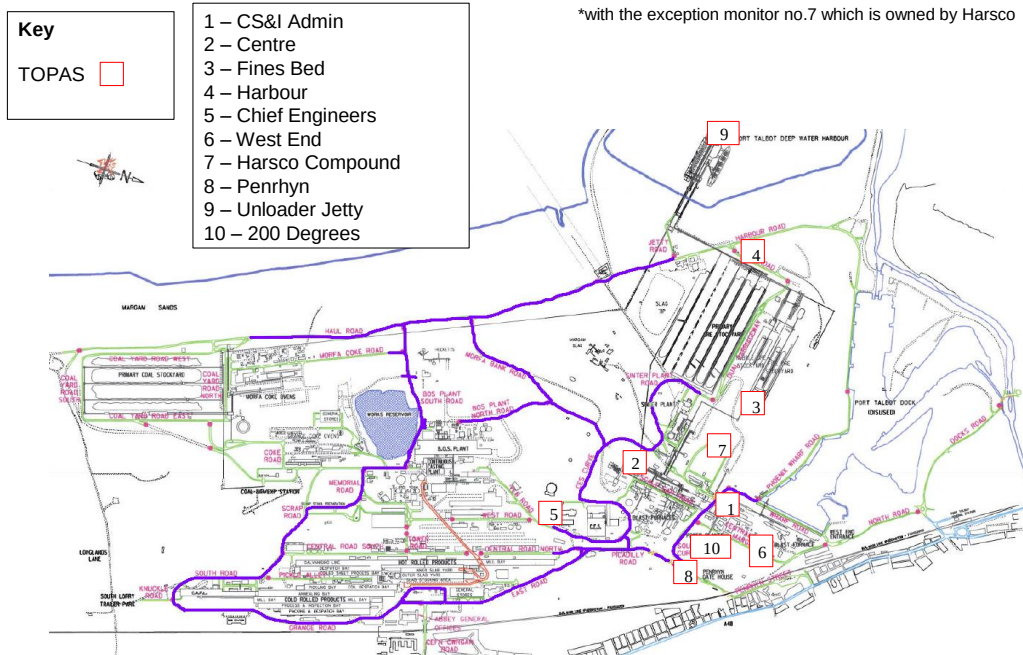


Figure 3 Future On Site Monitoring Network (Tata Steel Monitors*) as Planned in March 2014



- Key**
- 1 – CS&I Admin
 - 2 – Centre
 - 3 – Fines Bed
 - 4 – Harbour

Figure 4 Rose Diagrams Showing Predominant Wind Directions Impacting the TOPAS Monitors in Quarter 1 2014

