

Tata Steel Strip Products UK Port Talbot Steelworks

Quarterly On-site Ambient PM₁₀ Monitoring Report for Quarter 3 2014

			Signed	Dated
Written	Georgina Brooks	Environmental Engineer		27/10/14
Checked	Claire Grainger	Environmental Engineer		28/10/14
Approved	Fiona Abbott	Lead Environmental Engineer		30/10/14

Initial Circulation

General Circulation

TSSP UK

Glenn Perry

Richard Leonard

Fiona Abbott

Claire Grainger

Georgina Brooks

Natural Resources Wales

Mark Broom

Doug Cowie

The contents of this report are the exclusive property of Tata Steel and are confidential. The contents must not be disclosed to any other party without Tata Steel's previous consent which (if given) is in any event conditional upon that party indemnifying Tata Steel against all costs, expenses and damages claims which might arise pursuant to such disclosure.

Table of Contents

1	INTRODUCTION.....	4
2	MONITOR DEPLOYMENT AND DATA CAPTURE.....	5
3	MONITORED DATA TRENDS	7
4	MONITORED DATA ROSE DIAGRAMS	12
5	CONCLUSIONS.....	13

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 July to 30th September 2014 (Q3) 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 no breaches of the daily mean PM₁₀ air quality objective in Port Talbot, however, one near miss day was recorded. Near miss days occur when the daily average PM₁₀ concentration is between 45 and 50 µg/m³. A summary of the near miss day recorded at the Margam Fire Station monitor (AURN) during Q3 2014 is shown in Table A. This information will be considered when undertaking the analysis outlined above.

Table A – Summary of near miss days from 1st July to 30th September 2014

Count	Near Miss 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}
1	28/08/2014	48.5µg/m ³	1.9µg/m ³	24.3µg/m ³	46.6µg/m ³	22.3µg/m ³	17%	Yes

^{*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.

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 shows the latest revision of the monitor network as reviewed in March 2014.

Table B shows the monitors deployed during Quarter 3 2014, their data capture and the reasoning for any failure to capture data.

Table B – Summary of TOPAS monitors deployed between 1st July and 30th September (Q3) 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	99.4	N/A	99.4	N/A	17/09/2013	18/02/2014
Centre	99.9	PI data used from 01/07/14-05/09/14	99.9 (wind direction only) PI data used from 01/07/14-05/09/14	Zero data capture for wind speed due to connection issues**	15/08/2014	05/09/2014
Fines Bed	73.3	Power cable disturbed – no data from 10/08/14 to 03/09/14 (PI data used from 24/10/14)	73.3	Power cable disturbed – no data from 10/08/14 to 03/09/14 (PI data used from 24/10/14)	25/07/2013	07/11/2013
Harbour	98.8	N/A	98.8 (wind direction only)	Zero data capture for wind speed due to connection issues **	10/12/2013	31/03/2014
Chief Engineers	98.2	PI data used from 09/07/14 - 23/07/14	98.2	PI data used from 09/07/14 - 23/07/14	11/07/2014	21/07/2014
West End	99.0	N/A	99.0	N/A	05/06/2013	21/10/2013
Harsco	15.7	Monitor out for calibration until 16/09/14	0	No wind vane connected.	Calibration record owned by Harsco	16/09/2014

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
Penrhyn	20.1	Monitor had failed due to electrical fault – resumed operating on 12/09/14.	20.1	Monitor had failed due to electrical fault – resumed operating on 12/09/14.	12/04/2010	09/01/2013
Harbour Jetty	81.0	Monitor installed on 18/07/14	81.0	Monitor installed on 18/07/14	08/11/2013	18/07/2014
Average	76.1%					

* 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. A new monitor was installed at the Centre location during Q3, however the problem was not rectified. Therefore, new wind vanes will be installed during Q4 2014.

An average data capture of around 76% has been achieved by the TOPAS monitors during Quarter 3 2014. The TOPAS monitor data capture is lower than that achieved during Quarter 2 2014 (86%). The main reasons for the lower data capture is the Harsco monitor being removed for calibration for the majority of the quarter and the Penrhyn monitor only resuming operation towards the end of the quarter.

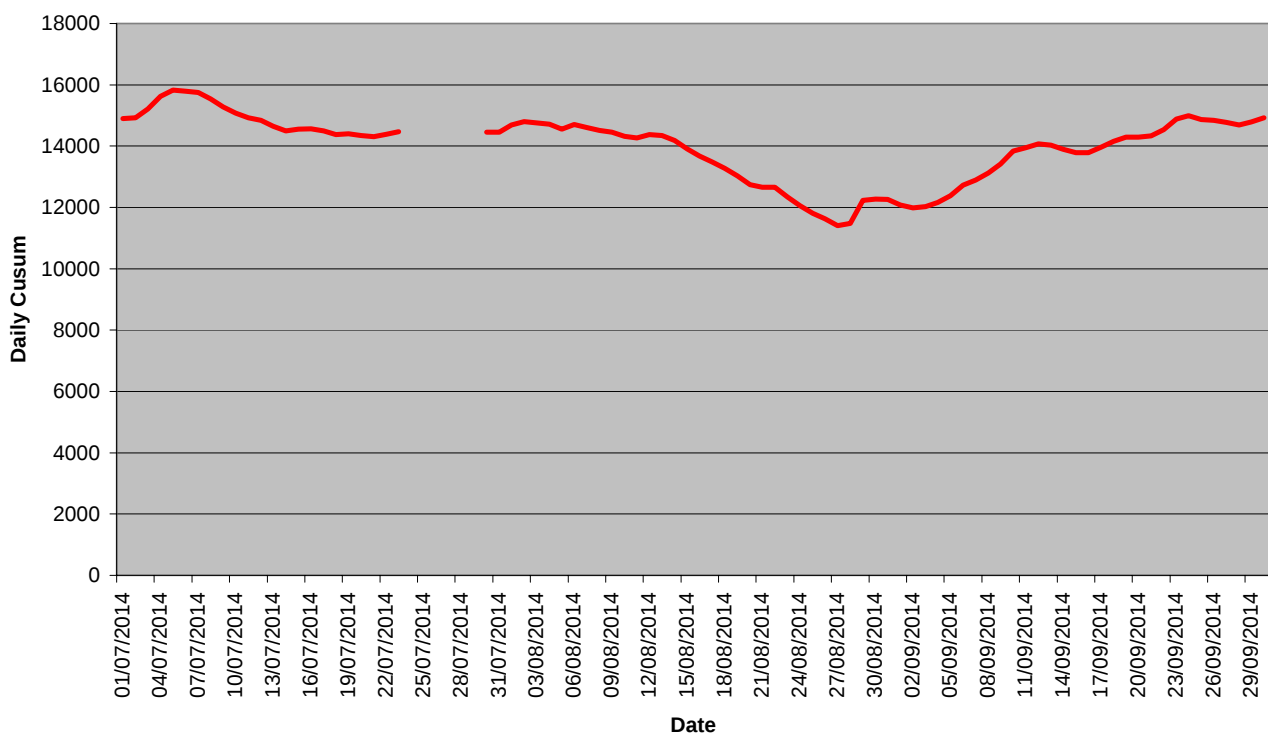
There is an ongoing issue with turnaround time of monitors that are sent away for service and calibration with Turnkey Instruments Ltd. This issue caused the delay with re-installation of the Harsco monitor and has delayed the replacement of Tata Steel-owned monitors due for calibration. A new contract is being developed and is expected to become valid in Q4, which is expected to improve turnaround times of the Tata Steel-owned monitors. Also, Harsco have been advised to review their contract with Turnkey Instruments Ltd.

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 would be deployed at a new location on the unloader jetty rather than at the original Beach location. The new unloader jetty monitor was deployed in Q3 2014.

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 July to 30th September 2014



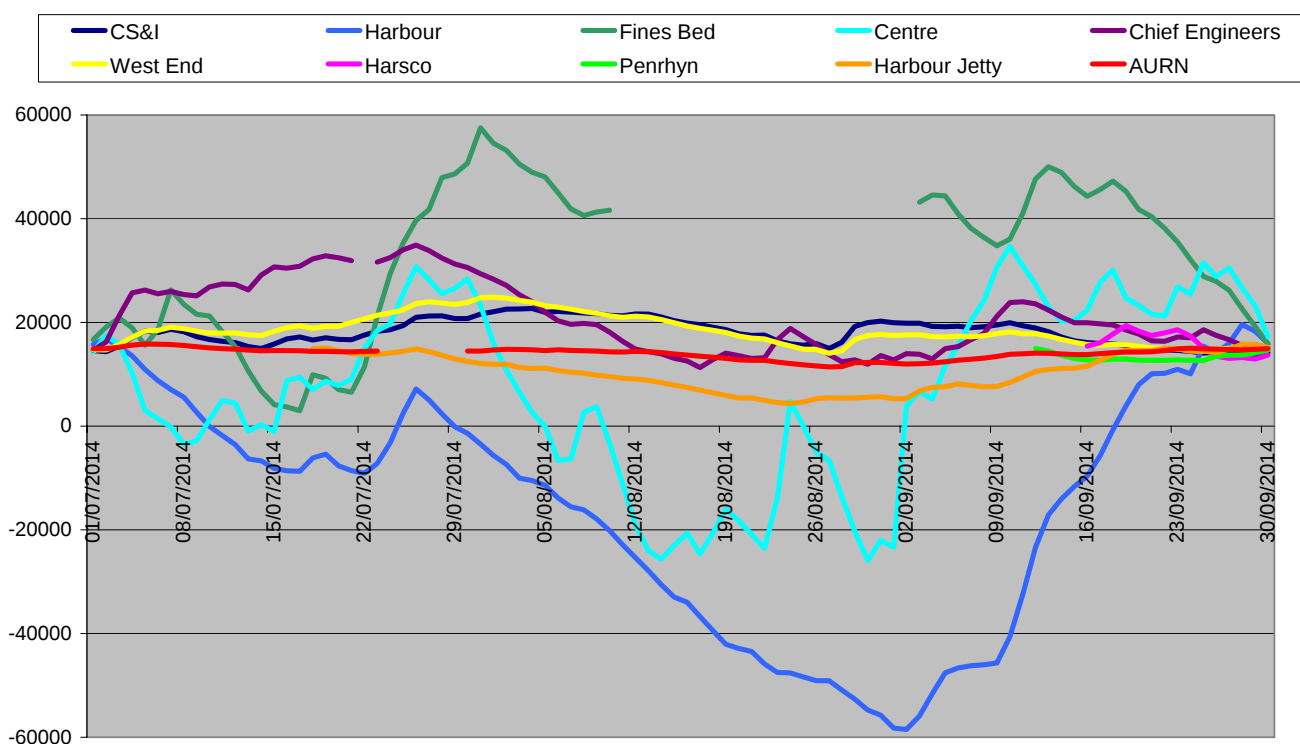
The daily cusum plot for the AURN (Figure A) has been included because comparisons can be made with some of the Steelworks' monitor plots (Figure B) over the monitoring period. However, some of the Steelworks' monitor plots are different the AURN plot. This indicates that these Steelworks' monitors are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

The AURN cusum plot is stable between 1st and 2nd July followed by an increase in the trend until 5th July. The trend generally decreases until 23rd July, when the monitor stopped operating. The AURN monitor begins operating again on 30th July and is relatively stable until 14th August. Then trend then decreases steeply until 21st August, levels out until 22nd August and then decreases again until 27th August. An increase in the trend between 27th and 29th August coincides with the near miss breach day that occurred on 28th August. The trend levels out until 31st August, decreases until 2nd September, and then increases until 24th September, except for slight decreases between 12th and 15th September and 19th and 20th September. The trend then levels out until the end of the quarter.

Only one EIF (Environmental Incident Form) was issued on 28th August. This EIF was issued by the Ironmaking area and regarded visible emissions from the Blast Furnace 4 (BF4) Ferrous Stockhouse and, therefore, cannot be discounted from contributing to the elevated PM₁₀ concentrations recorded at the AURN monitor on 28th August.

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

Figure B – Daily cusums for the Centre, CS&I, Harsco, West End, Penrhyn, Chief Engineers, Fines Bed, Harbour and Harbour Jetty TOPAS monitors from 1st July to 30th September 2014



The trend for the Centre monitor cusum increases slightly between 1st and 2nd July before a steep decrease in the trend until 8th July. This is followed by a general increase with peaks and troughs until 26th July, a decrease until 28th July and a further slight increase until 30th July. The trend decreases steeply once again until 6th August before an increase until 9th August and a sharp decrease until 14th August. There is another series of peaks and troughs before a sharp increase in the trend between 23rd August and 24th August. Following this is a steep decrease until 30th August, which does not coincide with the near miss breach day recorded at the AURN on 28th August. There is a series of peaks and troughs throughout September until the end of the quarter. During the periods 2nd to 3rd September, 5th to 10th September, 16th to 18th September, and on 23rd, 25th, and 27th September, when increases can be seen on the cusum trend for the Centre monitor, increases can also be seen on the AURN monitor trend. Therefore, it is likely that the two monitors are being impacted for similar sources.

Increases can be seen in the Centre monitor cusum trend, which are not mirrored by the trend of the AURN monitor. The Centre monitor is located in fairly close proximity to the Blast Furnaces, Ironmaking Raw Materials Delivery (RMD) area, Sinter Plant and the Burdening stockyards. The majority of the EIFs issued by Ironmaking area during Q3 were for casthouse emissions from Blast Furnaces 4 and 5. An investigation was carried out into the correlation between the cusum trend for the Centre monitor and the number of EIFs issued per day. No correlation was found as a very similar number of EIFs were issued on days when the cusum trend for the Centre monitor was decreasing compared to days when the trend was increasing. In the Burdening area on the 18th August, the Sinter Plant secondary dedusting system fan stopped for a period in order to perform fault finding activities on one of the dust removal system chain conveyors - 1074 chain conveyor. The chain conveyor fault was identified and rectified and the fan restarted as soon as possible. A notification was created on the SAP system for further maintenance to be performed chain conveyor 1074 when plant is on stop. The recently developed procedure was followed and the event was controlled. There were no other significant changes to processes within close proximity to the Centre monitor that could explain the increases or decreases in the trend during the quarter.

The Harsco monitor was only operating from 16th September as the monitor was removed and returned to the manufacturer for calibration. Therefore, the monitor was not operating during the near miss breach day that occurred on 28th August. The trend for the Harsco monitor increases between 16th and 19th September and is followed by a slight decrease until 21st September and a slight decrease until 23rd September. The trend then decreases once again until 26th September and then levels out until the end of the quarter. Similarities can be seen in the trends of the Harsco and Centre monitor and as the monitors are located in close proximity to each other, it is likely that the two monitors were impacted by similar sources during the Q3 monitoring period.

The cusum trend for the CS&I monitor increases between 1st and 7th July, followed by a decrease until 14th July. This is followed by a gradual general increase until 3rd August and a gradual general decrease until 27th August. This is prior to a steep increase between 28th and 31st August, which coincides with the near miss breach day that was recorded at the AURN monitor on 28th August. The trend levels out until 10th September and then gradually decreases until the end of the quarter. As the CS&I monitor is located in close proximity to the Blast Furnaces and Ironmaking Raw Materials Delivery areas, it is likely that the monitor was impacted by some of the same sources as potentially impacted the Centre monitor. However, no relationship was found between the number of EIFs issued for casthouse emissions and the cusum trend for the CS&I monitor. The trend bears greater similarity to the AURN monitor cusum trend than the trend for the Centre monitor, potentially due to its close proximity to the AURN monitor. The CS&I monitor is also located in close proximity to the Power Plant, however, there were no significant changes to processes within close proximity to the CS&I monitor that could explain the increases or decreases in the trend during the quarter.

The trend for the West End monitor increases between 1st and 7th July and is followed by a slight decrease until 14th July. Then trend then increases steadily once again until 27th July, followed by a slight decrease in the trend until 29th July and another slight increase until 31st July. The trend decreases very steadily until 27th August prior to a steeper increase until 30th August, which coincides with the near miss breach day recorded at the AURN monitor on 28th August. Following this, the trend levels out until 9th September, increases on the 10th September and then steadily decreases until the end of the quarter. The cusum trend for the West End monitor is very similar to that of the CS&I monitor. As these monitors are located in very close proximity to each other, it is likely that the sources affecting the CS&I monitor at this time, were also affecting the

West End monitor. Once again, there was no relationship between the number of EIFs issued for casthouse emissions and the trend for the West End monitor. The West End monitor also located in close proximity to the AURN monitor, and was likely impacted by similar sources. There were no significant changes to processes within close proximity to the West End monitor that could explain the increases or decreases in the trend during the quarter.

The Penrhyn monitor resumed operation on 12th September; therefore, it is not possible to determine if the monitor trend would have coincided with the near miss day recorded at the AURN monitor on 28th August. The cusum trend for the Penrhyn monitor is very stable between the period 12th to 30th September, decreasing slightly between 12 and 16th September, levelling out until 24th September and increasing very slightly until the end of the quarter. As the Penrhyn monitor is also located in close proximity to the AURN monitor, it is likely that the two monitors were impacted by similar sources during the monitoring period.

The cusum trend for the Chief Engineers monitor increases steeply between 1st and 4th July and increases more gradually until 19th July, except for one decrease in the trend between 12th and 13th July. The trend decreases very slightly until 21st July. The monitor resumes operating on 23rd July and the trend increases until 26th July, prior to a steady decrease until 17th August. The trend increases slightly until 19th August, decreases slightly until 22nd August, followed by a steeper increase until 24th August. The trend decreases once again until 28th August, levels out until 4th September and increases 11th September. This does not coincide with the near miss breach day recorded at the AURN monitor on 28th August. Following this, the trend decreases until 22nd September, increases slightly until 25th September and decreases once again until the end of the quarter.

There are some similarities between the Chief Engineers monitor cusum trend and the trend for the AURN monitor. Both monitors show increases at similar times in July and September but there are times during the quarter when increases are seen on the Chief Engineers trend but not on the AURN trend. Therefore, there may be sources more local to the Chief Engineers monitor contributing to the increases seen on the cusum trend. The Chief Engineers monitor is located in close proximity to the Steel & Slab area of the site. The majority of the EIFs issued by the Steel & Slab area during Q3 were for slopping events. However, no correlation could be found between the number of EIFs for slopping events and the cusum trend for the Chief Engineers monitor. During August and September a 100% hot metal charging trial was taking place. However, the trials coincided with decreases in the Chief Engineers monitor cusum trend. There were no other significant changes to processes within close proximity to the Chief Engineers monitor that could explain the increases or decreases in the trend during the quarter.

The Chief Engineers monitor is also located in close proximity to the iron plating pits at Harsco's (Metal Recovery) MR Plant. EIFs were issued for plating emissions at times when increases can be seen on the Chief Engineers cusum trend but not on the AURN trend in July. In these cases, immediate actions were taken to mitigate emissions.

The cusum trend for the Fines Bed monitor increases between 1st and 3rd July, decreases until 5th July and increases once again until 7th July. This is followed by a decrease in the cusum trend until 17th July prior to an increase until 18th July and a further decrease until 21st July. The cusum trend then increases steeply until 31st July and is followed by a steep decrease until 8th August and a slight increase until 10th August. The Fines Bed monitor was not operating between 10th August and 3rd September, therefore it is not possible to determine whether there would have been an

increase in the trend on the near miss day recorded at the AURN monitor on 28th August. The trend increases slightly between 3rd and 4th September and then decreases until 9th September, followed by an increase in the trend until 13th September. The trend decreases once again until 16th September, increases until 18th September and then decreases steeply until the end of the quarter.

The Fines Bed monitor is located in close proximity to the Burdening Stockyards and the Sinter Plant, however, there were no significant changes to the processes within these areas of the site that could have possibly impacted upon the Fines Bed monitor when increases were seen on the Fines Bed monitor cusum trend but not on the AURN monitor trend.

The cusum trend for the Harbour monitor decreases from the start of the quarter until 17th July, followed by an increase until 19th July and a further decrease until 22nd July. The trend increases steeply until 26th July followed by a prolonged decrease until 2nd September, which does not coincide with the near miss breach day that was recorded at the AURN on 28th August. The trend increases until 5th September, prior to the trend levelling out until 9th September. The trend increases once again until 28th September and then decreases until the end of the quarter.

The Harbour monitor is located in close proximity to the Burdening stockyards and the Jetty. The Harbour monitor cusum trend follows a very different trend to the cusum for the AURN monitor. However, there were no significant changes to the processes within this area of the site that could explain the increases seen on the Harbour monitor cusum trend.

The Harbour Jetty monitor cusum trend is very stable throughout the quarter. The monitor commenced operation on 18th July and remains on a level until 26th July. The trend decreases very gradually until 24th August followed by a general gradual increase until the end of the quarter. With regard to the near miss day on 28th August, the cusum trend decreases very slightly between 27th and 28th August, which does not coincide with the increase seen on the AURN monitor trend. There were no significant changes to processes within close proximity to the Harbour Jetty monitor that could explain the increases in trend during the quarter.

4 Monitored Data Rose Diagrams

Rose diagrams for data from all of the Tata Steel-owned monitors (and one monitor owned by Harsco) are presented as Figures 3 and 4 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. 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 1st July and 30th September 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 WSW (150° to 260°) and NW (320°)	Blast Furnaces, Lafarge Tarmac Slag Pools and Slag Granulation Plant, Granulated Coal Injection Plant (GCI), Raw Materials Handling (RMH), Sinter Plant, Civil and Marine's Slag Plant and the Docks.	Primary Stockyards, Harbour, Lafarge Tarmac's Slag Handling Plant, Steel & Slab (S&S), Harsco Briquetting and Metal Recovery (MR) Plants, Slab Yards, Coke Ovens, the coast and other off-site sources.
Centre	N (0°), ENE (70°), SE (130°) and NW (300°)	GCI, RMH, Blast Furnaces, Lafarge Tarmac's Slag Pools and Slag Granulation Plant and the Sinter Plant.	Fines Bed, Harsco's Briquetting Plant, Rolling Mills, Slab Yards, other offsite sources and the coast.
Fines Bed	NE (30° to 40° and 60°), S (170° and 190°), SW (210° to 220°), W (270°) and WNW (290°)	Civil and Marine's Slag Plant, Docks, Fines Bed, Reverts Stockyard and the Primary Stockyard.	Harbour, Lafarge Tarmac's Slag Handling Plant, Harsco's MR Plant, the coast and other off-site sources.
Harbour	N to NE (0° to 60°) and SE (150°)	Reverts Stockyard, Fines Bed and the Primary Stockyard.	Civil and Marine's Slag Plant, Docks, other off-site sources and the coast.
West End	NE (40°), ENE (60° to 80°), SE (150°), SW to NW (210° to 310°) and NNW (350°)	Power Plant, Lafarge Tarmac Slag Pools and Slag Granulation Plant, Blast Furnaces, RMH, GCI, Sinter Plant Margam and Taibach residential areas, Peripheral Distributor Road (PDR), M4 motorway.	Lafarge Tarmac's Slag Handling Plant, Civil and Marine's Slag Plant, Docks, Harsco's MR Plant, Hot Mill, Fines Bed, Reverts Stockyard, Primary Stockyard, Harbour, the Coast and other off-site sources.
Harsco	ENE (80°), SE (150°), WSW (260°), WNW (280°) and NNW (350°)	RMH, GCI, Power Plant, Civil and Marine's Slag Plant, Docks,	Fines Bed, Reverts Stockyard, Primary Stockyard, S&S, other off-site sources and the coast.
Chief Engineers	ESE (100°), SE (120°), SW (210° and 240° to 250°), NW (300°) and NNW to N (340° to 0°)	Lafarge Tarmac's Slag Pools and Slag Granulation Plant, RMH, GCI, S&S, Harsco's MR Plant and the Hot Mill.	Power Plant, Sinter Plant, Fines Bed, other off-site sources and the coast.
Penrhyn	NNE (10°), E to ESE (90° to 100°), NW (330°) and NNW (350°)	Margam and Taibach residential areas, PDR and the M4 motorway.	Other off-site sources.
Harbour Jetty	SW to WNW (220° to 290°), NW (310° to 320°) and NNW (340°)	Harbour & the coast	N/A

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 Q3 2014 there were no breach days recorded at the AURN monitor. However, one near miss day was recorded on 28th August. Near miss days occur when the daily average PM₁₀ concentration is between 45 and 50 µg/m³.
- The TOPAS monitors achieved an average data capture of 76% during Q3 2014. The data capture for the TOPAS monitors was lower than that achieved during Q2 2014 (86%).
- 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, Harbour monitor cusum trends are 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.
- 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 1 Locations of Tata Steel Monitors* Operating during Quarter 3 2014

*with the exception monitor no.7 which is owned by Harsco

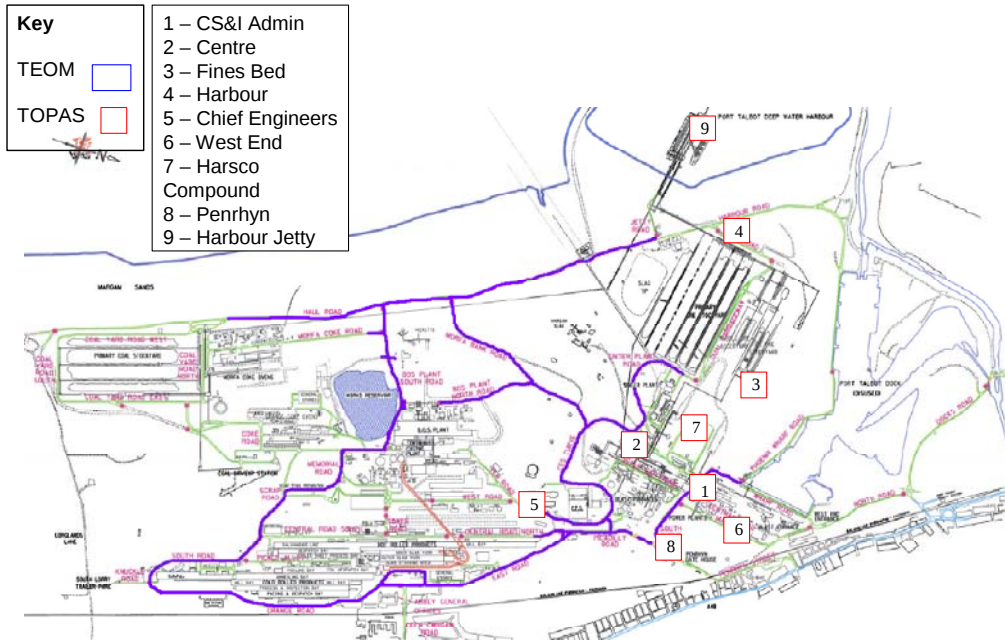


Figure 2 Future On Site Monitoring Network (Tata Steel Monitors*) as Planned in March 2014

*with the exception monitor no.7 which is owned by Harsco

