

Tata Steel Strip Products UK Port Talbot Steelworks

Quarterly On-site Ambient PM₁₀ Monitoring Report for Quarter 1 2015

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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) 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 2015 (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 nine breaches of the daily mean PM₁₀ air quality objective in Port Talbot. Three of these breaches, however, were attributed to the influence of trans-boundary pollution (18th, 19th and 20th March). In addition, four near miss days were recorded on 1st January, 8th March, 17th March and 28th March. Near miss days occur when the daily average PM₁₀ concentration is between 45 and 50µg/m³. A summary of the breach days recorded at the Margam Fire Station monitor (AURN) during Q1 2015 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 2015

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}
1	07/01/2015	56.2	0	24.3	56.2	31.9	31	Yes
2	18/02/2015	70.7	1.8	24.3	68.9	44.6	22	Yes
3	19/02/2015	71.3	0	24.3	71.3	47.0	33	Yes
4	28/02/2015	50.7	5.2	24.3	45.5	21.2	35	Yes
5	06/03/2015	55.5	4.9	24.3	50.6	26.3	30	Yes
6	07/03/2015	63.5	12.8	24.3	50.7	26.4	30	Yes
7	18/03/2015	54.0	17.8	24.3	36.2	11.9	64	No
8	19/03/2015	76.2	34.7	24.3	41.5	17.2	74	No
9	20/03/2015	60.3	16.4	24.3	43.9	19.6	66	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.

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

Table B shows the monitors deployed during Quarter 1 2015, their data capture and the reasoning for any failure to capture data.

Table B – Summary of TOPAS monitors deployed between 1st January and 31st March (Q1) 2015

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	89.4	Memory full 08/03/15 – 16/03/15 PI data used 17/03/15 onwards	89.4	Memory full 08/03/15 – 16/03/15 PI data used 17/03/15 onwards	10/11/2014	15/12/2014
Centre	95.9	N/A	95.9 (wind direction only)	Zero data capture for wind speed due to connection issues**	15/08/2014	05/09/2014
Fines Bed	53.6	Monitor overdue for calibration until replacement on 02/02/2015	53.6	Monitor overdue for calibration until replacement on 02/02/2015	10/11/2015	02/02/2015
Chief Engineers	98.8	N/A	98.8	N/A	11/07/2014	21/07/2014
West End	0	Monitor failed – see comments below	0	Monitor failed – see comments below	04/10/2014	22/10/2014
Harsco	98.8	N/A	0	No wind vane connected	Calibration record owned by Harsco	16/09/2014
Penrhyn	43.9	Flow issues after 09/02/15	99.0	N/A	10/03/2014	12/09/2014
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 monitor. A new wind vane was installed on 9th April 2015, which has rectified the issue. Therefore, wind speed data will be available for the Q2 2015 report.

An average data capture of 68.6% has been achieved by the TOPAS monitors during Quarter 1 2015. The TOPAS monitor data capture is lower than that achieved during Quarter 4 2014 (87%). The main reason for the lower data capture is due to zero data capture at the West End monitor during the quarter. There was a PI network failure on routine replacement of this monitor and access to the monitor was limited because the site has been taken over by contractors carrying out ground work for a potential new project. Once access was gained, an air flow fault was identified and several attempts were made to repair the monitor but unfortunately the monitor could not be fixed locally and requires repair with an external contractor.

Only 7 of the 9 monitors in the planned network (see Figures 1 and 2, appendix A) were deployed during Q1. This is because the Harbour and Harbour Jetty monitors were out of calibration according to their respective calibration dates, although both monitors were operating within a year of their start dates of operation (see Table C below). As a result of a corrective action from an external ISO14001 audit we are no longer able to operate monitors outside of the annual calibration period, despite monitors being deployed for less than a year. In addition, due to delays with the initiation of a service contract with a new supplier, the contract did not start until March 2015. Consequently, the monitors will not be re-instated until replacement monitors become available. We aim to increase the monitor network back to the planned 9 monitors by the end of Q2 2015.

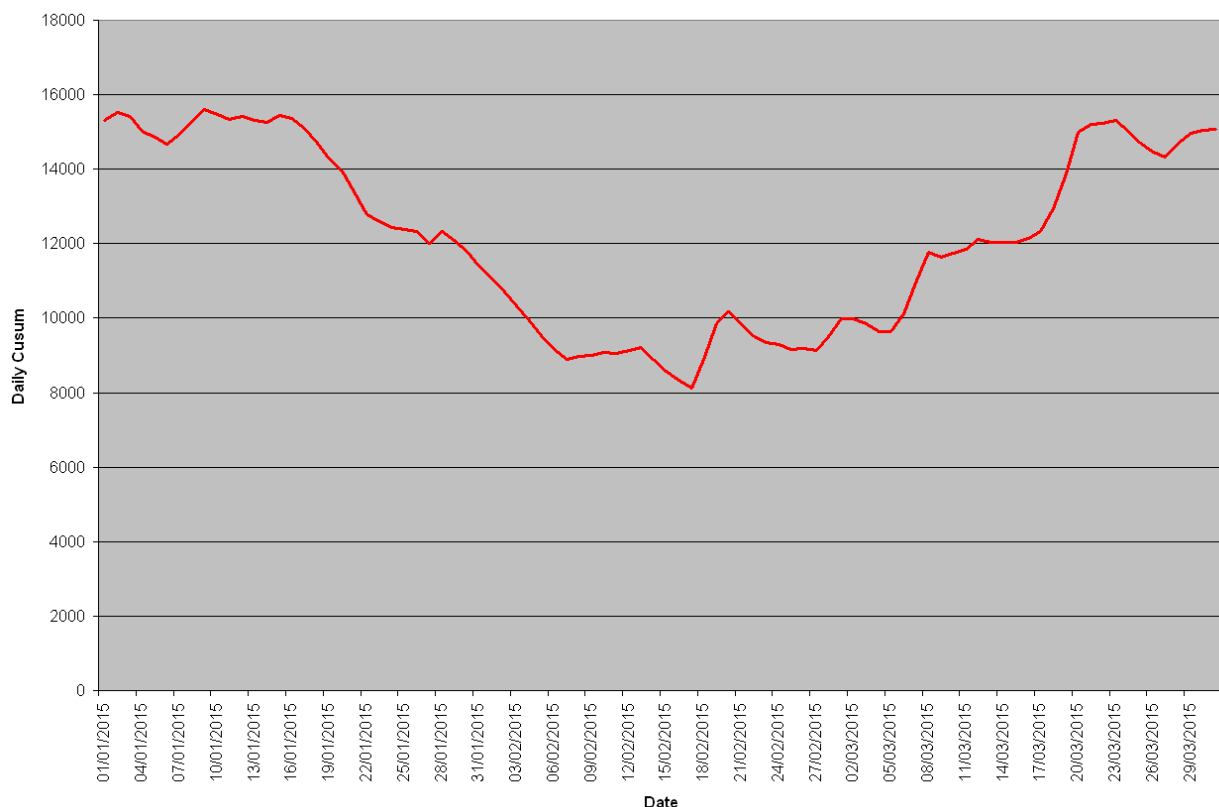
Table C – Summary of TOPAS monitors taken off-line between 1st January and 31st March (Q1) 2015

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
Harbour	0.0	Monitor out of annual calibration	0.0	Monitor out of annual calibration	10/12/2013	31/03/2014
Harbour Jetty	0.0	Monitor out of annual calibration	0.0	Monitor out of annual calibration	08/11/2013	18/07/2014

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 January to 31st March 2015

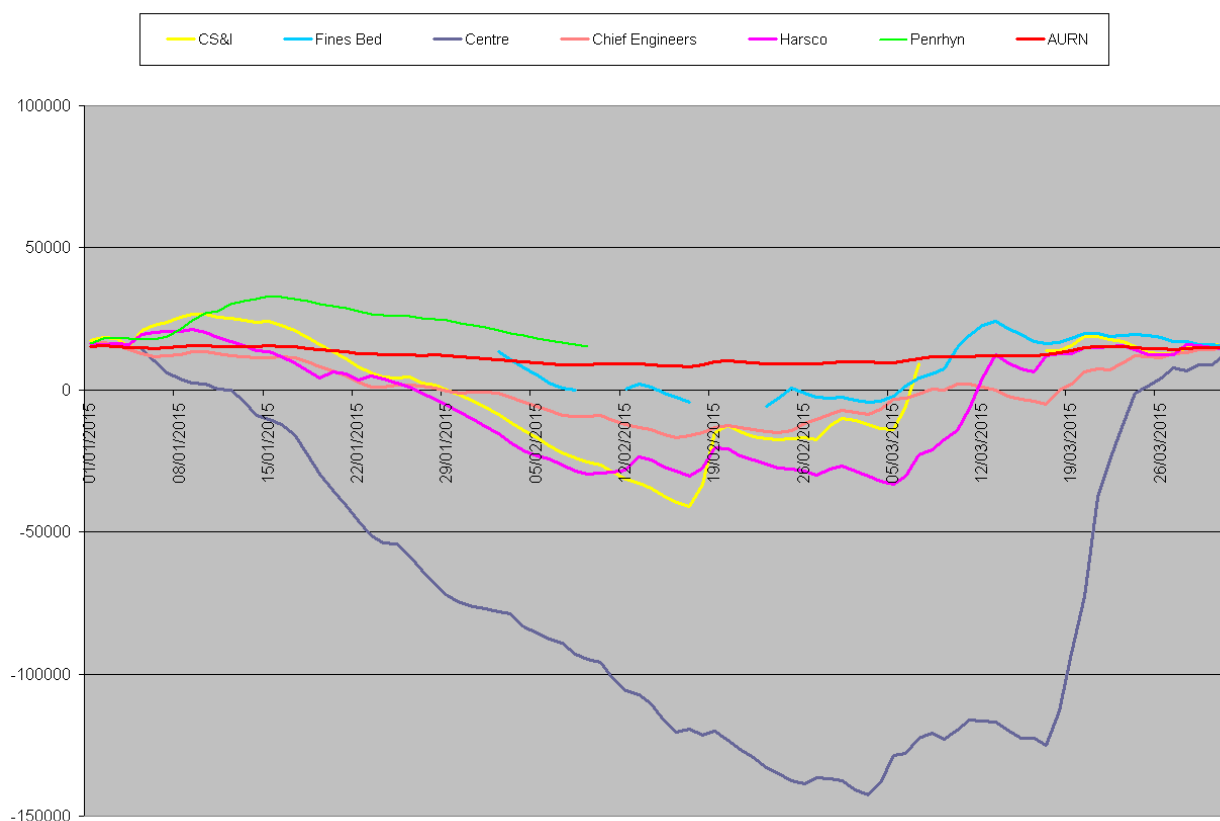


The daily cusum plot for the AURN (Figure A) has been included because comparisons can be made with some of the Steelworks' monitor plots (Figure B) over the monitoring period. However, some of the Steelworks' monitor plots are different the AURN plot. This indicates that these Steelworks' monitors are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

The cusum plot for the AURN monitor is relatively stable between 1st and 15th January, with a slight increase between 6th and 9th January, which coincides with the breach day that occurred on 7th January. The trend then decreases until 17th February, prior to a steep increase until 20th February, coinciding with the breaches that occurred on 18th and 19th February. The trend then levels out until 4th March, followed by two steep increases between 5th and 8th March and 17th and 20th March, which coincide with five breaches that occurred at the AURN during these periods. The trend then levels out until the end of the quarter.

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

Figure B – Daily cusums for the Centre, Harsco, CS&I, Penrhyn, Chief Engineers and Fines Bed TOPAS monitors from 1st January to 31st March 2015



The cusum trend for the Centre monitor decreases from the start of the quarter until 3rd March. During this period, the trend levels out slightly to coincide with the breach days that occurred on 18th, 19th and 28th February, but does not level out to coincide with the breach day recorded on 7th January. The trend then increases until 11th March (coinciding with the 6th and 7th March breach days) and then decreases once again until 17th March. This is prior to a very steep increase between 24th March and a more gradual increase until the end of the quarter. The steep increase coincides with the three trans-boundary breach days recorded on 18th, 19th and 20th March.

Similarities can be seen between the Centre monitor cusum trend and the AURN monitor cusum trend throughout the quarter. However there are differences between the two trends in early January, when increases are seen on the AURN monitor cusum trend but not on the Centre trend. There are also differences between the trends from 23rd to 27th March, when increases are seen on the Centre monitor cusum but not on the AURN trend. The Centre monitor is located in fairly close proximity to the Ironmaking (Blast Furnaces, Raw Materials Handling (RMH) and Granulated Coal Injection (GCI) Plant) area of the site, the Sinter Plant and the Burdening stockyards. The majority of the EIFs (Environmental Incident Forms) issued by Ironmaking area during Q1 were for casthouse emissions from Blast Furnaces 4 and 5. An investigation was carried out into the relationship between the cusum trend for the Centre monitor and the number of EIFs

issued for casthouse emissions per day. No relationship was found as the vast majority of EIFs were issued on days when the cusum trend for the Centre monitor was decreasing compared to days when the trend was increasing. Further, no relationship could be found between increases on the Centre monitor cusum trend and Blast Furnace bleeder openings or ferrous stockhouse emissions. No EIFs were issued from the Burdening area at times when increases can be seen on the Centre monitor trend but not on the AURN trend. There were no changes to processes in close proximity to the Centre monitor during the quarter that could explain increases in the trend, which was not mirrored by the AURN trend.

The cusum trend for the Harsco monitor commences with an increase until 9th January, coinciding with the 7th January breach day, followed by a decrease in the trend until 10th February. This is prior to a series of small increases and decreases in the trend until 3rd March, with increases coinciding with the 18th, 19th and 28th February breach days. This is followed by an increase in the trend until the end of the quarter, coinciding with the five remaining breach days recorded at the AURN. Similarities can be seen between the Harsco and Centre monitor trends throughout the quarter and as the monitors are located in close proximity to each other, it is likely that that the two monitors were impacted by similar sources during the monitoring period. As was also the case with the Centre monitor, no relationship could be found between EIFs issued in the area and increases on the Harsco monitor cusum trend during the quarter. The Harsco monitor trend is very similar to that of the AURN monitor, with increases and decreases in the trends being seen at similar times throughout the quarter. The Harsco monitor is also located in very close proximity to the Sinter Plant and in close proximity to the Burdening Stockyards. However, no EIFs were issued from the Burdening area at times when increases can be seen on the Centre monitor trend but not on the AURN trend. There were no changes to processes in close proximity to the Harsco monitor that could explain the increases and decreases in the trend during the quarter.

The CS&I monitor cusum trend increases until 10th January, followed by a decrease in the trend until 17th February. This is prior to an increase in the trend until the end of the quarter with steeper increases coinciding with the breach days recorded at the AURN. The trend for the CS&I monitor is very similar to that of the AURN monitor; therefore, it is possible that the two monitors were impacted by similar sources. The CS&I monitor trend is also fairly similar to that of the Harsco and Fines Bed monitor throughout the quarter. The CS&I monitor is located in close proximity to the Ironmaking area of the site. However, no relationship could be found between EIFs issued in the area and increases on the CS&I monitor cusum trend during the quarter. 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 increases and decreases in the trend during the quarter.

The cusum trend for the Penrhyn monitor is stable between 1st and 6th January, followed by a gradual increase until 16th January. This coincides the breach day that occurred on 7th. This is prior to a gradual decrease in the trend until the monitor encountered flow issues on 9th February. The Penrhyn monitor follows a fairly similar trend to the AURN monitor during this early part of the quarter; however, the AURN was stable between 9th and 15th January when the trend for the Penrhyn monitor was increasing. There were no changes to site processes during this time, however, preliminary excavation work on the proposed power station site was taking place in the area during the early part of the quarter, which may possibly have impacted upon the Penrhyn monitor but not the AURN monitor.

The cusum trend for the Chief Engineers monitor decreases gradually until 16th February (with a slight increase between 6th and 9th January) followed by a gradual increase until 10th March. This is prior to a decrease in the trend until 17th March, followed by a gradual increase until the end of the quarter. Therefore, the cusum trend coincides with all nine breach days that occurred during the quarter – including the three trans-boundary breach days in March. The Chief Engineers monitor trend is similar to the trend for the AURN monitor, showing increases and decreases at similar times throughout the quarter. The Chief Engineers monitor is located in close proximity to the Steel & Slab area of the site and also Harsco's Metal Recovery (MR) Plant. No relationship could be found between EIFs for BOS Plant converter slopping emissions and increases on the Chief Engineers monitor cusum trend during the quarter. There were no significant changes to processes or unusual operations taking place within close proximity to the Chief Engineers monitor that could explain the increases or decreases in the trend during the quarter.

The cusum trend for the Fines Bed monitor decreases from 2nd February until 8th February and is then fairly stable until 4th March; with a very slight increase at the time of the breach day recorded on 28th February. The Fines Bed monitor was not operating from 9th to 11th February and 18th to 22nd February, therefore it is not possible to see if the trend would have coincided with 18th and 19th February breach days. The trend then increases until the end of the quarter to coincide with the remaining breach days recorded in Q1. The Fines Bed monitor follows a similar trend to the Harsco monitor cusum trend with increases and decreases seen at similar times during the quarter. The Fines Bed monitor, like the Harsco 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 account for the increases and decreases seen on the Fines Bed monitor cusum trend during Q1.

The West End monitor was not operating throughout the monitoring period.

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 in 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 D), 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 D - Summary of potential sources impacting the TOPAS monitors between 1st January and 31st March 2015

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 (150° to 210°)	Blast Furnaces, Granulated Coal Injection (GCI) Plant, Raw Materials Handling (RMH) Lafarge Tarmac's Slag Pools and Slag Granulation Plant.	Lafarge Tarmac's Slag Handling Plant, Steel & Slab (S&S), Harsco's Metal Recovery (MR) Plant, Slab Yards, Darlow Lloyds HAA Site (HAA), Coke Ovens and other off-site sources.
Centre	NNW (340°)	GCI Plant, RMH and Civil & Marine's Slag Plant.	The Docks and Aberavon town and residential area.
Fines Bed	E to ESE (90° to 120°)	Fines Bed, RMH, GCI Plant, Blast Furnaces, Power Plant and Lafarge Tarmac's Slag Pools and Slag Granulation Plant.	Margam and Taibach residential areas, Harbour Way, M4 motorway, and other off-site sources.
Harsco	SE (120° to 150°)	RMH, GCI Plant, Blast Furnaces, Lafarge Tarmac's Slag Pools and Slag Granulation Plant.	S&S, Slab Yards, HAA, Rolling Mills, and other off-site sources.
Chief Engineers	SW (230°)	Harsco's MR Plant.	The coast and other off-site sources.
Penrhyn	NW to NE (330° to 60°), ENE to SE (80° to 130°), WNW (280°) and NW (300° to 310°)	Power Plant, Margam and Taibach residential areas, Harbour Way and the M4 motorway.	Civil and Marine's Slag Plant, Fines Bed and the Docks.

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 Steel will use the 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 2015 there were nine breach days recorded at the AURN monitor. Three of these breaches, however, were attributed to the influence of trans-boundary pollution (18th, 19th and 20th March).
- In addition, four near miss days were recorded during the quarter. Near miss days occur when the daily average PM₁₀ concentration is between 45 and 50µg/m³.
- The TOPAS monitors achieved an average data capture of 68.6% during Q1 2015. The data capture for the TOPAS monitors was lower than that achieved during Q4 2014 (87%).
- The daily cusum plot for the AURN (Figure A) has been included because comparisons can be made with all of the Steelworks' monitor plots over the monitoring period.
- There are similarities between all of the on-site monitor trends and the trend for the AURN monitor during Quarter 1, with most trends increasing to coincide with the breach days that occurred during the quarter.
- 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 Q1 2015

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

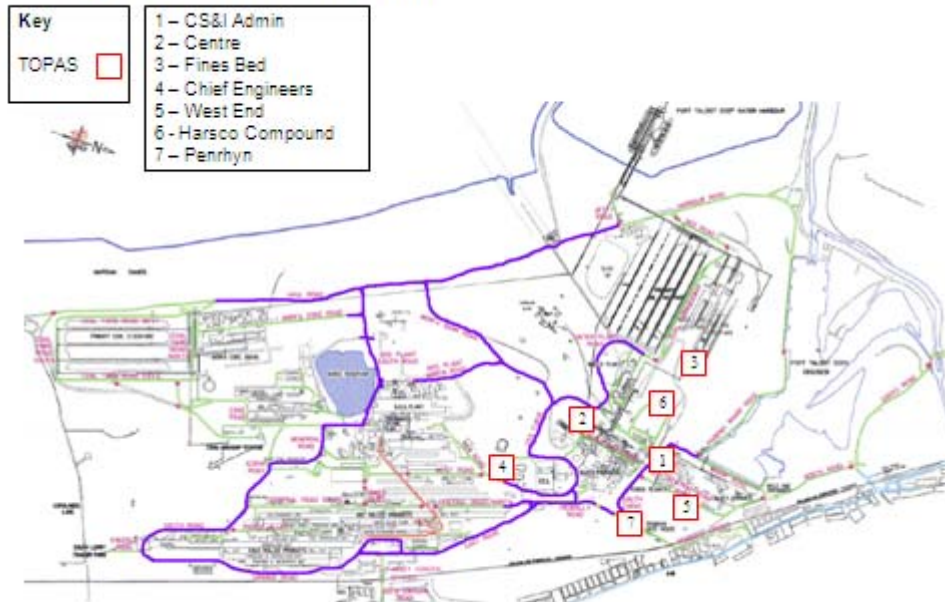


Figure 2 On Site Monitoring Network (Tata Steel Monitors*) as Planned in March 2014

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

