

Adelaide Brighton Cement Birkenhead Works. Licence Number: 1126

**QUARTERLY STACK MONITORING
REPORT**

October - December 2015

Version: 1

Submitted: 29th January 2016

EPA LICENCE NO: 1126

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Quarterly Report October- December 2015

Monitoring Objective

The aim of the Quarterly Stack Monitoring Report is to identify and report on emissions to compare actual emissions from Adelaide Brighton Cement Birkenhead Works against the Environment Protection (Air Quality) Policy 1994, Authorisation 1126 and Exemption Authorisation 12368. Furthermore the aim of the report is to continuously monitor and provide reasons for the particulate emissions exceeding reporting limits in order to establish key areas where opportunities lie for process and mechanical improvements to reduce the level of stack dust emissions from the site.

Monitoring Plan

Monitoring of stacks 4A and 4B on the Birkenhead site is performed using Durag Dust and Opacity Meters. These meters provide a continuous % opacity and this is converted to mg/Nm^3 using a calibration curve. The results are then summarized as one hourly averages based on 10 minute averages for the purpose of this report.

The license that Adelaide Brighton Cement operates under in regard to stack emissions is summarized below.

Environment Protection (Air Quality) Policy

- Schedule 1 (1) - limit of $250\text{mg}/\text{Nm}^3$ stack 4A and 4B
- Exemptions License
 - Kiln or calciner light up &/or purge – max 10 minutes
 - Level 3 combustibles trip – max 5 minutes
 - Power failure – duration of emergency situation

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- Stack emissions testing for calibration of opacity meter – provided that an EPA authorised officer is on site
- Reporting Levels
 - All emissions in excess of 80 mg/m³ (Stack 4B) and 150 mg/m³ (Stack 4A)

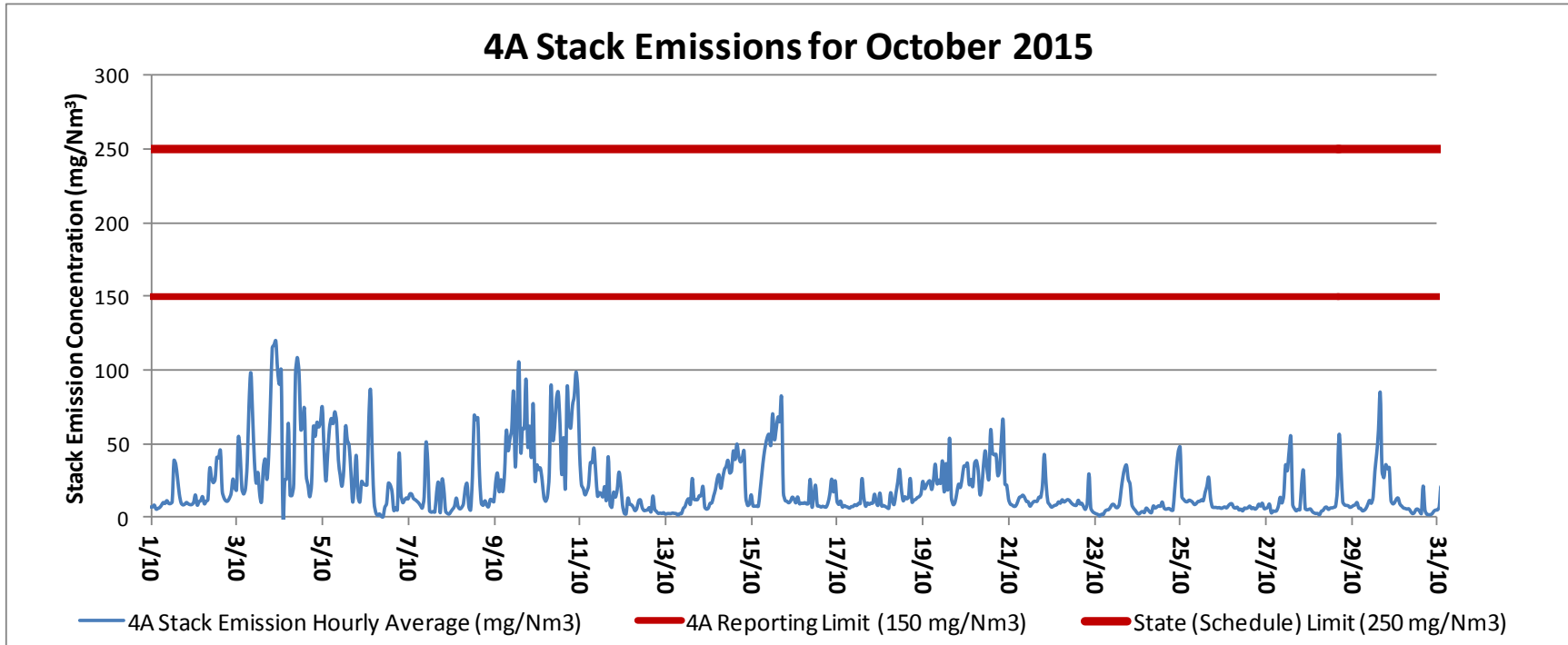
The Environmental Protection Authority (EPA) must be notified as soon as practicably possible of all emissions in excess of the Schedule 1 (1) limit or reporting limit and cause as well as remedial actions must be communicated. Where particulate emissions exceed the Schedule 1(1) limit and the cause is not explicitly covered by the exemptions an investigation will be carried out by the EPA to ensure that ABC Birkenhead has taken all reasonable and practicable measures to reduce the emissions.

Monitoring Results

Presentation of Results

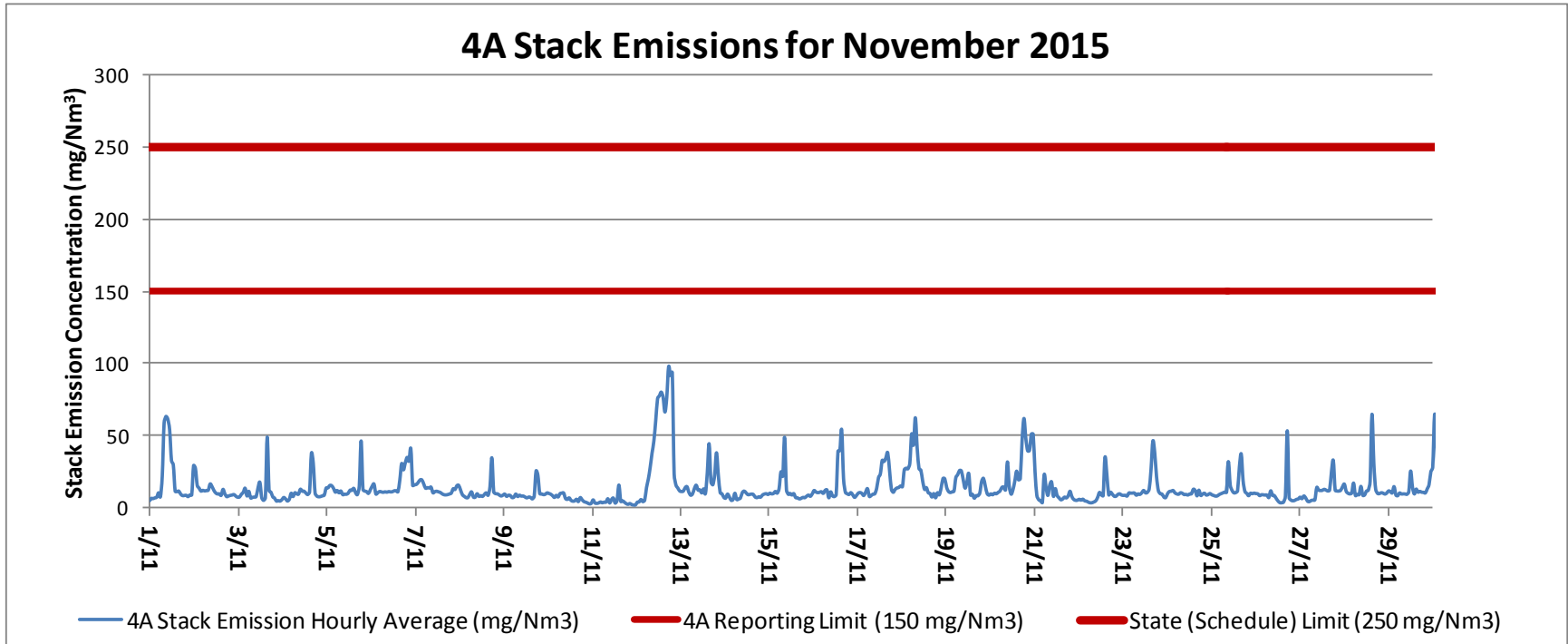
The graphs on the following pages detail the hourly averages of 10 minute averages of stack emissions from 4A and 4B stacks by month. The tables below each chart show the results of RCA (root cause analysis) that was undertaken for plant stoppages resulting in emissions above either the reporting limit or the Air Quality Policy Schedule 1 (1) limit on an hourly average.

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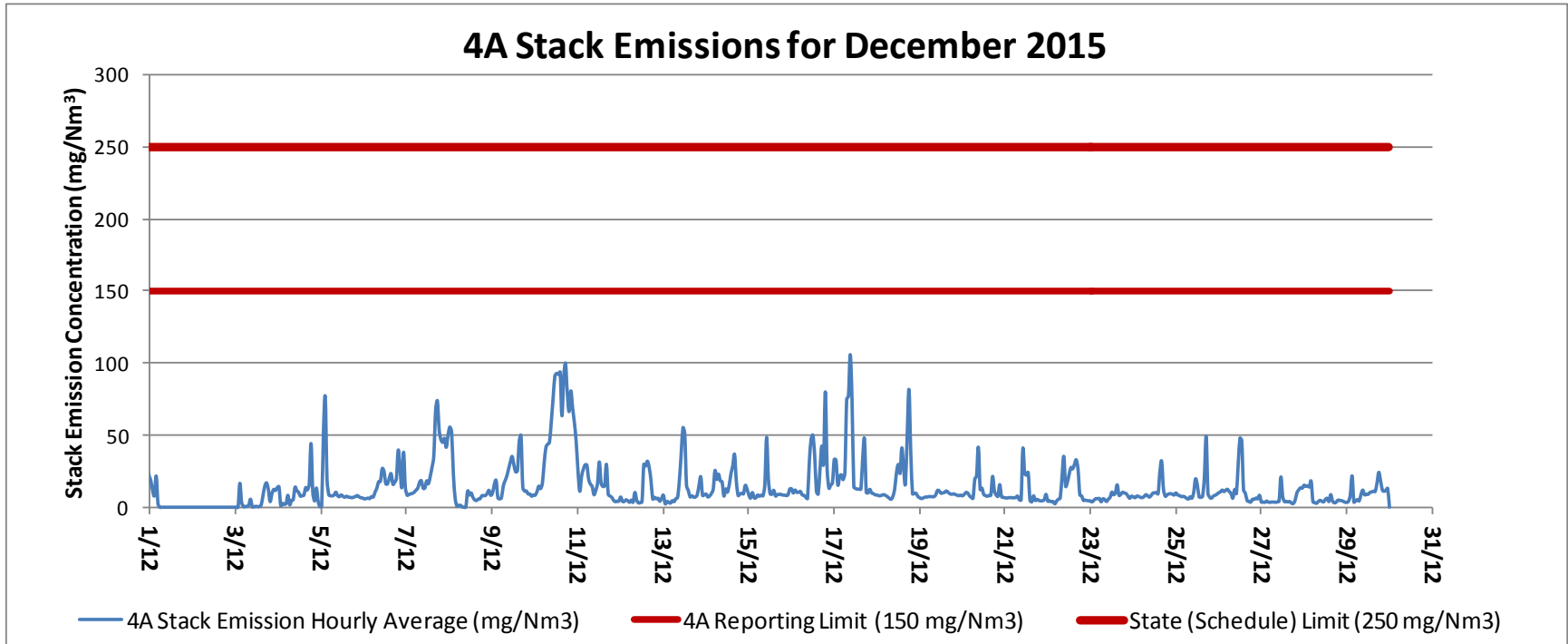
Tag	RCA Number	Description

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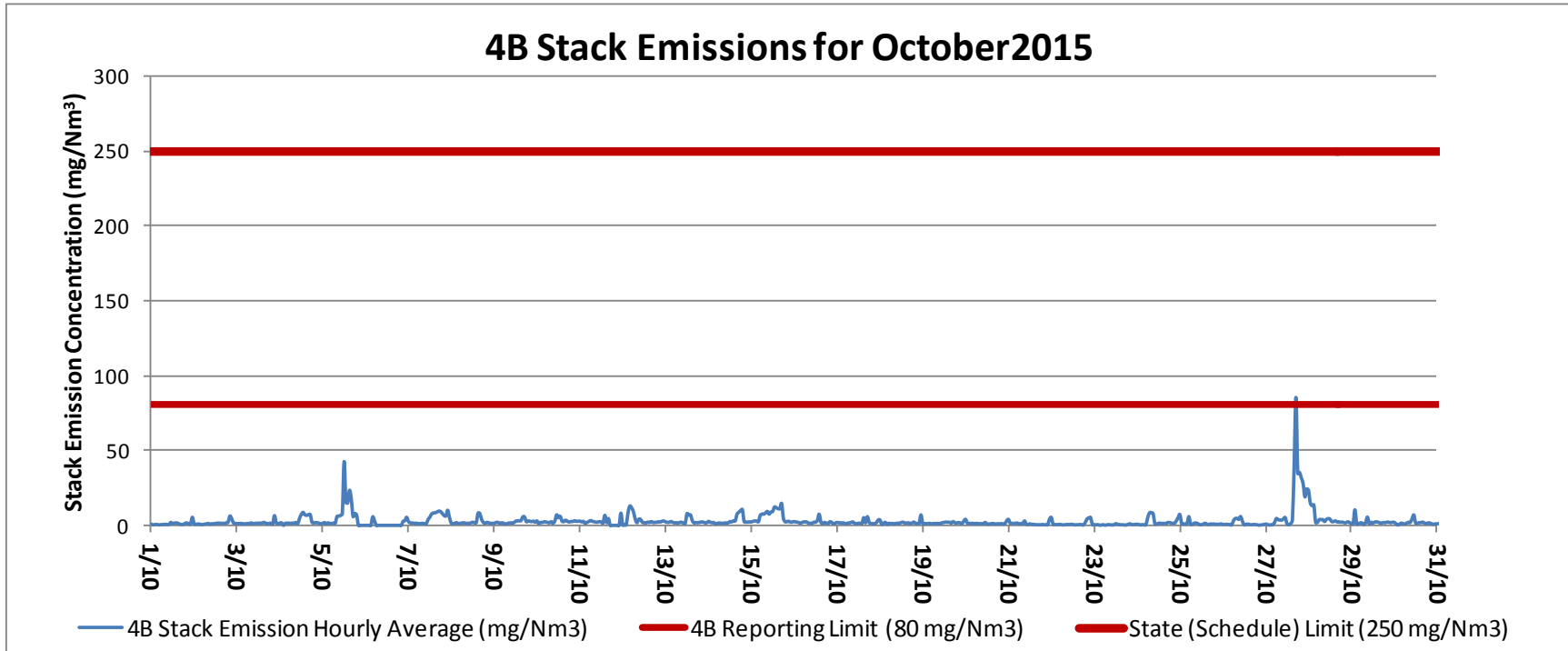
Tag	RCA Number	Description

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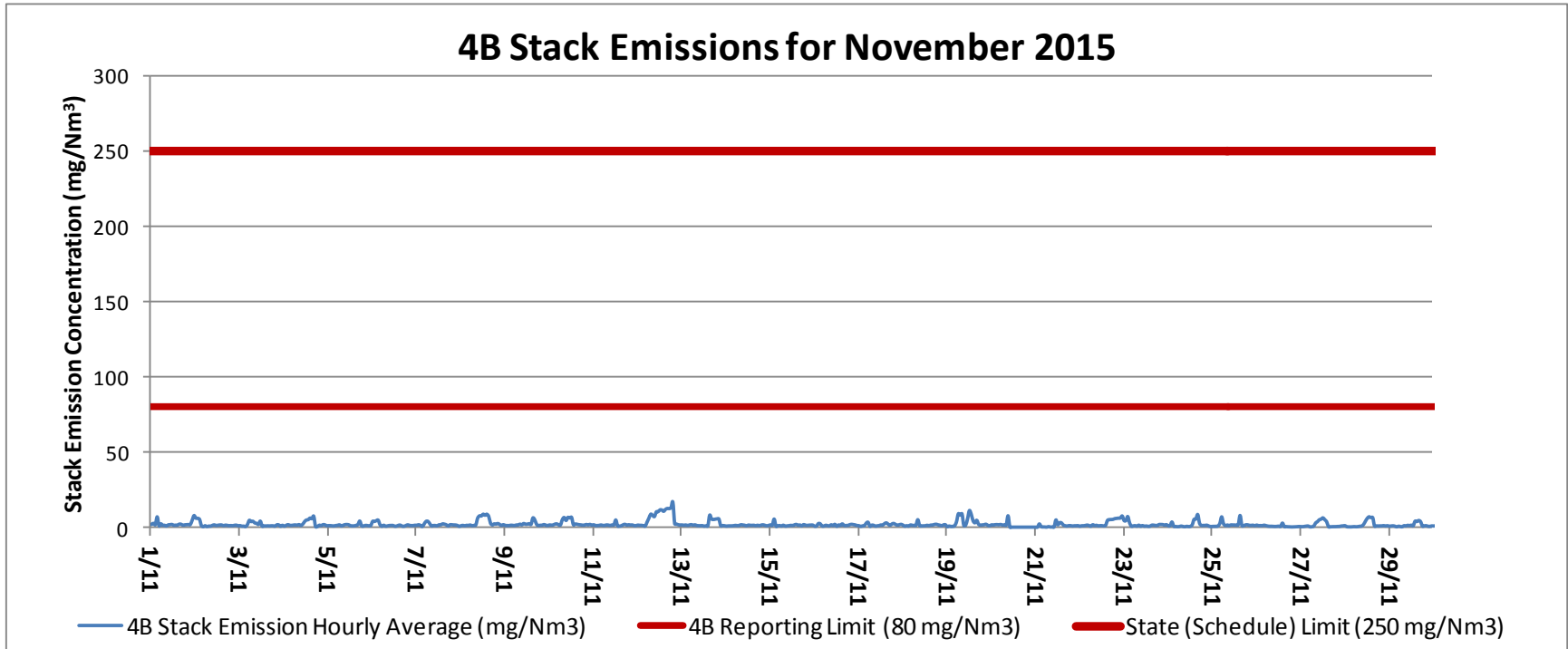
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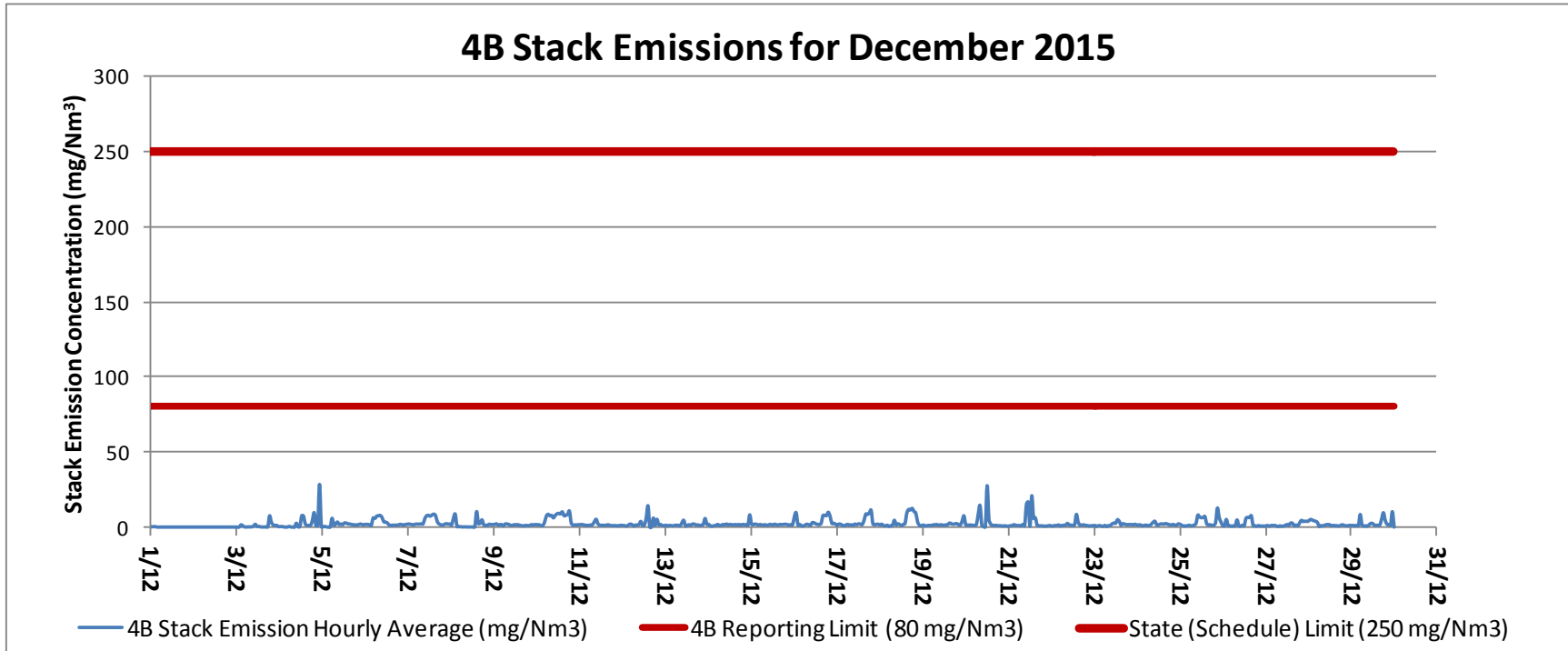
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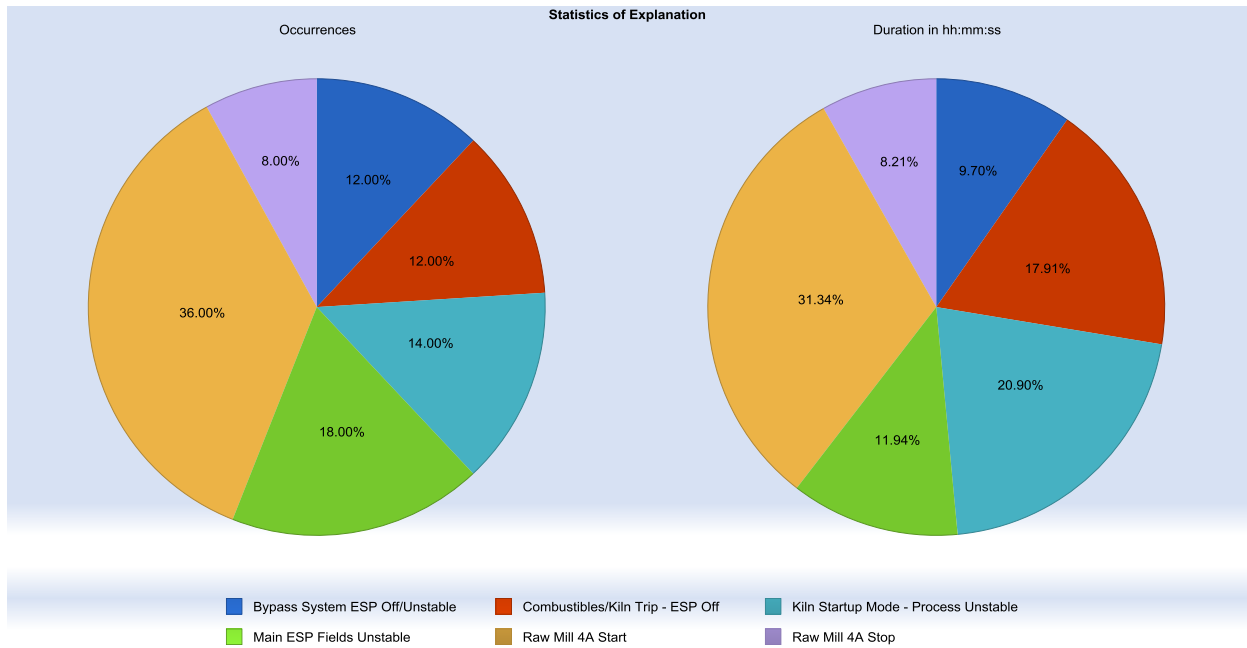
Tag	RCA Number	Description

Short Term Report Summary

1. Short Term Excursions above 250mg/Nm³

In addition to hourly averages shown earlier in the report short term excursions above 250mg/Nm³ are reported during the period to the EPA. Below is a pie chart of the causes on both 4A and 4B stack.

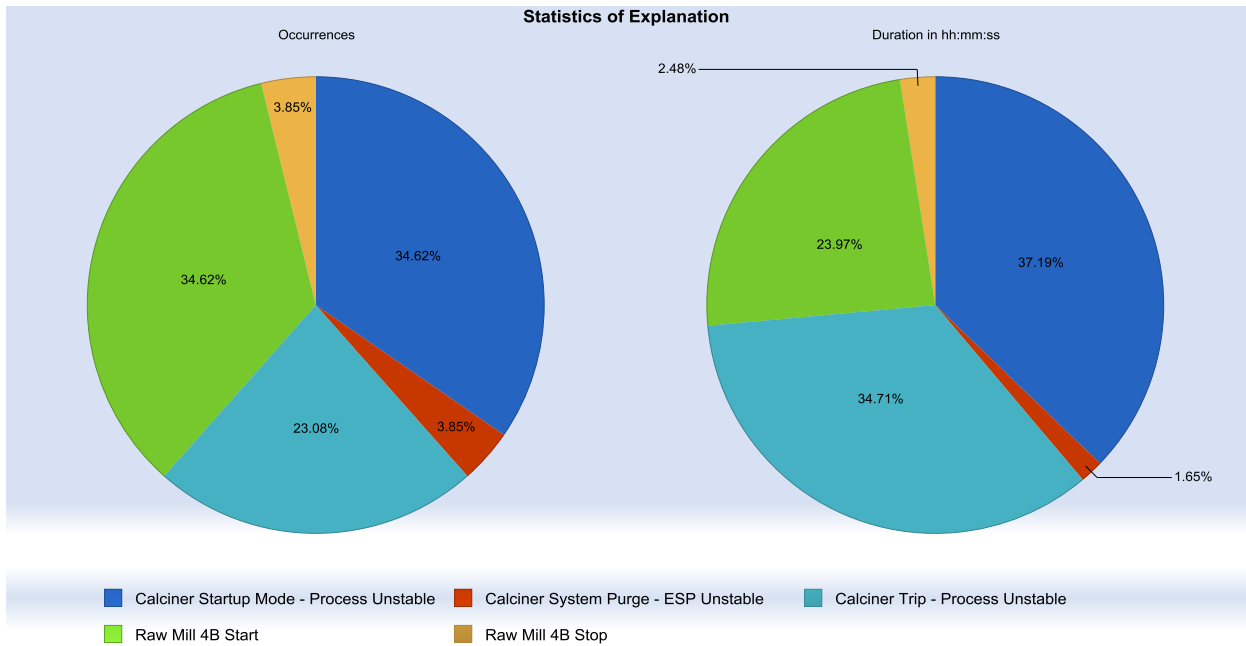
4A Greater Than 250mg/Nm³ Emissions Qtr 4 2015



4A Stack Pie Chart of causes over 250 mg/Nm³ in terms of number of occurrences and total time

Total number of occurrences =50; total time 22 minutes 20 seconds

4B Greater Than 250mg/Nm³ Emissions Qtr 4 2015



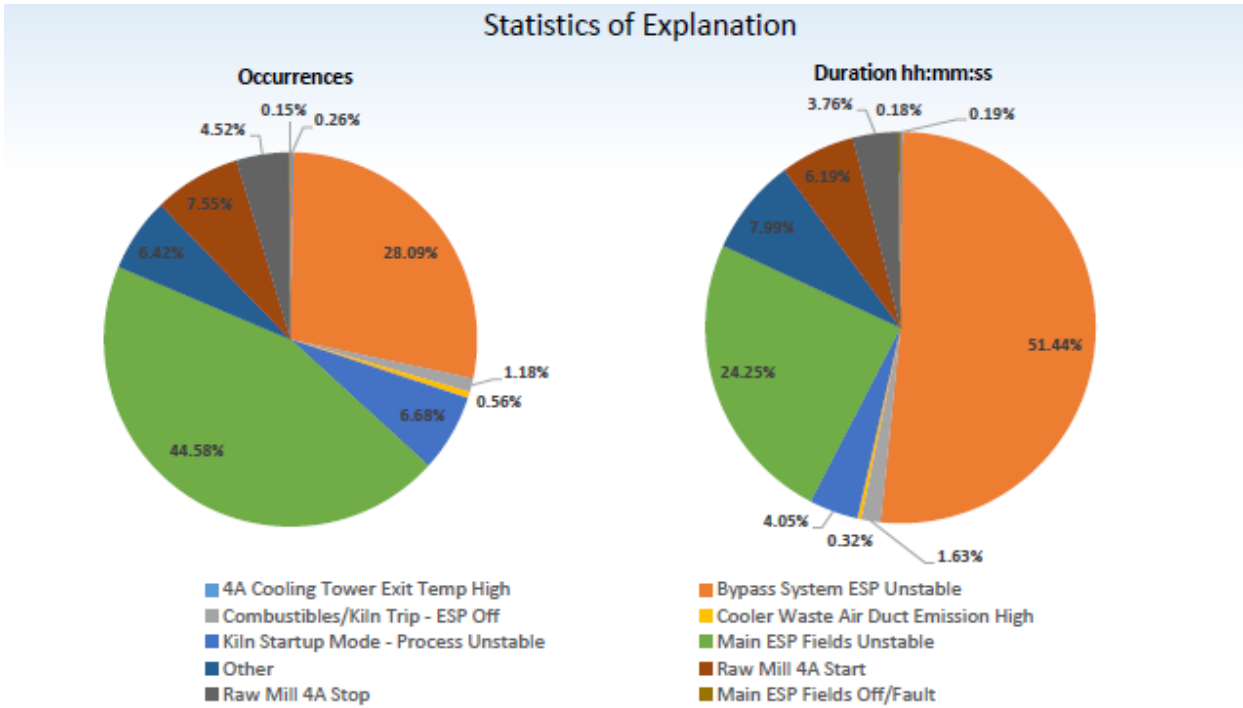
4B Stack Pie Chart of causes over 250 mg/Nm³ in terms of number of occurrences and total time

Total number of occurrences = 26; total time 20 minutes 10 seconds

2. Causes of reporting limit excursions

Stack emissions greater than 80 mg/Nm³ (4A Stack), 150 mg/Nm³ (4A Stack) and 80 mg/Nm³ (4B Stack) are reported to the EPA on a weekly basis. A pie chart and the total time are presented. Below are pie charts for 4A and 4B stack for the three month period; and also the total time charts up until the end of June 2015.

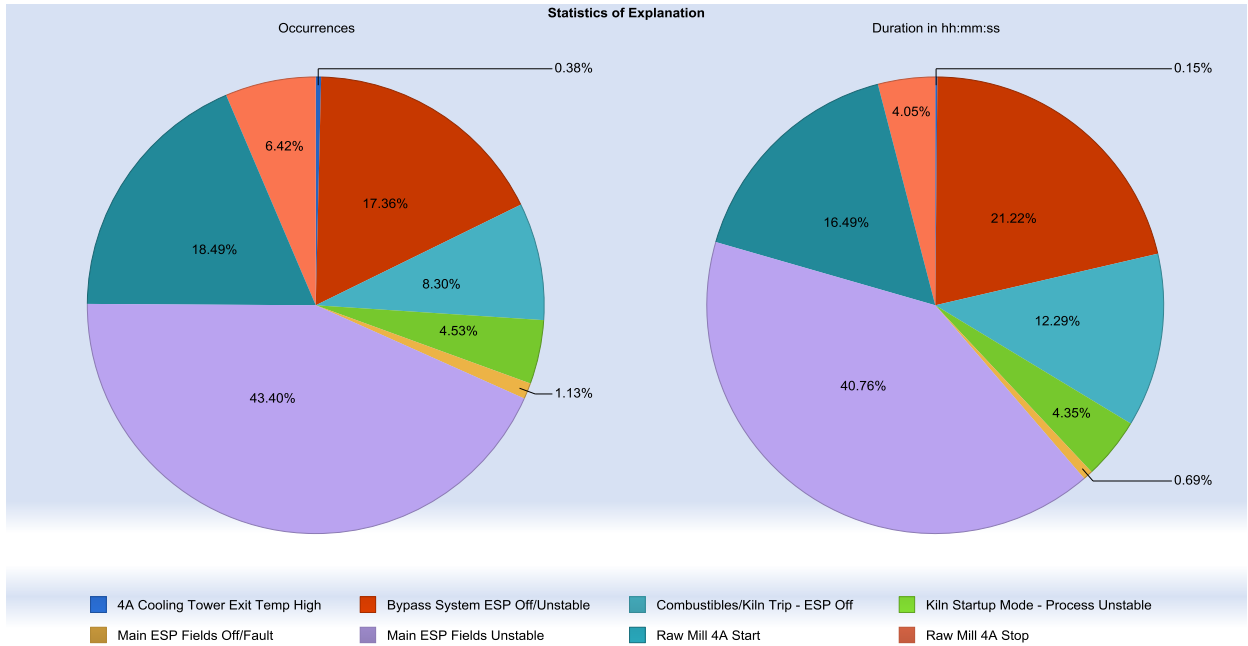
4A Greater Than 80mg/Nm³ Emissions Qtr 4 2015



4A Stack Pie Chart of causes over 80 mg/Nm³ in terms of number of occurrences and total time

Total number of occurrences = 1947; total time 2 days 7 hours 21 minutes 20 seconds

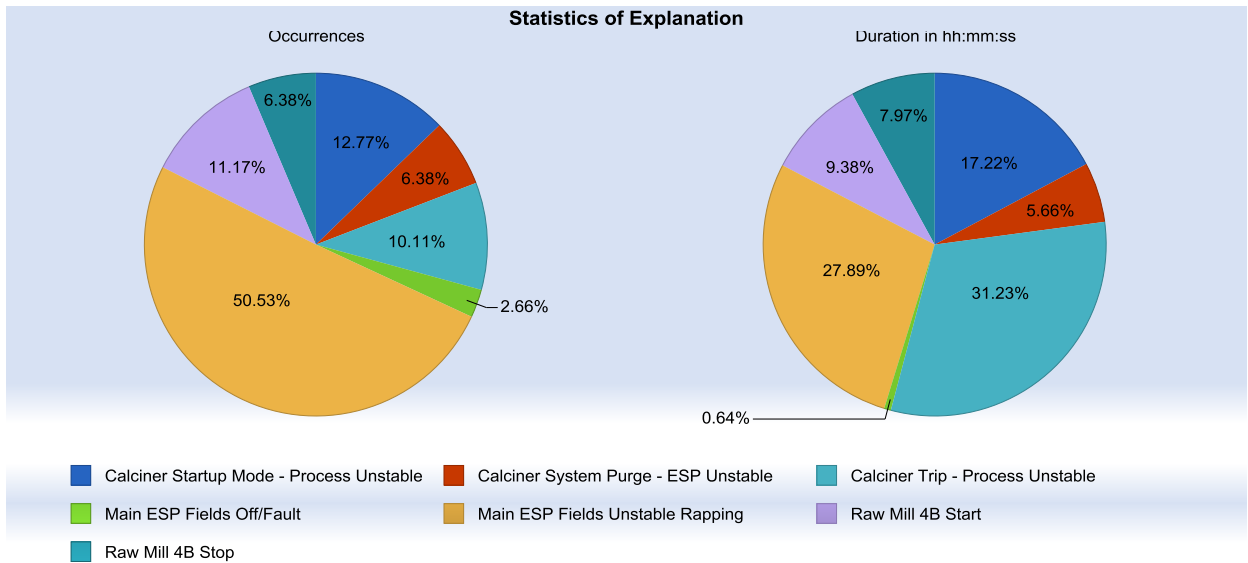
4A Greater Than 150mg/Nm³ Emissions Qtr 4 2015



4A Stack Pie Chart of causes over 150 mg/Nm³ in terms of number of occurrences and total time

Total number of occurrences = 265; total time 3 hours 38 minutes 20 seconds

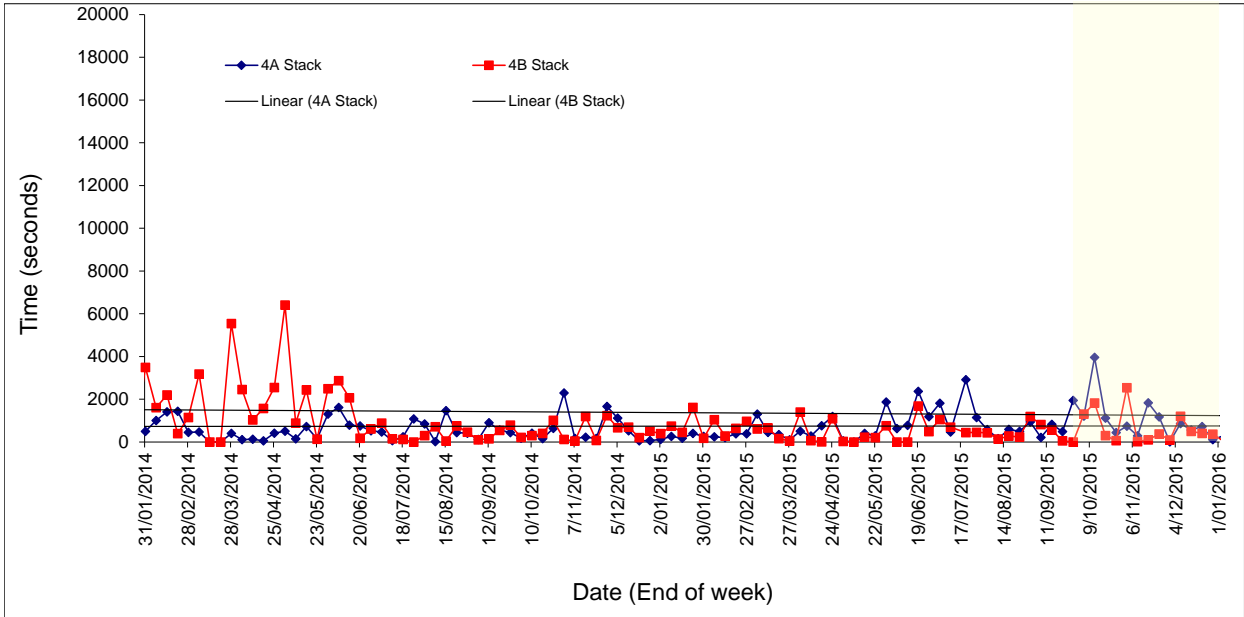
4B Greater Than 80mg/Nm³ Emissions Qtr 4 2015



4B Stack Pie Chart of causes over 80mg/Nm³ in terms of number of occurrences and total time

Total number of occurrences = 188; total time 2 hours 09 minutes 40 seconds

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Tracking total time for stack emissions greater than the reporting levels of $150\text{mg}/\text{Nm}^3$ on 4A stack and $80\text{mg}/\text{Nm}^3$ on 4B stack.

Monitoring Results – Quality Assurance / Quality Control Evaluation

The data shown in the graphs above was calculated using an opacity curve generated by a number of iterations of spot testing by Axiom Air whom are accredited for compliance with ISO/IEC 17025. The opacity meters are also calibrated daily and via regular planned maintenance as per the suppliers' standard.

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Process Improvement for the Quarter

As part of our continuous improvement commitment the emissions reduction team formed last year has continued to work on new and existing projects to mitigate emissions, including:

Electrostatic precipitator improvements

- Ongoing evaluation of ESP operating functionality.

During raw mill down-days, operations team has been working on improving emissions performance through temperature control through conditioning towers, including altering control parameters for mill off conditions.

Plant Stack Emissions Improvement Team

- FLSmidth Airtech audit in November 2015

An FLSmidth Airtech specialist visited the site for several days to review the operability and state of the electrostatic precipitators and fabric filter bag house. Improvements were trialed and implemented on all of the electrostatic precipitator field controllers. Changes were made to improve the collecting efficiency during process upsets (e.g. Raw mill starts) and during normal operation to reduce the emissions. The change has lowered baseline emissions on 4A and 4B electrostatic precipitator during both normal and unstable operating conditions. The average improvements in baseline stack emissions to date are in the vicinity of 35%, 17 % for 4A Stack (Mill running/mill off) and 9%, 29% for 4B Stack (Mill running/mill off).

- Improved blockage clearing practice has been implemented in recent months, which has seen a reduction in 4A stack emissions
- A further one million dollars' worth of blasters has been designed and justified for scheduled installation in the upcoming shutdown to further improve blockage management. Less blockages will result in more stable plant operations and reduced emissions
- Further work is planned during the upcoming February-March 2016 plant shutdown on all the three ESP's, including a comprehensive review and inspection of all the internals by a specialist FLS consultant

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Conclusions and Recommendations

There were no incidents above $250\text{mg}/\text{Nm}^3$ for a one hour average on 4A or 4B stack in the quarter. There were no incidents above $150\text{ mg}/\text{Nm}^3$ on 4A stack and one above $80\text{ mg}/\text{Nm}^3$ on 4B stack for a one hour average in the quarter. A process of review and improvements mentioned above, including root cause analysis, are utilized to reduce these situations, thereby reducing the number of occurrences of emissions greater than $250\text{ mg}/\text{Nm}^3$ and overall emissions.

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Appendix A

See attached PDF files.



4A lvl3 q4.pdf



4B lvl2 q4.pdf



4A_GT_250_Q4.pdf



4B_GT_250_Q4.pdf



4A lvl1A q4.pdf