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Stack Particulate Management Plan Annual Stack Particulate Report

COMPLIANCE DATE: 31/10/23 – Annual Report 2023 (July 2022-June 2023)

EPA Licence 1126: Stack Particulate Management Plan (U - 1556)

Licensed site: Adelaide Brighton Cement, Birkenhead Works

62 Elder Road, Birkenhead, SA 5015

EPA Licence number: 1126

Date of Submission: 31 October 2023

Version Number: 1



Report Submitted by: Advisor Environment - C&L (SA/NSW/NT)

Glossary

Term	Definition
$\mu\text{g}/\text{m}^3$	micrograms per cubic metre
mg/m^3	milligrams per cubic metre
m	metre
m^3	cubic metres
m^3/s	cubic metres per second
Nm^3	Gas volume in cubic metres at STP dry basis
Abbreviations	Definition
Air EPP	Environment Protection (Air Quality) Policy 2016
SA EPA	South Australian Environment Protection Authority
STP	Standard Temperature and Pressure (zero degrees Celsius and 101.3 kilo Pascals absolute)
TSP	Total Suspended Particulates
SPMP	Stack Particulate Management Plan

<p>Monitoring Objective</p>	<p>All stack particulate emissions events for the reporting period where levels have exceeded the following reporting thresholds:</p> <p>Before 1/11/2022:</p> <ul style="list-style-type: none"> • 100mg/Nm³ (1 hour averaging period) on Kiln Stack 4A) • 60 mg/Nm³ (1 hour averaging period) on Precalciner Stack 4B) <p>After 1 /11/2022:</p> <ul style="list-style-type: none"> • 80mg/Nm³ (1 hour averaging period) on Kiln Stack 4A) • 50 mg/Nm³ (1 hour averaging period) on Precalciner Stack 4B) <p>An annual report will be prepared and submitted by the last day of October of each year that provides an analysis of the 1-hour particulate reporting events including:</p> <ul style="list-style-type: none"> • A table detailing the number and cause of reporting events for Kiln Stack 4A and Precalciner Stack 4B • A trend analysis of magnitude and duration of 1-hour notifications on a time series graph for each stack • A trend analysis of community complaints by type against 1-hour reporting events by cause on a time series graph for each stack • A table comparing the number of 1-hour reporting events by cause for the current and previous year • Identification of opportunities for improvement to decrease the frequency, duration and magnitude of 1-hour reporting events
<p>Monitoring Plan</p>	<p>This monitoring report has been prepared in line with the objectives of the Stack Particulate Management Plan approved on 12 September 2023 by the South Australian EPA.</p> <p>The Plan is available on the ABC Birkenhead Community Website: http://www.birkenheadcommunity.com.au</p>

4A Stack - Summary of 1-hr Reporting Events for the period 1/7/2022 to 30/06/2023

The table below provides a summary of 1-hr reporting events:

- before 1/11/2022, where stack particulates levels exceeded 100 mg/Nm³ (1 hour averaging period)) and
- after 1/11/2022, where stack particulates levels exceeded 80 mg/Nm³ (1 hour averaging period))

Date	Time start	Time finish	Duration (min)	Magnitude mg/Nm ³	Cause	Immediate Actions Taken	Actions Taken to Prevent a Reoccurrence
20/12/2022	20:47	21:27	40	101.2	Erratic 4A ESP performance whilst 4A Mill was offline.	4A Mill was restarted to reduce particulate emissions	ABC is currently investigating the cause for the erratic ESP performance
25/03/2023	9:08	9:34	26	88.8	4A conditioning tower sprays did not effectively cool exhaust gases to set point when 4A Mill was turned off, reducing ESP efficiency.	4A Mill restarted to reduce particulate emissions	Maintenance rectified issue with conditioning sprays.
05/04/2023	16:08	17:08	60	119	Electrical work on a raw material weigher resulted in a blown fuse which shutdown part of a plant switchboard resulting in loss of cooling sprays on the 4A gas conditioning towers which caused elevated emissions	The fuse was replaced, and plant returned to normal function.	Human error during routine electrical work - no further action required.
22/06/2023	21:08	21:21	13	81.1	The increase in particulate resulted from a faulty thermocouple in the Bypass conditioning tower, which triggered the conditioning tower sprays to turn off and on repeatedly due to faulty temperature readings, resulting in an increase in Bypass ESP temperatures and reduced ESP performance.	The thermocouple was replaced.	No further action required

4B Stack - Summary of 1-hr Reporting Events for the period 1/7/2022 to 30/6/2023

The table below provides a summary of 1-hr reporting events:

- before 1/11/2022, where stack particulates levels exceeded 60 mg/Nm³ (1 hour averaging period)) and
- after 1/11/2022, where stack particulates levels exceeded 50 mg/Nm³ (1 hour averaging period))

Date	Time start	Time finish	Duration (min)	Magnitude mg/Nm ³	Cause	Immediate Actions Taken	Actions Taken to Prevent a Recurrence
09/12/2022	12:30	13:08	38	53.8	Calciner combustion trip triggered by carbon monoxide sensor	Calciner, 4B raw mill,4B ESP, restarted, 4B conditioning tower sprays used to control emissions.	On detection of carbon monoxide, the Burner Management System immediately trips the plant. This is a critical process safety requirement.
09/12/2022	14:20	14:40	20	60.3	Unstable operating conditions following earlier combustion trip	Calciner, 4B raw mill,4B ESP, restarted, 4B conditioning tower sprays used to control emissions. It took an extended period for operating conditions to stabilise	On detection of carbon monoxide, the Burner Management System immediately trips the plant. This is a critical process safety requirement.
09/12/2022	15:02	15:19	17	53.1	Unstable operating conditions following earlier combustion trip	Calciner, 4B raw mill,4B ESP, restarted, 4B conditioning tower sprays used to control emissions. It took an extended period for operating conditions to stabilise	On detection of carbon monoxide, the Burner Management System immediately trips the plant. This is a critical process safety requirement.
20/12/2022	21:16	22:23	67	117.7	Erratic 4B ESP performance whilst 4B Mill was offline.	4B Mill was restarted to reduce particulate emissions	ABC is currently investigating the cause for the erratic ESP performance
29/12/2022	23:31	5:35	2	50.8	Calciner combustion trip triggered by a plant methane sensor	Calciner, 4B raw mill,4B ESP, restarted	On detection of methane, the Burner Management System immediately trips the plant. This is a critical process safety requirement.
20/03/2023	7:12	7:22	10	54.8	4B conditioning sprays not started by operator when the Kiln tripped due to main drive motor cooling fan failure. Resulting in 4B ESP inlet temperature increase reducing efficiency of the ESP fields.	Sprays started in response to increase in particulates	Investigate automation of sprays to reduce potential for operator error

Date	Time start	Time finish	Duration (min)	Magnitude mg/Nm3	Cause	Immediate Actions Taken	Actions Taken to Prevent a Recurrence
15/04/2023	20:46	21:29	43	71.9	<p>4B stack emissions became elevated during a calciner start-up. Emissions were elevated due to over-heating of the 4B Electrostatic Precipitator (ESP), reducing the ESP's efficiency.</p> <p>Before feed is introduced during the start-up, conditioning tower spray use is limited to avoid flooding the bottom of the conditioning tower.</p> <p>In this instance, no sprays were used to control the ESP temperature.</p> <p>There is a cold air bleed damper that can be used in this situation to cool the ESP instead</p>	Operators increased the bleed air flow once emissions began to increase.	Amend Calciner warm-up & start-up instructions to provide strict guidelines on use of cold air bleed.
12/05/2023	16:39	17:16	37	63.6	The increase in particulate resulted from a safety combustion trip, triggered by the burner management system, in response to an electrical component failure in a combustion gas analyser.	The electrical component in the gas analyser was replaced.	No Further action required
03/06/2023	9:12	9:53	41	60.4	The increase in particulate resulted when 4B conditioning tower sprays failed to control 4B ESP inlet temp and emissions during a routine 4B raw mill stop. 4B mill was restarted to control emissions. It appears the cause may have been due to a slow closure of a valve on the water system, resulting in insufficient water pressure to the sprays. The issue has not reoccurred. Confirmation of this cause requires investigation of wear on the valve & actuator on the next kiln stop.	4B mill was restarted to control emissions.	Investigation of wear on the valve & actuator on the next kiln stop. Replacement of both valves & actuators

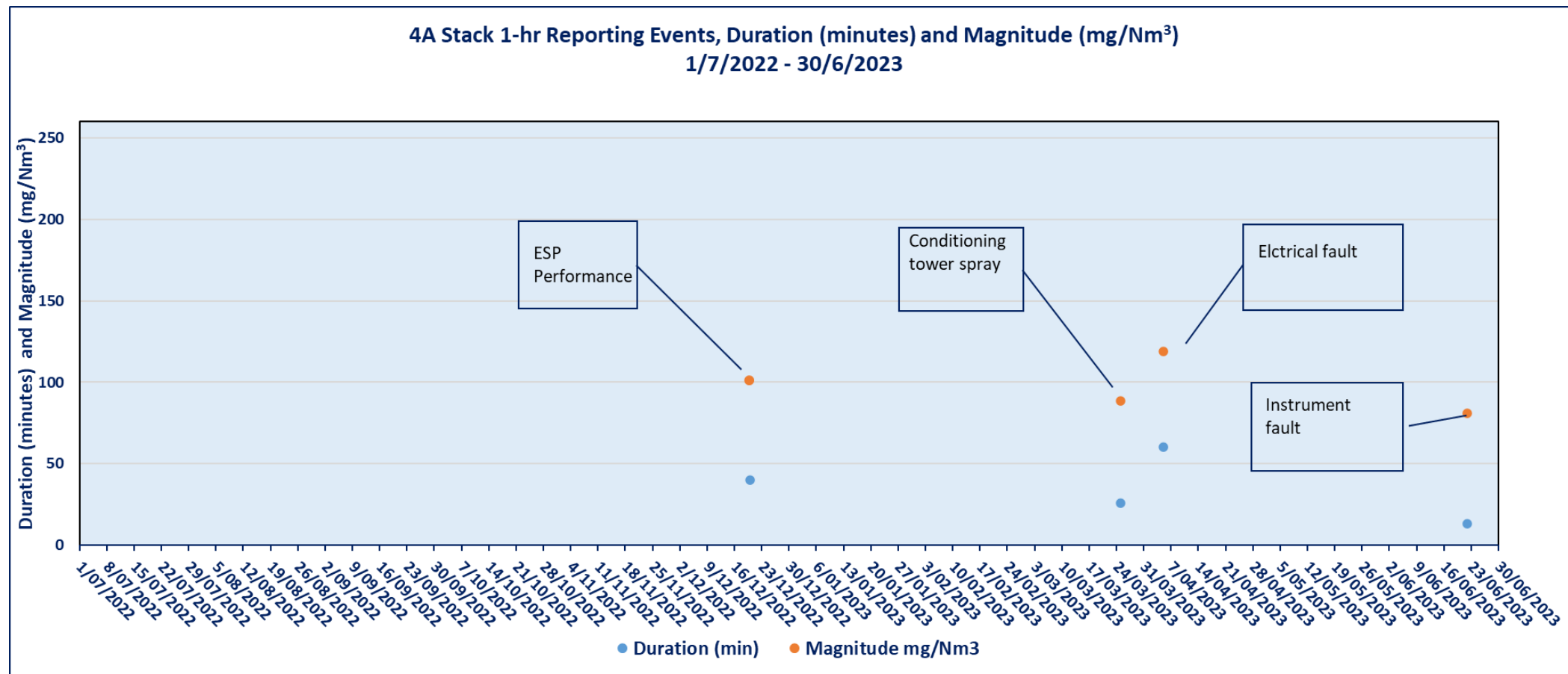
Stacks 4A and 4B - Number and Cause of 1- hour Reporting Events - 1/7/2022– 30/6/2023

The number of reporting events by cause for each stack is summarised in the table below.

Stack	Cause of 1-hr Reporting Event	Number of 1-hr reporting events current year 1/7/2022 - 30/6/2023
4A	Erratic ESP Performance - unknown cause	1
	Electrical fault tripped power supply to 4A conditioning tower sprays	1
	Faulty thermocouple - 4A conditioning tower sprays control erratic	1
	4A conditioning tower sprays did not deliver sufficient water for effective cooling	1
	Total Number of Reporting Events	4
4B	Erratic ESP Performance - unknown cause	1
	Mechanical failure of the water supply control valve for the 4B Conditioning Tower spray system, which resulted in a loss of water flow to the sprays. Valve failure occurred when 4B Raw Mill was off, which is when high water flow through the sprays is required to cool and condition the process gases to maintain effective ESP performance.	1
	Calciner start up after a false indication of high methane (natural gas) resulted in a safety trip of the Calciner and 4B electrostatic precipitator	1
	Calciner safety trip triggered by carbon monoxide sensor, unstable conditions for a period following start up.	3
	4B Conditioning tower sprays not started by operator following kiln trip caused by kiln main drive cooling fan failure	1
	4B ESP - too hot on start-up - insufficient cold air bleed on start up	1
	Combustion trip due to electrical component failure in combustion gas analyser.	1
	Total Number of Reporting Events	9

Trend Analysis of Magnitude and Duration of 1-hr Reporting Events between 1/07/2022 to 30/6/2023

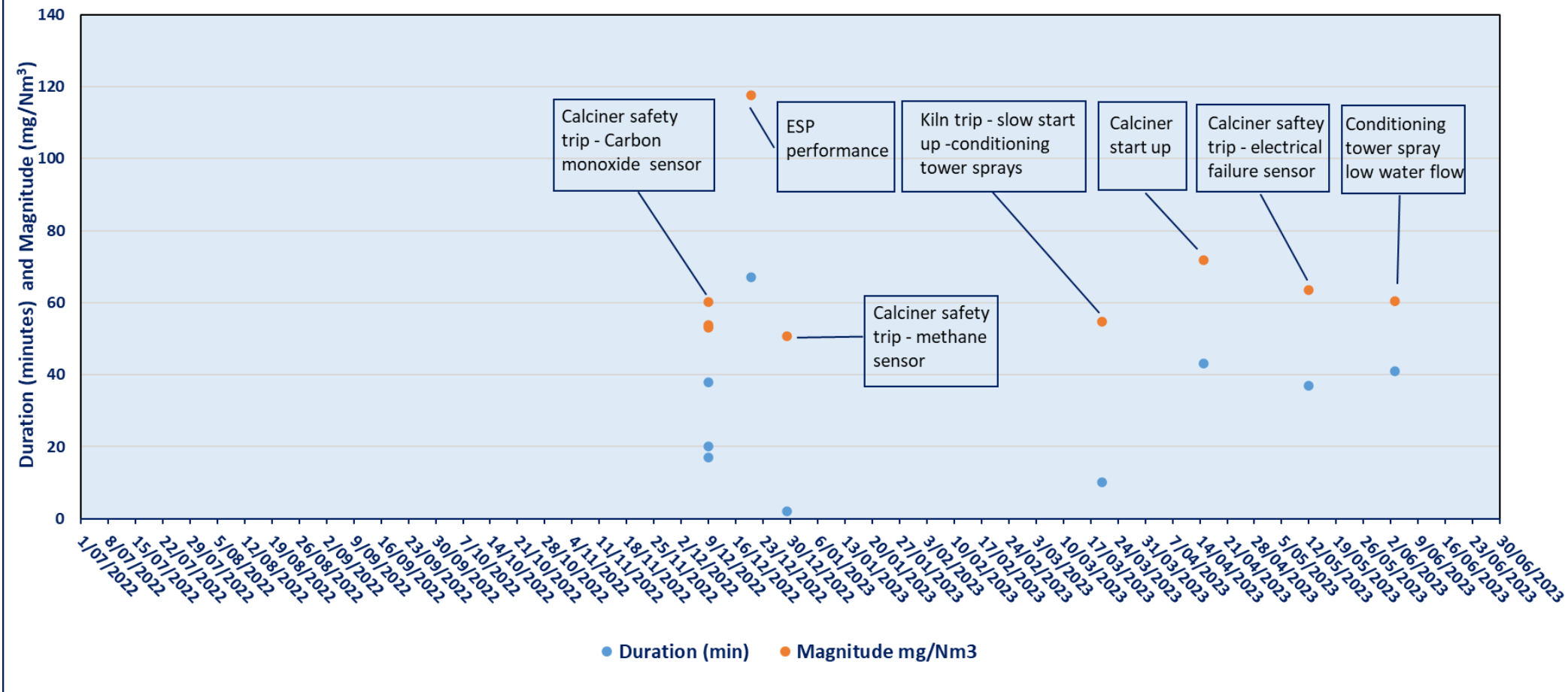
4A Stack:



There were 4, 1-hr reporting events for the year.

4B Stack:

4B Stack 1-hr Reporting Events, Duration (minutes) and Magnitude (mg/Nm³)
1/7/2021 - 30/6/2022



There were 9, 1-hr reporting events for the year.

Trend Analysis of Community Complaints by Type against 1-hr Reporting Events

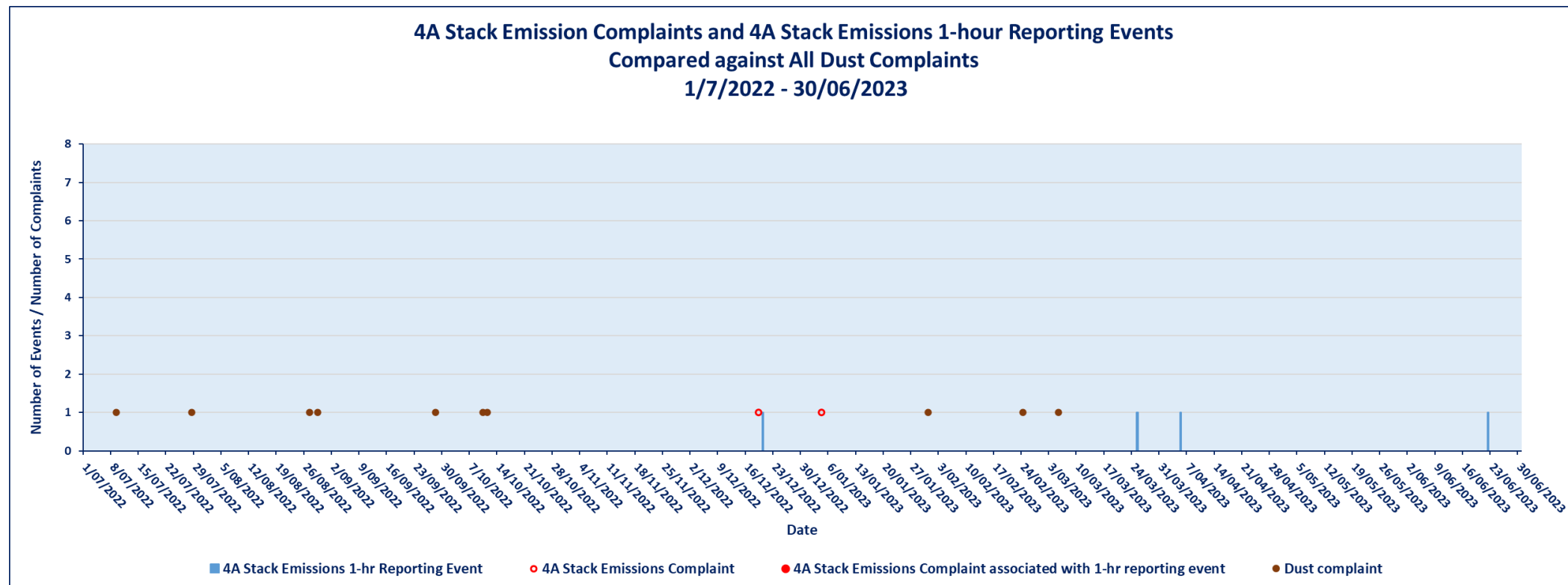
The table below captures community complaints by type and stack 1-hr reporting events for the period 1/7/2022 to 30/06/2023.

Date	Finish Time	4A Stack Emissions 1-hr Reporting Event	4B Stack Emissions 1-hr Reporting Event	4A Stack Emissions Complaint	4B Stack Emissions Complaint	4A Stack Emissions Complaint associated with 1-hr reporting event	4B Stack Emissions Complaint Associated with 1-hr reporting event	Dust complaint	Ambient Air 24- hr PM ₁₀ and PM _{2.5} Exceedance Report	Ambient Air 24- hr PM _{2.5} Exceedance Report
09/07/2022	12:43							1		
28/07/2022	09:00							1		
27/08/2022	17:24							1		
29/08/2022	13:36							1		
19/09/2022	20:37									
28/09/2022	16:27							1		
10/10/2022	15:36							1		
11/10/2022	12:09							1		
08/11/2022	22:32									
09/12/2022	12:30		3							
09/12/2022	14:20									
09/12/2022	15:02									
19/12/2022	21:45			1						
19/12/2022	21:45				1					
20/12/2022	20:47	1								
20/12/2022	21:16		1							
29/12/2022	22:32				1					
29/12/2022	23:31		1							
04/01/2023	21:28				1					
04/01/2023	21:28			1						
31/01/2023	15:30							1		
24/02/2023	16:34							1		
05/03/2023	13:21							1		
20/03/2023	07:12		1							
25/03/2023	09:08	1								
05/04/2023	16:08	1								
15/04/2023	20:46		1							
12/05/2023	16:39		1							
03/06/2023	09:12		1							
22/06/2023	21:08	1								

Legend
4A Stack 1-hr reporting event
4B Stack 1-hr reporting event
4A Stack Emissions complaint
4B Stack Emissions complaint
Ambient Air 24-hr PM _{2.5} exceedance
Ambient Air 24-hr PM ₁₀ & PM _{2.5} exceedance
Dust complaint

The above data is plotted on the following time series graphs for each stack.

4A Stack:

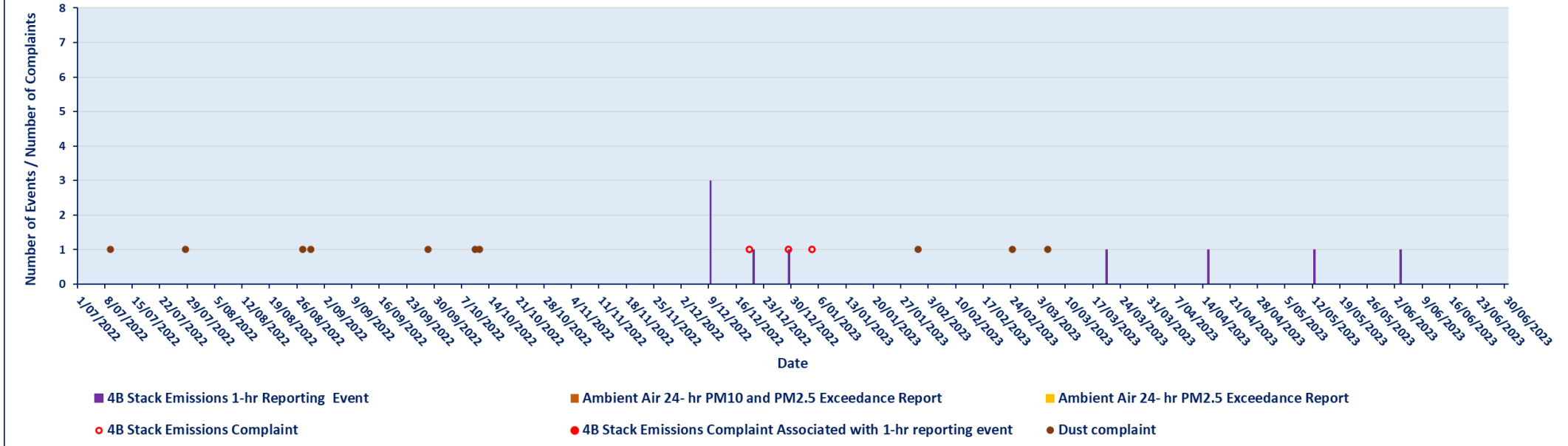


Stack emission complaints did not coincide with 4A stack 1-hr reporting events.

Dust complaints did not coincide with 4A stack 1-hr reporting events, indicating dust complaints are not related to stack emissions.

4B Stack:

**4B Stack Emission Complaints and All Dust Complaints Compared against
4B Stack Emissions 1-hour Reporting Events and Ambient 24 hr PM₁₀ and PM_{2.5} Exceedance Reports
1/7/2022 - 30/06/2023**



Stack emission complaints did not coincide with 4B stack 1-hr reporting events, except possible on one occasion 29/12/2023.

Dust complaints did not coincide with 4B stack 1-hr reporting events, indicating dust complaints are not related to stack emissions.

Stacks 4A and 4B - Comparison of current and previous year, 1-hr reporting events - by cause and number

The table below details the number and cause of 1-hr reporting events for both stacks, for the current and previous reporting year.

Stack	Cause of 1-hr Reporting Event	Type of 1-hr Reporting Event	Number of 1-hr reporting events current year 1/7/2021 - 30/6/2022	Number of 1-hr reporting events current year 1/7/2022 - 30/6/2023
4A	Erratic ESP Performance - unknown cause	Process related	0	1
	4A ESP field 6 - electrical trip due to a loose wire reducing effectiveness of ESP.	Equipment related	2	0
	Automatic safety trip on the kiln. 4A mill was also off at the same time	Process related	1	0
	ESP - F extractor screw Jammed - re entrainment of dust in process gas to 4A stack	Equipment related	1	0
	ESP - F extractor screw Jammed - clearing build-up of dust resulted in- re entrainment of dust in process gas to 4A stack	Process related	2	0
	Calciner tripped due to high exit pressure, resulting in blockage - kiln shutdown to clear blockages creating emissions	Process related	1	0
	Loss of compressed air to 4A conditioning tower sprays – due to water cooling system electrical fault tripping water cooled air compressor	Equipment related	1	0
	Electrical fault tripped power supply to 4A conditioning tower sprays	Equipment related	0	1
	Faulty thermocouple - 4A conditioning tower sprays control erratic	Equipment related	0	1
	4A conditioning tower sprays did not deliver sufficient water for effective cooling	Equipment related	0	1
	4A conditioning tower spray pump failed	Equipment related	0	0
	Total Number of Reporting Events			8

Stack	Cause of 1-hr Reporting Event	Type of 1-hr Reporting Event	Number of 1-hr reporting events current year 1/7/2021 - 30/6/2022	Number of 1-hr reporting events current year 1/7/2022 - 30/6/2023
	Erratic ESP Performance - unknown cause	Process related	0	1
	A section of refractory lining spalled off the 3B Cyclone in the Calciner preheater, tripping the Calciner combustion system. For safety reasons, the blockage consisting of refractory and raw meal at 600C is cleared under negative pressure, using high pressure water lances to break up the refractory. The process of clearing the blockage creates variations in draft and particulate emission levels which are difficult to manage	Equipment related	1	0
	Mechanical failure of the water supply control valve for the 4B Conditioning Tower spray system, which resulted in a loss of water flow to the sprays. Valve failure occurred when 4B Raw Mill was off, which is when high water flow through the sprays is required to cool and condition the process gases to maintain effective ESP performance.	Equipment related	1	1
	Calciner tripped due to a high positive draft on 4B Mill arising from dust fall back into 4B mill creating a blockage.	Process related	3	0
	Calciner start up after a false indication of high methane (natural gas) resulted in a safety trip of the Calciner and 4B electrostatic precipitator	Equipment related	1	1
	Calciner safety trip triggered by carbon monoxide sensor, unstable conditions for a period following start up.	Process related	0	3
	4B Conditioning tower sprays not started by operator following kiln trip caused by kiln main drive cooling fan failure	Equipment related	0	1
	4B ESP - too hot on startup - insufficient cold air bleed on start up	Process related	0	1
	Combustion trip due to electrical component failure in combustion gas analyser.	Equipment related	0	1
	Calciner shutdown at 2:30 due to low flow from blending silo	Process related	1	0
	Total Number of Reporting Events		7	9

The data above shows similar levels in 1-hr reporting events between the two reporting years

Identification of opportunities to reduce the frequency, duration and magnitude of 1-hr reporting events

Actions taken to prevent recurrence of 1-hr reporting events has been documented for each reporting event.

Equipment related failures are one off events and don't suggest an underlying condition that requires any further action.

Stack Particulate Management Plan / TARP Review:

The Stack Particulate Management Plan (SPMP), approved on the 13 September 2023, incorporates the use of stack particulate emissions Trigger Action Response Plans (TARP's). The purpose of the stack TARP's is to enable early action to be taken to prevent or minimise the number of occasions where stack emissions reach the 1-hr reporting threshold. The plant initiates early action when particulate emissions reach the 10-minute trigger threshold.

The table below details the number of 10-minute triggers that were activated for each stack for the reporting period 1/7/2022 to 30/6/2023.

10 minute TARP trigger events for the period 1/7/2022 to 30/6/2023

Stack	Number of 10-minute trigger events	Number of 1-hr Reporting events
4A	16	4
4B	33	9

The data in the table shows the current 10-minute triggers are providing sufficient early warning needed to reduce the number of 1-hr reporting events.

The following tables summarises the 1-hr reporting events by type for 4A and 4B stacks since the TARP was implemented in 2018.

Table 1-hr Reporting Events by type since implementation of the Stack Particulate TARP

Stack	Type of 1-hr Reporting Event	Number of 1-hr reporting events 1/11/2017 - 30/6/2018	Number of 1-hr reporting events 1/7/2018 - 30/6/2019	Number of 1-hr reporting events 1/7/2019 - 30/6/2020	Number of 1-hr reporting events 1/7/2020 - 30/6/2021	Number of 1-hr reporting events 1/7/2021 - 30/6/2022	Number of 1-hr reporting events 1/7/2022 - 30/6/2023
4A	Process related	5	1	3	1	4	1
	Equipment related	1			2	4	3
	Total	6	1	3	3	8	4
4B	Process related	7	1	4	6	4	4
	Equipment related	1	5	2	1	3	5
	Total	8	6	6	7	7	9

4A Stack

Stack	Cause of 1-hr Reporting Event	Type of 1-hr Reporting Event	Number of 1-hr reporting events 1/11/2017 - 30/6/2018	Number of 1-hr reporting events 1/7/2018 - 30/6/2019	Number of 1-hr reporting events 1/7/2019 - 30/6/2020	Number of 1-hr reporting events 1/7/2020 - 30/6/2021	Number of 1-hr reporting events 1/7/2021 - 30/6/2022	Number of 1-hr reporting events 1/7/2022 - 30/6/2023
4A	Excess build-up within the Bypass process	Process related	5	1	2	1	0	0
	Ruptured airline hose to valve that controls water flow to the conditioning tower cooling spray system	Equipment related	1	0	0	0	0	0
	Erratic ESP Performance - unknown cause	Process related	0	0	1	0	0	1
	4A ESP field 6 - electrical trip due to a loose wire reducing effectiveness of ESP.	Equipment related	0	0	0	0	2	0
	Automatic safety trip on the kiln, in response to a failure of the inlet temperature sensor on the Bypass ESP.	Equipment related	0	0	0	1	0	0
	Automatic safety trip on the kiln. 4A mill was also off at the same time	Process related	0	0	0	0	1	0
	ESP - F extractor screw Jammed - re entrainment of dust in process gas to 4A stack	Equipment related	0	0	0	0	1	0
	ESP - F extractor screw Jammed - clearing build-up of dust resulted in re entrainment of dust in process gas to 4A stack	Process related	0	0	0	0	2	0
	Calciner tripped due to high exit pressure, resulting in blockage - kiln shutdown to clear blockages creating emissions	Process related	0	0	0	0	1	0
	Loss of compressed air to 4A conditioning tower sprays – due to water cooling system electrical fault tripping water cooled air compressor	Equipment related	0	0	0	0	1	0
	Electrical fault tripped power supply to 4A conditioning tower sprays	Equipment related	0	0	0	0	0	1
	Faulty thermocouple - 4A conditioning tower sprays control erratic	Equipment related	0	0	0	0	0	1
	4A conditioning tower sprays did not deliver sufficient water for effective cooling	Equipment related	0	0	0	0	0	1
	4A conditioning tower spray pump failed	Equipment related	0	0	0	1	0	0
Total Number of Reporting Events			6	1	3	3	8	4

Stack	Cause of 1-hr Reporting Event	Type of 1-hr Reporting Event	Number of 1-hr reporting events 1/11/2017 - 30/6/2018	Number of 1-hr reporting events 1/7/2018 - 30/6/2019	Number of 1-hr reporting events 1/7/2019 - 30/6/2020	Number of 1-hr reporting events 1/7/2020 - 30/6/2021	Number of 1-hr reporting events 1/7/2021 - 30/6/2022	Number of 1-hr reporting events 1/7/2022 - 30/6/2023
4B	4B Mill off for extended period	Process related	7	0	2	4	0	0
	Equipment failure of 4B Elevator drag chain transport system	Equipment related	1	0	0	0	0	0
	Dislodged baffle plates at the entrance to the Electrostatic Precipitator were found to be the root cause	Equipment related	0	2	0	0	0	0
	4B Mill tripped (unforeseen sudden stop causing upset process conditions)	Process related	0	1	0	1	0	0
	Rare failure of a pump level protection sensor on the 4B conditioning tower header tank, tripping the pumps providing water to the conditioning tower sprays during a 4B mill stoppage	Equipment related	0	1	0	0	0	0
	Failure of the pump on the conditioning spray system to turn on, when the 4B Mill was turned off	Equipment related	0	1	0	0	0	0
	The 4B Electrostatic Precipitator (emission filtering equipment) efficiency was reduced as a result of water ingress from a cracked plastic casing on an electrical control unit.	Equipment related	0	1	0	0	0	0
	VVF drive fault occurred on 4B Raw feed conveyor during 4B mill start up sequence, preventing 4B conditioning tower sprays to come on.	Equipment related	0	0	1	0	0	0
	The event occurred after the calciner tripped on high exit pressure. The increase in particulate emissions occurred as a result of increased flow required to safely perform fault finding and remove a metal pole, that was found lodged in the dust flap below 4B cyclone.	Process related	0	0	1	0	0	0
	The event occurred as a result of an electrical fault on 4B ESP field 3, which resulted in loss of that field, with resulting increase in particulate emission. The root cause of the problem was a failed cartridge fuse switch and associated cabling on the ESP switchboard.	Equipment related	0	0	1	0	0	0
	Erratic ESP Performance - unknown cause	Process related	0	0	1	0	0	1
Kiln and Calciner trip- Emergency stop activated in response to a Kiln shell hot spot	Equipment related	0	0	0	1	0	0	

	Cause of 1-hr Reporting Event	Type of 1-hr Reporting Event	Number of 1-hr reporting events	Number of 1-hr reporting events	Number of 1-hr reporting events	Number of 1-hr reporting events	Number of 1-hr reporting events	Number of 1-hr reporting events
			1/11/2017 - 30/6/2018	1/7/2018 - 30/6/2019	1/7/2019 - 30/6/2020	1/7/2020 - 30/6/2021	1/7/2021 - 30/6/2022	1/7/2022 - 30/6/2023
4B	Short term electrical instability in 4B ESP fields on start-up of the calciner following a kiln trip.	Process related	0	0	0	1	0	0
	A section of refractory lining spalled off the 3B Cyclone in the Calciner preheater, tripping the Calciner combustion system. For safety reasons, the blockage consisting of refractory and raw meal at 600C is cleared under negative pressure, using high pressure water lances to break up the refractory. The process of clearing the blockage creates variations in draft and particulate emission levels which are difficult to manage	Equipment related	0	0	0	0	1	0
	Mechanical failure of the water supply control valve for the 4B Conditioning Tower spray system, which resulted in a loss of water flow to the sprays. Valve failure occurred when 4B Raw Mill was off, which is when high water flow through the sprays is required to cool and condition the process gases to maintain effective ESP performance.	Equipment related	0	0	0	0	1	1
	Calciner tripped due to a high positive draft on 4B Mill arising from dust fall back into 4B mill creating a blockage.	Process related	0	0	0	0	3	0
	Calciner start up after a false indication of high methane (natural gas) resulted in a safety trip of the Calciner and 4B electrostatic precipitator	Equipment related	0	0	0	0	1	1
	Calciner safety trip triggered by carbon monoxide sensor, unstable conditions for a period following start up.	Process related	0	0	0	0	0	3
	4B Conditioning tower sprays not started by operator following kiln trip caused by kiln main drive cooling fan failure	Equipment related	0	0	0	0	0	1
	4B ESP - too hot on startup - insufficient cold air bleed on start up	Process related	0	0	0	0	0	1
	Combustion trip due to electrical component failure in combustion gas analyser.	Equipment related	0	0	0	0	0	1
	Calciner shutdown at 2:30 due to low flow from blending silo	Process related	0	0	0	0	1	0
	Total Number of Reporting Events		8	6	6	7	7	9

The data in the above tables shows that there are a number of process and equipment related conditions that give rise to 1-hr reporting events.

The data also shows that since the introduction of stack TARPs in July 2018, there has been a reduction in the number of process-related 1-hr reporting events.

Equipment performance related events that result in a 1-hr reporting event, are often unique in nature and require the plant to remain operational long enough to be able to determine the root cause of the problem, so that corrective action can be taken.

The current 10-minute triggers provide the plant with the early warning needed to start trouble shooting for equipment and process related issues.

The current Trigger Action Reporting Plans have been effective in improving operation response times to conditions that have the potential for stack emissions to reach 1-hr reporting levels.

There have been no identified improvements required in the existing TARPs.

Summary:

- The existing TARPs have been effective, in reducing the number of 1-hr reporting events.
 - Opportunities to reduce the frequency, number and magnitude of 1-hr reporting events have been identified and implemented.
 - It is recommended that the performance of the existing TARPs continue to be monitored for improvement over the next 12 months.
-