

Sasol South Africa

Secunda Synfuels Operations

Annual Emission Report

Dated 30 August 2018

prepared for

Gert Sibande District Municipality

regarding atmospheric emission license for Sasol South Africa (Pty) Ltd
Sasol Synfuels - number 0016/2015/F02

Reporting period: July 2017 – June 2018

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Standard abbreviation list	
AEL	atmospheric emissions license
CH ₄	methane
CO ₂	carbon dioxide
CTL	coal to liquid
DEA	Department of Environmental Affairs
FY	financial year
GJ	gigajoules
GTC	gas to chemicals
H ₂ S	hydrogen sulphide
HOW	high organic waste
IPCC	intergovernmental panel on climate change
kNm ³	kilo normal cubic meter
LDAR	leak detection and repair programme
LPG	liquid petroleum gas
mg/Nm ³	milligram per normal cubic meter
N ₂ O	nitrous oxide
NAQO	national air quality officer
NO ₂	nitrogen dioxide
NO _x	oxides of nitrogen
N ₂ O	nitrous oxide
O ₂	oxygen
PCF	poly crete foam
PM	particulate matter
RDP	reconstruction development programme
RTO	regenerative thermal oxidiser
SHE	safety health and environment
SO ₂	sulphide dioxide
SSO	Secunda Synfuels Operations
t/h	ton per hour
TAME	tertiary amyl methyl ether
VOC	volatile organic compound
WA	water and ash

1. INTRODUCTION

Emission monitoring on identified compliance points at SSO was conducted by various independent service providers. Section 3 of this document summarises the emissions measured compared to the maximum emission rates as per the AEL.

2. SERVICE PROVIDERS

Future Projects (Pty) Ltd and Gondwana Environmental Solutions are the independent service providers that conducted the necessary emission testing. SNC-Lavalin (Kentz) undertook fugitive emission sampling (leak detection and repair programme (LDAR)). Relevant contact details are shown in the tables below.

Table 2.1: Gondwana Environmental Solutions

Physical address	Gondwana Environmental Solutions International (Pty) Ltd 562 Ontdekkers Road Florida
Postal address	PO Box 158 Florida Hills 1716
Telephone No:	+27 11 472 3112
Fax No	+27 11 674 3705
Email	info@gesza.co.za

Table 2.2: Future Projects (Pty) Ltd

Physical address	480 Smuts Drive Halfway Gardens Midrand Gauteng 1685 South Africa
Telephone No:	+27 11 052 1250
Email	info@futureprojects.co.za

Table 2.3: SNC-Lavalin (Kentz)

Physical address	Kiewiet Office Park, Block E Kiewiet Street Secunda 2302
Postal address	PO Box: 89, 14TH Road Erand Johannesburg/Midrand 1685
Telephone number	+27 17 631 3080 +27 78 185 4373
Email	Breyten.Groenewald@snclavalin.com

3. RESULTS

3.1 Emissions testing results

Table 3.1: Summarised sampling results for SSO: steam plant (sub-category 1.1), gas turbines (sub-category 1.4) and rectisol (sub-category 3.6)

Point source code	Pollutant	Measured daily average concentration (mg/Nm ³)	Reference AEL limit (mg/Nm ³)
B1 (unit 43) Main stack west	PM	See figure 1 for online PM data	120 at 10% O ₂
	SO ₂	See figure 3 for online SO ₂ data	3 500 at 10% O ₂
	NO _x expressed as NO ₂	See figure 5 for online NO _x data	1 100 at 10% O ₂
B2 (unit 243) Main stack east	PM	See figure 2 for online PM data	120 at 10% O ₂
	SO ₂	See figure 4 for online SO ₂ data	3 500 at 10% O ₂
	NO _x expressed as NO ₂	See figure 6 for online NO _x data	1 100 at 10% O ₂
Gas turbine 1 (GT1)	PM	5	10 at 15% O ₂
	NO _x expressed as NO ₂	48	300 at 15% O ₂
	SO ₂	<3,3	500 at 15% O ₂
Gas turbine 2 (GT2)	PM	9	10 at 15% O ₂
	NO _x expressed as NO ₂	33	300 at 15% O ₂
	SO ₂	<3,3	500 at 15% O ₂
Rectisol east (off gas to main stack)	H ₂ S (measured as S)	See figure 8 and 9	13,5 t/h maximum daily average during upset conditions 8 400 mg/Nm ³ normal operating conditions
	VOCs	10,5	300
	SO ₂	<3	3 500
Rectisol west (off gas to main stack)	H ₂ S (measured as sulphur)	See figure 7 and 9	13,5 t/h maximum daily average during upset conditions 8 400 mg/Nm ³ normal operating conditions
	VOCs	52,5	300
	SO ₂	<3	3 500

Table 3.2: Summarised sampling results for SSO: catalyst manufacturing (sub-category 4.2 and 4.7)

Point source code	Pollutant	Measured daily average concentration (mg/Nm³)	Reference AEL limit (mg/Nm³)
CM1 (West kiln stack)	PM	30	100
	NO _x expressed as NO ₂	43	500
	SO ₂	<3	2 000
CM2 (West arc furnace stack)	PM	3	100
	NO _x expressed as NO ₂	104	500
	SO ₂	<3	500
CM3 (East kiln A stack)	PM	16	100
	NO _x expressed as NO ₂	96	500
	SO ₂	<3	2 000
CM4 (East arc furnace stack)	PM	90	100
	NO _x expressed as NO ₂	252	500
	SO ₂	8	500
CM5 (East Kiln B stack)	PM	42	100
	NO _x expressed as NO ₂	84	500
	SO ₂	18	2 000

Table 3.3: Summarised sampling results for SSO: heaters (sub-category 2.1)

* Note internal project underway to assess the feasibility to install sampling ports on refining heaters in order to undertake isokinetic sampling for PM.

Point source code	Pollutant	Measured daily average concentration (mg/Nm ³ at 10% O ₂)	Reference AEL limit (mg/Nm ³ at 10% O ₂)
R1 (14HT101)*	NO _x expressed as NO ₂	Due to plant unavailability no sampling could be conducted	1 700
	SO ₂		1 700
R2(14HT201)*	NO _x expressed as NO ₂		1 700
	SO ₂		1 700
R3(214HT101)*	NO _x expressed as NO ₂	124	1 700
	SO ₂	<2	1 700
R4(214HT201)*	NO _x expressed as NO ₂	112	1 700
	SO ₂	<2	1 700
R5(228HT101)*	NO _x expressed as NO ₂	72	1 700
	SO ₂	54	1 700
R6 (30HT101)*	NO _x expressed as NO ₂	3	1 700
	SO ₂	<4	1 700
R7 (30HT102)*	NO _x expressed as NO ₂	119	1 700
	SO ₂	<4	1 700
R8 (30HT103)*	NO _x expressed as NO ₂	94	1 700
	SO ₂	55	1 700
R9 (30HT104)*	NO _x expressed as NO ₂	82	1 700
	SO ₂	<2	1 700
R10 (30HT105)*	NO _x expressed as NO ₂	103	1 700
	SO ₂	<2	1 700
R11 (230HT101)*	NO _x expressed as NO ₂	73	1 700
	SO ₂	66	1 700
R12 (230HT102)*	NO _x expressed as NO ₂	98	1 700
	SO ₂	206	1 700
R13 (230HT103)*	NO _x expressed as NO ₂	102	1 700
	SO ₂	46	1 700
R14 (230HT104)*	NO _x expressed as NO ₂	76	1 700
	SO ₂	15	1 700
R15 (230HT105)*	NO _x expressed as NO ₂	64	1 700
	SO ₂	26	1 700
R17 (34HT101)*	NO _x expressed as NO ₂	51	1 700
	SO ₂	<2	1 700
R18 (234HT101)*	NO _x expressed as NO ₂	72	1 700
	SO ₂	<12	1 700
R19 (35HT101)*	NO _x expressed as NO ₂	112	1 700
	SO ₂	123	1 700

Point source code	Pollutant	Measured daily average concentration (mg/Nm ³ at 10% O ₂)	Reference AEL limit (mg/Nm ³ at 10% O ₂)
R20 (35HT102)*	NO _x expressed as NO ₂	84	1 700
	SO ₂	28	1 700
R22 (235HT101)*	NO _x expressed as NO ₂	78	1 700
	SO ₂	<3	1 700
R23 (235HT102)*	NO _x expressed as NO ₂	74	1 700
	SO ₂	58	1 700
R24 (35HT103)*	NO _x expressed as NO ₂	77	1 700
	SO ₂	<2	1 700
R25 (35HT104)*	NO _x expressed as NO ₂	91	1 700
	SO ₂	<3	1 700
R26 (35HT105)*	NO _x expressed as NO ₂	114	1 700
	SO ₂	<4	1 700
R27 (29HT101)*	NO _x expressed as NO ₂	67	1 700
	SO ₂	33	1 700
R28 (29HT102)*	NO _x expressed as NO ₂	50	1 700
	SO ₂	<2	1 700
R29 (229HT101)*	NO _x expressed as NO ₂	79	1 700
	SO ₂	<3	1 700
R30 (33HT101)*	NO _x expressed as NO ₂	51	1 700
	SO ₂	<2	1 700
R31 (33HT102)*	NO _x expressed as NO ₂	108	1 700
	SO ₂	<4	1 700
R32 (33HT105)*	NO _x expressed as NO ₂	99	1 700
	SO ₂	<2	1 700
R33 (233HT101)*	NO _x expressed as NO ₂	96	1 700
	SO ₂	<2	1 700
R34 (233HT102)*	NO _x expressed as NO ₂	77	1 700
	SO ₂	<4	1 700
R35 (233HT105)*	NO _x expressed as NO ₂	67	1 700
	SO ₂	<5	1 700
R36 (32HT101)*	NO _x expressed as NO ₂	62	1 700
	SO ₂	<3	1 700
R37 (32HT201)*	NO _x expressed as NO ₂	66	1 700
	SO ₂	<2	1 700
R38 (32HT102)*	NO _x expressed as NO ₂	70	1 700
	SO ₂	<3	1 700
R39 (232HT101)*	NO _x expressed as NO ₂	79	1 700
	SO ₂	<9	1 700
R40 (232HT201)*	NO _x expressed as NO ₂	80	1 700

Point source code	Pollutant	Measured daily average concentration (mg/Nm ³ at 10% O ₂)	Reference AEL limit (mg/Nm ³ at 10% O ₂)
	SO ₂	<3	1 700
R41 (232HT102)*	NO _x expressed as NO ₂	73	1 700
	SO ₂	<8	1 700

Table 3.4: Summarised sampling results for SSO: SCC (sub-category 2.2), WSA (sub-category 7.2), carbo tar (sub- category 3.3), phenosolvan (sub-category 3.6) and storage tanks (sub-categories 3.3)

Point source code	Pollutant	Measured daily average concentration (mg/Nm ³)	Reference AEL limit (mg/Nm ³)
SCC 1 stack	PM	169 at 10% O ₂	330 at 10% O ₂
	SO ₂	<2 at 10% O ₂	3 000 at 10% O ₂
	NO _x expressed as NO ₂	10 at 10% O ₂	550 at 10% O ₂
WSA	SO ₂	479	2 800
	SO ₃	12	100
	NO _x expressed as NO ₂	52	2 000
P1/P2 (unit 016)*	<p>These point sources were subject to postponement applications and subsequent decisions received from the National Air Quality Officer in 2015. The decision and associated conditions imposed by the local licensing authority have been included in the AEL being the subject of this report. The AEL provided, in clause 7.6, for the necessary baseline assessments to be undertaken for purposes of appropriately determining the applicable emission limits. Accordingly, SSO complied through its confirmation of the actual performance limits until year 2018. Consistent with the provisions of clause 7.6.2 of the varied AEL, received on May 2018 (0016/2018/F03), we will continue sampling quarterly until November 2018. It should be noted that an abatement project is under way to sustain compliance with the new limits applicable to sources. This is supported by the management, in parallel, of potential onsite health exposure risks, consistent with applicable occupational health and safety requirements. Furthermore, ambient station measurements indicate compliance with the National Ambient Air Quality Standards, as applicable.</p> <p>The results below are an average of the two factory phases.</p>		
	VOC quarter 1	22 548*	250
	VOC quarter 2	57 689	250
	VOC quarter 3	16 143*	250
	VOC quarter 4	12 127*	250
P3/P4 (unit 216)*	VOC quarter 1	13 435*	250
	VOC quarter 2	42 891*	250
	VOC quarter 3	8 076*	250
	VOC quarter 4	Due to plant unavailability no sampling could be conducted	250
FFP 1, 2, 3, 4 and 5	VOCs	These common vent sources are now being routed to the applicable regenerative thermal oxidizer (RTO) in accordance with SSO's site fugitive emissions	250

Point source code	Pollutant	Measured daily average concentration (mg/Nm ³)	Reference AEL limit (mg/Nm ³)
		monitoring plan.	
CT 1 (039TK101):	VOCs	10,1	250
CT 2 (039TK102)	VOCs	9,8	250
CT 3, 4, 5 (039 TK 103, 104, 105)	VOCs	134.1	250
Storage tank 15TK101 - Evapostop disc technology will be installed during the September 2018 shutdown.	VOCs	2 741	250 Storage tanks are monitored as per site fugitive emissions monitoring plan, the plan includes the site tanks retrofit schedule as submitted to the authorities. The fugitive monitoring plan is inclusive of the LDAR programme.
Storage tank 215TK101 - Evapostop disc technology installed during the September 2018 shutdown.	VOCs	2,03	

Table 3.5: Summarised results for water and ash plant (point sources under sub-category 8.1) (quarter 1: July to September 2017)

* These point sources were subject to postponement applications and subsequent decisions received from the National Air Quality Officer in 2015. The decision and associated conditions imposed by the local licensing authority have been included in the AEL being the subject of this report. The AEL provided, in clause 7.6, for the necessary baseline assessments to be undertaken for purposes of appropriately determining the applicable emission limits. Accordingly, SSO complied through its confirmation of the actual performance limits by the required date of 31 March 2018. Consistent with the provisions of clause 7.6.2 of the varied AEL, received in May 2018 (0016/2018/F03) and as communicated to the local licensing authority in writing on 21 June 2018, we will commence reporting on the new limits included in the varied AEL in FY19. It should be noted that abatement projects are under investigation to sustain compliance with the new limits applicable to sources.

Pollutants	Unit of measurement	HOW1 (052CI-101)	HOW2 (252CI-101)	Reference maximum release rate in AEL	WA1 (052 WK-2102)	WA2 (052 WK-2202)	WA3 (252 WK-2102)	WA4 (252 WK-2202)	Reference maximum release rate in AEL
PM	mg/Nm ³ at 10% O ₂	142*	571*	400	860*	312*	248*	290*	300
CO	mg/Nm ³ at 10% O ₂	14*	1 707*	75	2 428*	2 436*	2 303*	2 188*	3 000
SO ₂	mg/Nm ³ at 10% O ₂	<10*	29*	50	<6*	<6*	102*	<14*	70
NO _x expressed as NO ₂	mg/Nm ³ at 10% O ₂	2 208*	3 942*	1 600	279*	340*	539*	370*	500
HCl	mg/Nm ³ at 10% O ₂	0.13*	2.17*	10	0.06*	0.05*	0.77*	<0.040*	12
HF	mg/Nm ³ at 10% O ₂	<0.04*	1.1*	1	<0.02*	0.04*	<0.021*	<0.040*	20
Pb+As+Sb+Cr+Co+Cu+Mn+Ni+V	mg/Nm ³ at 10% O ₂	<5.889*	<9.576*	21	<4.2743*	<0.505*	<1.760*	<3.09631*	1
Hg	mg/Nm ³ at 10% O ₂	<0.075*	<0.071*	0.27	<0.1397*	<0.356*	<1.167*	<1.16368*	0.5
Cd and Tl	mg/Nm ³ at 10% O ₂	<0.132*	<0.055*	0.12	<0.0419*	<0.0226*	<0.0403*	<0.04570*	0.12
TOC	mg/Nm ³ at 10% O ₂	16 ¹ *	23*	10	4*	54*	177*	N/A ² *	10

¹ TOC measurements for quarter 1 for the incinerators were conducted on 18 -20 December 2017 due to 3rd party experiencing challenges with sampling equipment

² Incinerator not available for sampling at the time of sampling for this pollutants

NH ₃	mg/Nm ³ at 10% O ₂	6.75*	1.73*	10	8.75*	4.46*	13.9*	14.41*	30
Dioxins and furans	ng.Nm ⁻³ I-TEQ at 10% O ₂	0.35*	2.31*	0.1	0.07*	0.06*	0.06*	0.02*	0.1
Exit temperature	°C	413*	346*	300-400	66*	63*	63*	49*	NA
Measured oxygen	%	18*	18.3*	NA	15.5*	16.1*	15.8*	18.8*	NA
Sampling dates		24 Jul – 20 Sep 2017	24 Jul – 20 Sep 2017	NA	24 Jul -20 Sep 2017	24 Jul - 20 Sept 2017	24 Jul -20 Sep 2017	24 Jul - 20 Sep 2017	NA

Table 3.6: Summarised results for water and ash plant (point sources under sub-category 8.1) (quarter1: October to December 2017)

* These point sources were subject to postponement applications and subsequent decisions received from the National Air Quality Officer in 2015. The decision and associated conditions imposed by the local licensing authority have been included in the AEL being the subject of this report. The AEL provided, in clause 7.6, for the necessary baseline assessments to be undertaken for purposes of appropriately determining the applicable emission limits. Accordingly, SSO complied through its confirmation of the actual performance limits by the required date of 31 March 2018. Consistent with the provisions of clause 7.6.2 of the varied AEL, received in May 2018 (0016/2018/F03) and as communicated to the local licensing authority in writing on 21 June 2018, we will commence reporting on the new limits included in the varied AEL in FY19. It should be noted that abatement projects are under investigation to sustain compliance with the new limits applicable to sources

Pollutants	Unit of measurement	HOW1 (052CI-101)	HOW2 (252CI-101)	Reference maximum release rate in AEL	WA1 (052 WK-2102)	WA2 (052 WK-2202)	WA3 (252 WK-2102)	WA4 (252 WK-2202)	Reference maximum release rate in AEL
PM	mg/Nm ³ at 10% O ₂	183*	75*	400	404*	412*	457*	1209*	300
CO	mg/Nm ³ at 10% O ₂	182*	286*	75	1 898*	2 475*	2 174*	4 012*	3 000
SO ₂	mg/Nm ³ at 10% O ₂	<11*	34*	50	<6*	< 9*	<6*	89*	70
NO _x expressed as NO ₂	mg/Nm ³ at 10% O ₂	1822*	2901*	1 600	119*	235*	392*	521*	500
HCl	mg/Nm ³ at 10% O ₂	<0.034*	<0.045*	10	<0.027*	<0.05*	0.64*	<6.14*	12.0
HF	mg/Nm ³ at 10% O ₂	0.51*	<0.016*	1	<0.027*	<0.142*	0.10*	<0.231*	20
Pb+As+Sb+Cr+Co+Cu+Mn+Ni+V	mg/Nm ³ at 10% O ₂	<1.215*	<3.764*	21	<3.219*	<1.223*	<3.029*	<14.064*	1
Hg	mg/Nm ³ at 10% O ₂	<0.069*	<0.062*	0.27	1.576*	0.389*	<0.595*	<1.344*	0.5
Cd and Tl	mg/Nm ³ at 10% O ₂	<0.046*	<0.123*	0.12	<0.047*	<0.026*	<0.038*	<0.190*	0.12
TOC	mg/Nm ³ at 10% O ₂	15*	22*	10	20*	37*	26*	N/A ^{3*}	10
NH ₃	mg/Nm ³ at 10% O ₂	2.3*	4.77*	10	<0.009*	155*	8.8*	47.79*	30.0

Dioxins and furans	ng.Nm ⁻³ I-TEQ at 10% O ₂	0.014*	0.21*	0.1	0.011*	0.010*	0.010*	N/A ^{3*}	0.1
Exit temperature	°C	407*	311*	300-400	65*	61*	62*	47*	NA
Measured oxygen	%	18.1*	18.8*	NA	15.5*	17.6*	15.8*	19.8*	NA
Sampling dates		2 Oct – 29 Dec 2017	2 Oct – 29 Dec 2017	NA	2 Oct – 29 Dec 2017	NA			

³ Incinerator not available for sampling at the time of sampling for these pollutants

Table 3.7: Summarised results for water and ash plant (point sources under sub-category 8.1) (quarter 3: January to March 2018)

* These point sources were subject to postponement applications and subsequent decisions received from the National Air Quality Officer in 2015. The decision and associated conditions imposed by the local licensing authority have been included in the AEL being the subject of this report. The AEL provided, in clause 7.6, for the necessary baseline assessments to be undertaken for purposes of appropriately determining the applicable emission limits. Accordingly, SSO complied through its confirmation of the actual performance limits by the required date of 31 March 2018. Consistent with the provisions of clause 7.6.2 of the varied AEL, received in May 2018 (0016/2018/F03) and as communicated to the local licensing authority in writing on 21 June 2018, we will commence reporting on the new limits included in the varied AEL in FY19. It should be noted that abatement projects are under investigation to sustain compliance with the new limits applicable to sources.

Pollutants	Unit of measurement	HOW1 (052CI-101)	HOW2 (252CI-101)	Reference maximum release rate in AEL	WA1 (052 WK-2102)	WA2 (052 WK-2202)	WA3 (252 WK-2102)	WA4 (252 WK-2202)	Reference maximum release rate in AEL
PM	mg/Nm ³ at 10% O ₂	192*	376*	400	268*	290*	298*	Incinerator offline from January to March 2018.	300
CO	mg/Nm ³ at 10% O ₂	918*	1258*	75	2870*	3715*	1981*		3 000
SO ₂	mg/Nm ³ at 10% O ₂	<10*	<15*	50	<7*	<13*	<6*		70
NO _x expressed as NO ₂	mg/Nm ³ at 10% O ₂	1732*	2448*	1 600	326*	216*	205*		500
HCl	mg/Nm ³ at 10% O ₂	0.17*	0.33*	10	0.21*	2*	0.07*		12
HF	mg/Nm ³ at 10% O ₂			1					20
Pb+As+Sb+Cr+Co+Cu+Mn+Ni+V	mg/Nm ³ at 10% O ₂	<0.010*	<0.019*	21	<0.011*	<0.019*	0.256*		1
Hg	mg/Nm ³ at 10% O ₂	<3.922*	<2.738*	0.27	<2.761*	<1.6*	<2.305*		0.5
Cd and Tl	mg/Nm ³ at 10% O ₂	<0.033*	1.664*	0.12	0.152*	1.351*	0.601*		0.12
TOC	mg/Nm ³ at 10% O ₂	<0.026*	<0.046*	10	<0.073*	<0.046*	<0.037*		10
NH ₃	mg/Nm ³ at 10% O ₂	58 *	131*	10	14*	228*	314*		30
Dioxins and furans	ng.Nm ⁻³ I-TEQ at 10% O ₂	1.15*	0.81*	0.1	32.9*	203.5*	9.41*		0.1

Exit temperature	°C	0.371*	0.041*	300-400	0.030*	0.162*	0.032*	NA
Measured oxygen	%	420*	319*	NA	62*	60*	65*	NA
Sampling dates		17.8*	18.8*	NA	16.4*	18.6*	15.4*	NA

Table 3.8 LDAR summarised results from July 2017 - June 2018

Units	Number of points measured	Number of leaks detected
Unit 034 – Vacuum distillation west	126	1
Unit 035 – Distillate hydro treater west	6 370	10
Unit 042 – Fuel gas system west	373	9
Unit 079 – tertiary amyl methyl ether (TAME) production	1 817	3
Unit 228 – Creosote hydrogenation	1 313	8
Unit 230 – Platformer east	12 488	81
Unit 232 – Polymerization east	26 083	371
Unit 233 – Polymer gasoline hydrotreater east	5 525	27
Unit 235 – Distillate hydrotreater east	3 830	4
Total	57 925	514

A total of 514 leaks were identified during the monitoring campaign. Leak reports were issued to all unit managers to initiate repairs.

Table 3.9 Dust fall out results

Restriction areas	Dust fall rate (D) [mg/m ² /day 30 days average)	Permitted frequency of exceeding dust fall rate
Residential areas	D < 600	2 within a year, not sequential months
Non-residential areas	600 < D < 1200	2 within a year, not sequential months
Location of bucket	Coal Separation East (CP1)	Coal Separation West (CP2)
July 2017	31*	94*
August 2017	76	69
September 2017	123	59
October 2017	127	601
November 2017	161	68
December 2017	59	43
January 2018	70	196
February 2018	154	253
March 2018	96	203
April 2018	174	508
May 2018	207	242
June 2018	253	243

*Results flagged due to underexposure (5/6 July - 31 July/1 August 2017)

The dust fall out results indicate all measurements within the specification for non-residential areas

4. EMISSION TRENDS

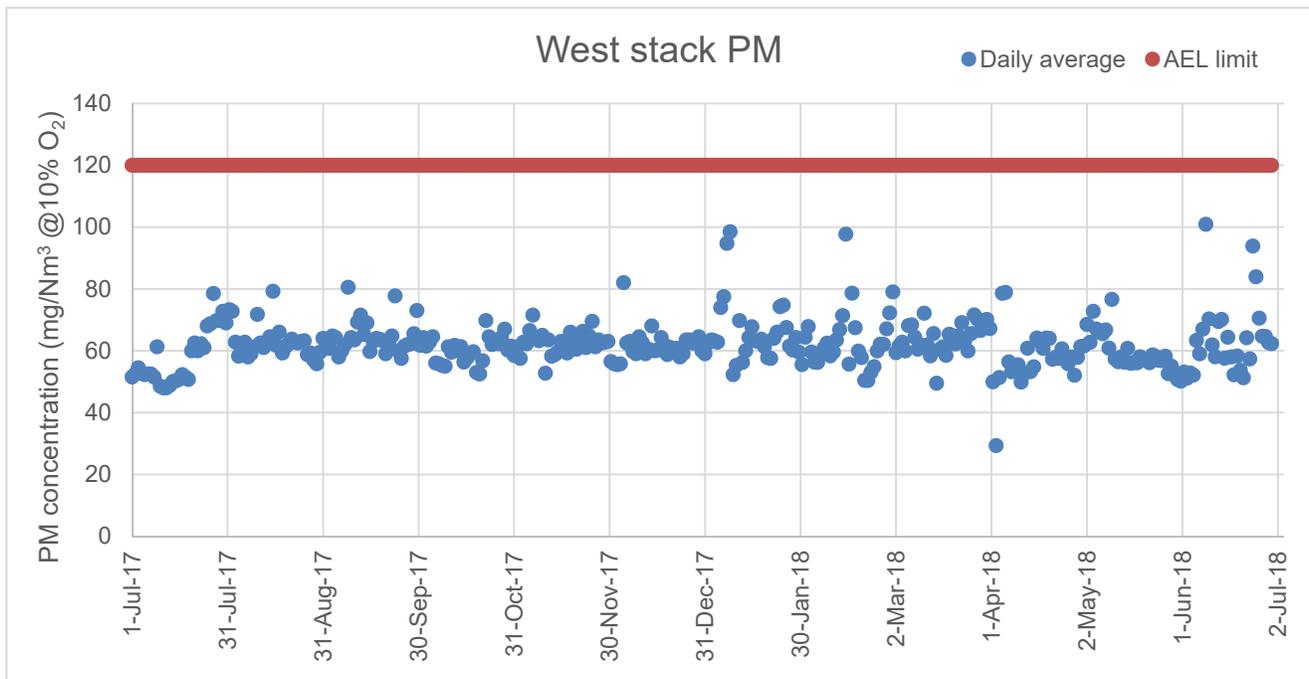


Figure 1: PM emissions for western stack (point source code B1 (unit 43))

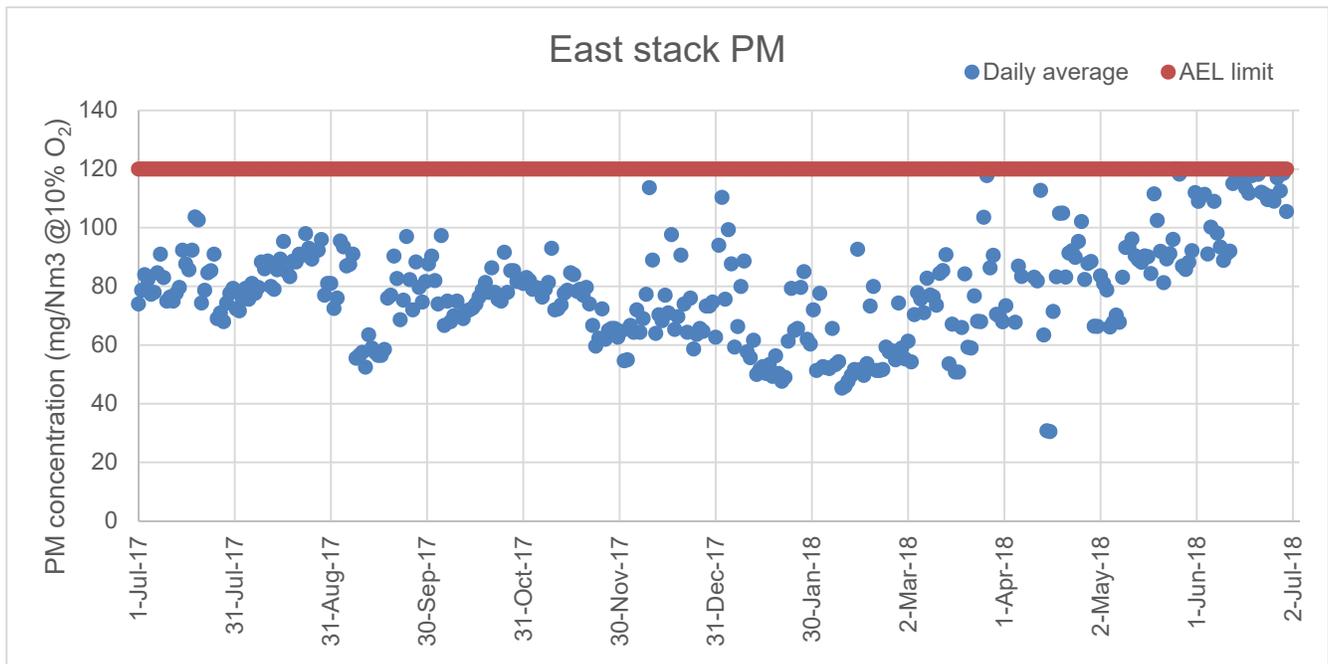


Figure 2: PM emissions from eastern stack (point source code B2 (unit 243))

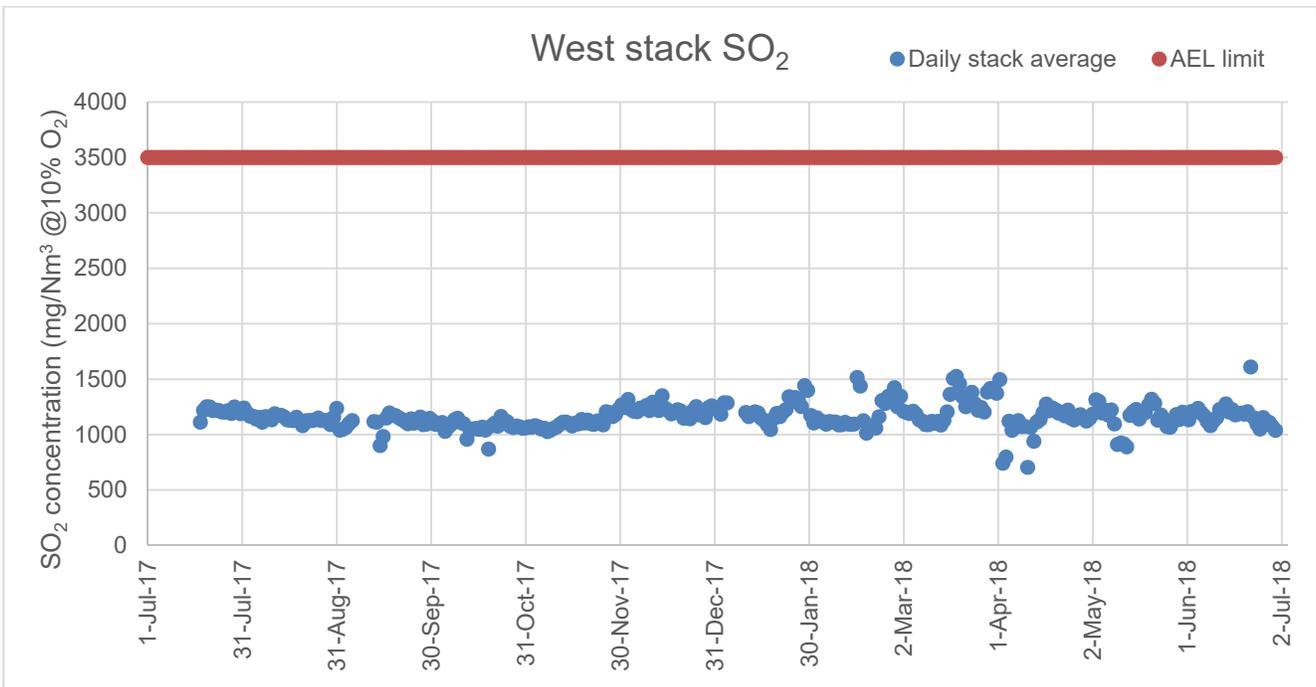


Figure 3: SO₂ emissions from western stack (point source code B1 (unit 43))

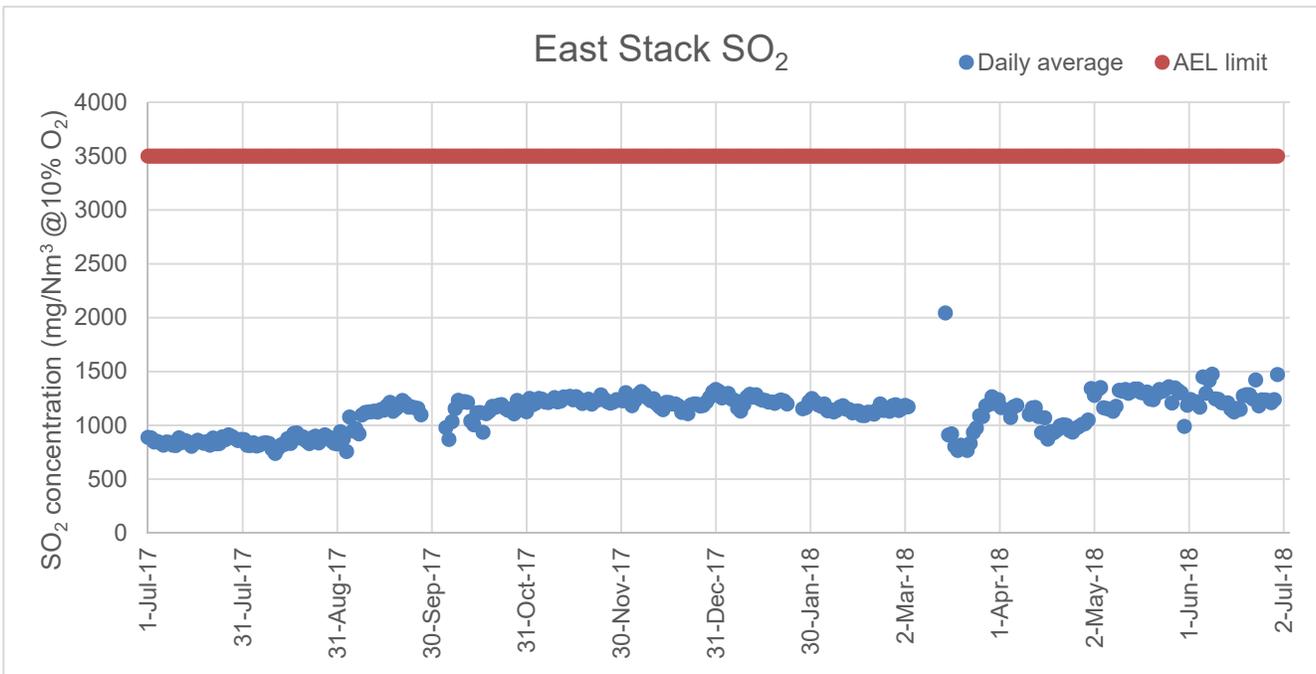


Figure 4: SO₂ emissions from eastern stack (point source code B2 (unit 243))

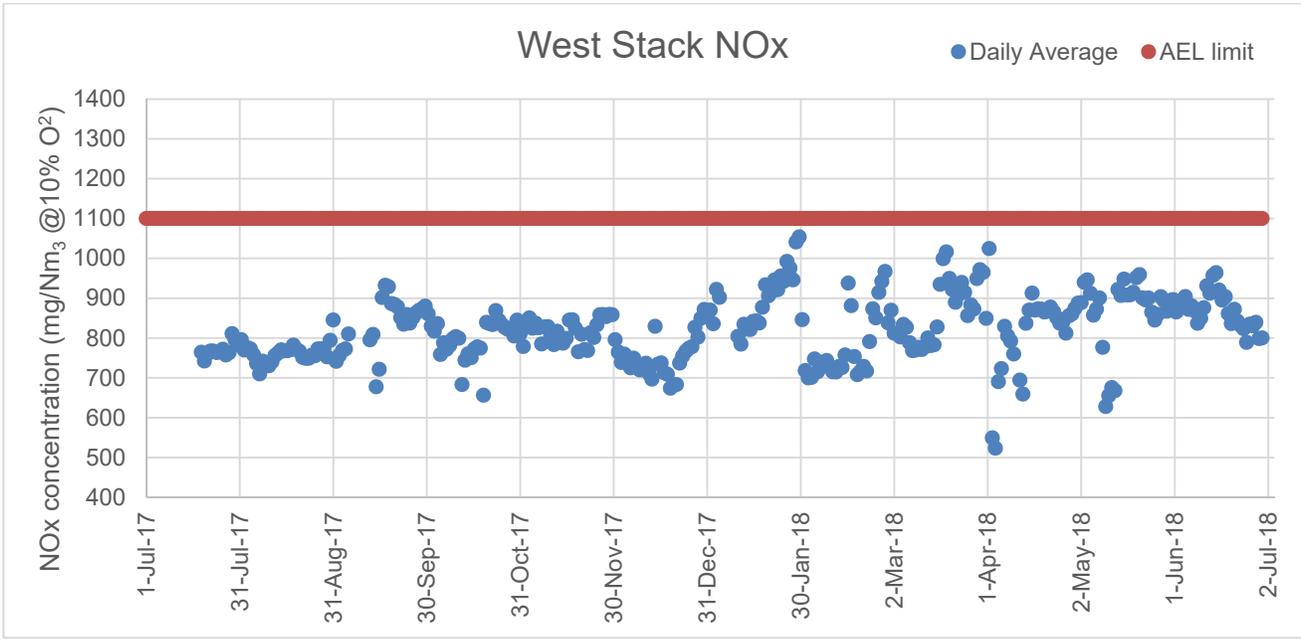


Figure 5: NO₂ emissions from western stack (point source code B1 (unit 43))

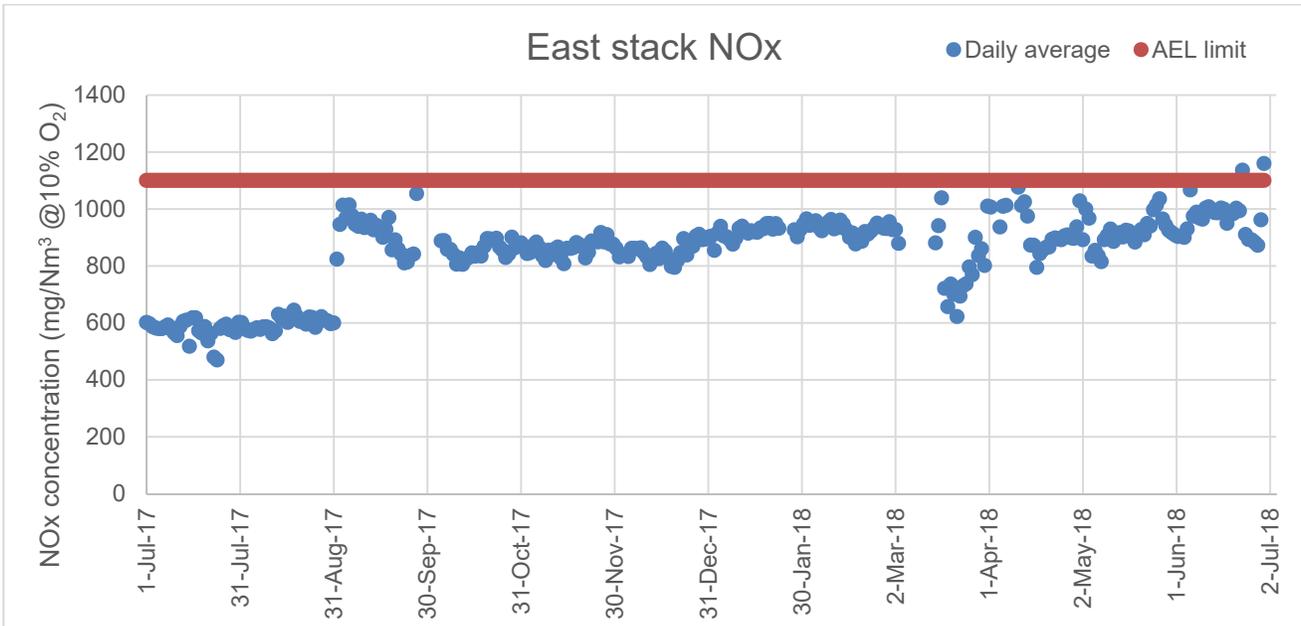


Figure 6: NO₂ emissions from eastern stack (point source code B2 (unit 243))

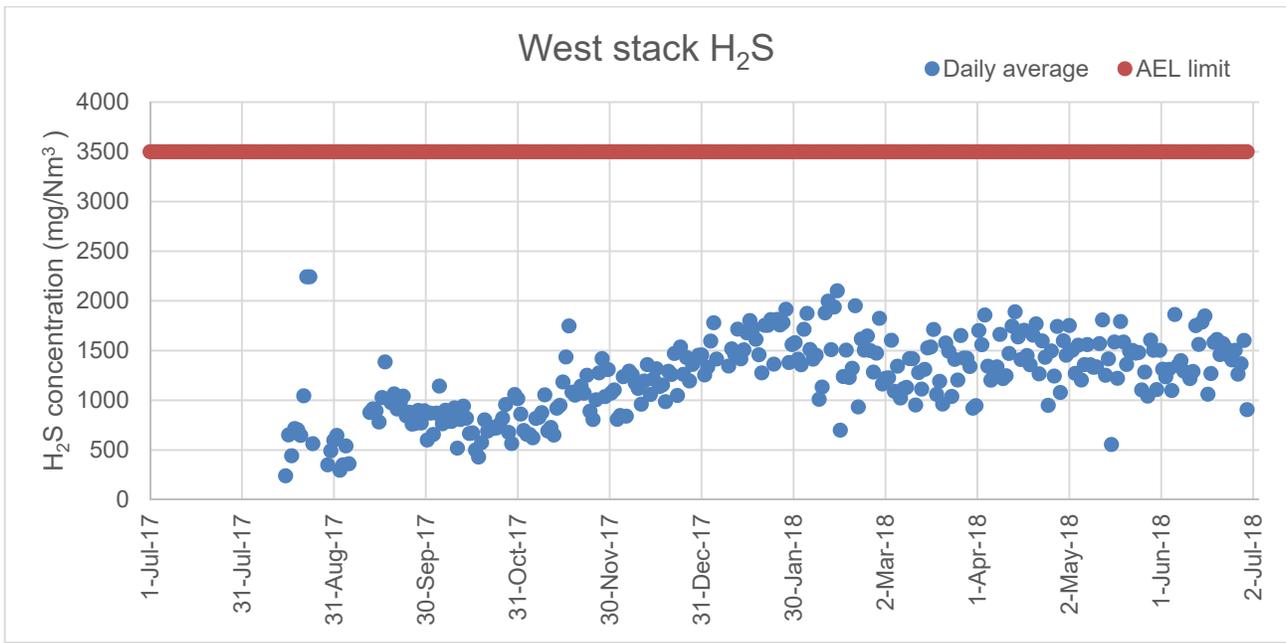


Figure 7: H₂S emissions from sulphur recovery west

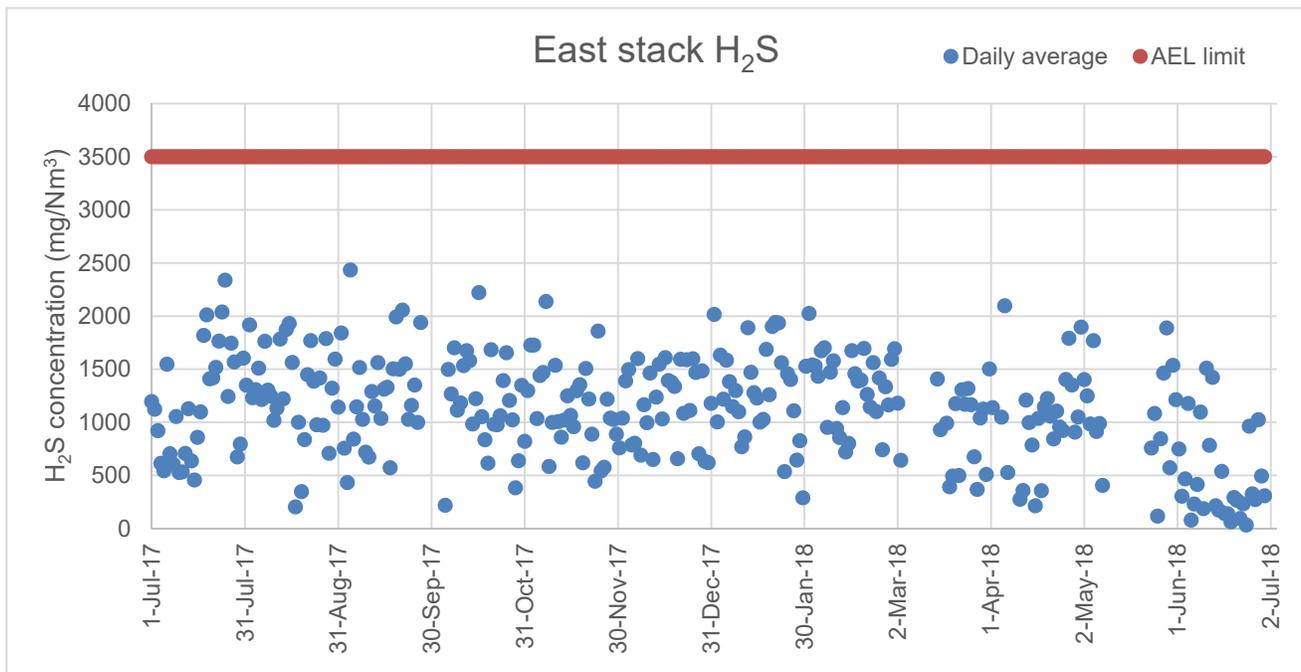


Figure 8: H₂S emissions from sulphur recovery east

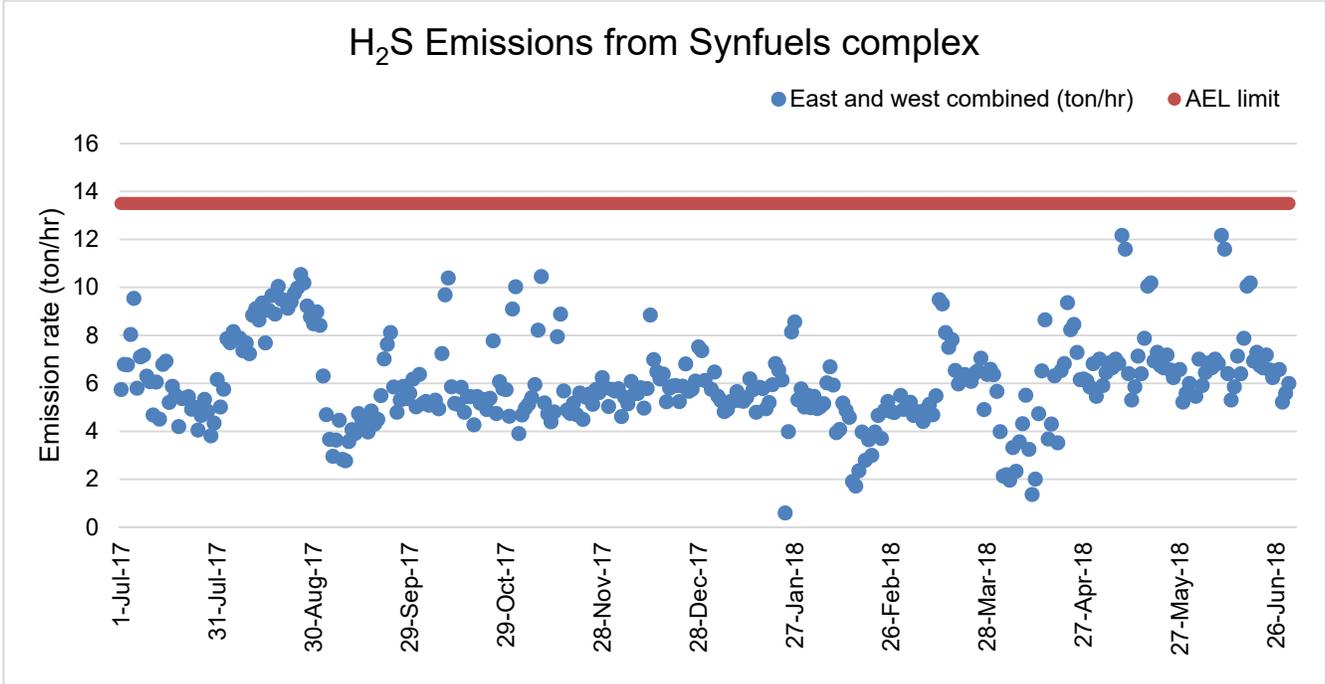


Figure 9: H₂S emissions from sulphur recovery

5. COMPLIANCE AUDIT REPORTS

No AEL related audit findings were noted during the third party audit conducted in July 2018.

6. MAJOR UPGRADE PROJECTS

There was no major upgrade that achieved beneficial operation in financial year 2018 (FY18).

7. GREENHOUSE GAS (GHG) EMISSIONS

Sasol South Africa Limited is registered as required in terms of the National Greenhouse Gas Emission Reporting Regulations, section 5 (1) with the Department of Environmental Affairs (DEA). Data has been submitted to the DEA on 31 March 2018 for calendar year 2017 as per the requirements set out in Annexure 3 of the Regulations. The GHG emissions and activity data relates specifically to all the registered Sasol facilities.

Please refer to Annexure 1 for the GHG emission and activity data that was submitted.

8. PUBLIC CONSULTATION FORUM

Two public consultation sessions were held in FY18 to meet the applicable AEL requirements. On 29 November 2017, public consultation sessions were held at Sasol eMbalenhle club and Sasol Secunda recreation club. Another session was held at Difa Nkosi hall in Lebohang on 30 November 2017. The second round of public consultations took place at Secunda and Lebohang. On 19 April 2018 the scheduled session could not safely proceed at Sasol eMbalenhle recreation club due to unforeseen community disruptions unrelated to air quality management matters. However, it took place at Sasol Secunda recreation club. The session that was held on 20 April 2018 at Leandra RDP hall took place as planned. (See annexure 2 for the presentation and attendance registers for the two sessions that took place in FY18).

9. ACTIONS TAKEN ON COMPLAINTS RECEIVED

No complaints were received in the reporting period July 2017 to June 2018.

10. HIGHVELD PRIORITY AIR QUALITY MANAGEMENT PLAN AND OFFSET PROGRAMME

10.1 Highveld priority air quality management plan

The report on the Highveld priority air quality management plan is in Annexure 3.

10.2 Sasol Secunda offset implementation plan

The Sasol Secunda offset plan was approved by the National Air Quality Officer on 31 May 2017.

Baseline campaign activities have been completed. The results of both the ambient air quality, source apportionment and quality of life surveys are currently being scrutinized where after a report will be provided to the DEA. Preliminary assessment indicate that the intervention undertaken by Sasol is aligned with and will contribute to mitigating pollution sources in the targeted areas. The paragraphs below highlight the activities as detailed in the applicable progress reports submitted to the authorities.

10.2.1 Grass cutting and veld fire management

Grass cutting and veld fire management activities are ongoing by the Secunda Operations emergency management team, with their scope of activities enhanced to support greater mitigation of veld fires to reduced smoke (PM) emissions from veld fires. The following activities were undertaken to ensure the management of veld fires:

- **Fire breaks preparation**

Progress meetings were held with representatives from Sasol Mining and emergency services on the preparation of firebreaks. The fire breaks for Sasol Secunda's secondary areas and the rest of the Sasol land (conveyor belts and at mines) were completed on as planned. These existing fire breaks along the roads and conveyor belts were maintained continuously by cutting the grass short. Photographs were captured on areas where fire breaks were prepared at Sasol secondary areas and conveyor belts (Annexure 4). The firebreaks completed distance was estimated to about 502 kilometers.

Notification letters were sent to adjacent landowners to notify them about the preparation of fire breaks. Best practices were shared for implementation on different methods on the preparation of fire breaks, e.g. burning, scraping or grading and the use of herbicides along conveyor belts to suppress the growth of the grass.

- **Reported incidents**

All reported incidents of veld fires were recorded, noting the date, time, where the fire occurred and a description of the fire incident. From July 2017 to June 2018, 40 fire incidents were recorded and approximately 1 912 766 square meters of veld was affected by fires. In all incidents, emergency management responded and extinguished the grass fires before they declared the area safe. Veld fires were noted in different areas such as the

ventilation shaft at Shondoni mine, Nitro Explosive (outside areas), north of Charlie 5 gate and Roodebank Standerton road (outside Sasol area).

- **Geographical areas of grass cutting**

The land and biodiversity team were able to cut grass in Sasol secondary areas and ensured that it was short to prevent fuelling of fire in the event of veld fires. In addition, the grass was cut at eMbalenhle and Lebohang in FY18. The total estimation of grass cut at eMbalenhle and Lebohang was approximately 1 393 014 and 169 271 square metres respectively.

10.2.2 Air quality awareness campaign

The target audience are communities of eMbalenhle and Lebohang where offsets are implemented and 27 primary schools in the Govan Mbeki District Municipality area. To reach the community as a whole in the target areas, various mediums of communication were used to execute the activities planned for this initiative. These activities include the development of booklets and pamphlets on air quality and the various air pollutants, which was used as educational tools for both young and mature community members.

Pre-assessment surveys using questionnaires were completed in both eMbalenhle and Lebohang. The aim of the pre-assessment surveys was to gather information to measure the level of knowledge about air quality related topics among the communities and to inform the approach of the air quality education and awareness programme. These questionnaires were completed by almost 900 households that were randomly selected so as to achieve a 5% margin of error at a 95% confidence level based on sample size. The questionnaire set a baseline that will be used again in evaluating the effectiveness of the project. A sample of the completed questionnaire is attached in Annexure 4.

Based on the results of the surveys the following was considered for the approach towards the education and awareness activities campaign:

- The radio, newspapers and meetings/workshops are the preferred means of communication for both communities.
- Over 80% of people in both communities listen to the radio. Most popular stations are iKwekwezi and uKhozi.
- The Ridge Times and the Daily Sun are the most commonly read newspapers.
- The communities requested communication to be done in isiZulu and English.
- The surveys also indicated that there is a need to focus on burning of solid waste as a contributor to air pollution.

Field officers were trained to undertake general public door-to-door awareness campaigns. The door-to-door sessions focused on introducing the community to air quality concepts. It laid the foundation for specific focus on the different air pollution sources in the subsequent

sessions. A flyer was prepared and used in the door-to-door campaign. It was also placed at locations frequently visited by community members of the focus areas. Adverts to promote awareness were placed in the Ridge Times. Target households were randomly chosen, and a feedback form was completed for each house where the flyer/pamphlets were distributed to record comments and questions received from the public. A summary list of questions and comments raised by the public during this session of the door-to-door campaign were recorded. The materials used for the door-to-door campaign and pictures showing the training of field workers and the door to door awareness campaign are included in Annexure 4. A post learning assessment of the targeted audience was conducted after every campaign session.

Twenty seven primary schools in the Govan Mbeki Municipality are targeted for an education and awareness campaign. The primary schools were selected in consultation with the Department of Basic Education (DoBE). Discussions were held with DoBE to align with the current curriculum when rolling out the intended projects at schools. Presentations of the project were made to the principals at Highveld Ridge east and Highveld Ridge west circuits. School coordinators were selected by the principals and educators will be provided with support.

The activities identified for different grades is ongoing and will be rolled over in financial year 2019 (FY19). The following activities will be conducted with the schools: Colouring book and puzzle (grades one to four), quiz (grades five and six), drama (grade five and six), and projects (grade seven).

Grades one to four: Colouring book and puzzle

A coloring book was prepared with various activities of differing complexity that seek to introduce various air quality concepts. A picture of the jig saw puzzle was prepared with images that present the various air quality concepts. In order to manage the puzzle complexity and make the puzzle interesting for the different grades the puzzles will be presented as follows:

- Grades one and two: Less puzzle pieces (less complex)
- Grades three and four: More puzzle pieces (more complex)

Grades five and six: Quiz and drama

A project and debate guidelines were prepared to provide an outline of what need to be done. Educators will be provided with support to roll out the activities. Competitions will be conducted as follows:

- School level (internal): certificates will be prepared for the participating learners. Mini trophies will be provided for the winners from each participating school.
- District level competition (best from each school): Sasol to provide a prize for the winning school.

The materials used for school education and awareness for different grades is included in Annexure 4.

The impact assessment will be conducted annually and will be guided by the baseline study and pre-learning assessment.

10.2.3 Insulation of reconstruction development programme houses (RDP)

To ensure successful implementation of insulating RDP houses, a staggered approach was adopted, with the first focus in eMbalenhle, followed a year later in Lebohang. Basic insulation which refers to the abatement technology being sprayed on the ceiling was applied.

A local managing unit office was established at eMbalenhle (Osizweni) and 505 eligible RDP houses in eMbalenhle were insulated together with coal stove exchange in FY18. Service providers including local small medium micro enterprises assisted in various activities during the insulation. In addition, coal stoves were exchanged with liquid petroleum gas (LPG) packages (four plates stove with an oven, gas heater and two, nine kilograms cylinders). The completed activities were appropriately signed off after insulation and accepted by the owners. Repairs were conducted during the course of the insulation phase, caused by related activities, as necessary.

The census to identify eligible households was completed and approximately 16 000 houses were identified. Nine hundred and ninety four (994) household owners signed an agreement with Sasol to provide permission for the insulation to be conducted and stove swop to take place for purposes of the objectives to be reached. The training on the use of the LPG packages was done to all households that received the package and will be an on-going process. The pictures showing different activities are included in Annexure 4. The coal stoves were removed and dismantled at a Sasol reclamation yard.

Three ambient air quality monitoring stations were installed at eMbalenhle north (Buyani primary school), eMbalenhle south (Kl Twala secondary school) and Lebohang (Chief Ampie Mayisa high school). These ambient air quality monitoring stations measure the emissions from all activities which include industrial sources and non-industrial sources.

Ambient air quality data from eMbalenhle north and Lebohang on particulate matter (PM10) hourly averages on 25 May 2018 depicted a clear trend on increased use of solid fuel burning during morning (eMbalenhle) and evening (eMbalenhle and Lebohang). The graph is attached in Annexure 4.

In FY19 (July 2018 to June 2019) a total of 2 800 of RDP houses are planned to be insulated at eMbalenhle and Lebohang. Also, a project design document is being finalised to clearly document the scope and measurement of the project impacts.

10.2.4 Insulating serviced informal houses with polyurethane foam together with a stove swop at Lebohang.

The insulation of serviced informal houses on 30 households in Lebohang commenced in

March 2017 until October 2017. Six households chose not to continue to participate after the project commenced. The remaining 24 serviced informal houses were insulated with spray polyurethane foam under the roof and walls were plastered with polystyrene cement foam. The insulated serviced informal houses are shown in Annexure 4.

Solid fuel stoves were exchanged with either the LPG package (four plates gas stove and a gas heater) or a more efficient solid fuel burning stove (Kitchen king) at the 24 insulated serviced informal houses. Twelve households received the LPG package while the other 12 received a Kitchen king stove.

The indoor air quality measurement was conducted on the 12 households that received the Kitchen king stoves. Summer and winter temperature impact measurements and indoor air quality data collection were concluded in June 2018. These studies were imperative to determine the suitability and the durability of the intervention. See Annexure 4 with photographs.

After visual and physical inspection of the walls intervention the following were observed:

- All households showed superficial cracks in exterior cement plaster;
- A majority of households exhibited deeper and wider cracks extending into Polyurethane foam wall;
- Half of the households have windows that cannot fully open; and
- Half of the households portrayed rust markings on walls.

After visual and physical inspection of the roof intervention the following were observed:

- A majority of ceilings exhibited light brown markings;
- Seven households exhibited dark brown and black markings on ceilings;
- Some ceilings showed sagging;
- Some ceilings indicated gypsum boards pulling out of fasteners; and
- Some ceilings exhibited some vertical movement when physically pressured.

Following the evaluation of the insulated serviced informal houses, Sasol concluded that the current intervention is not feasible for a larger scale roll out in eMbalenhle and Lebohang as the proportion of houses which displayed problems were high. However, since the feasibility study was not viable, an additional, 400 RDP houses will be insulated at eMbalenhle and Lebohang in FY19.

10.2.5 Surfacing of roads to reduce dust

A technology was developed in conjunction with the Council for Scientific and Industrial Research which was found to have challenges with implementation in the high clay areas in the Govan Mbeki Municipality region. The source apportionment results confirmed that the impact of dust from unsurfaced roads is minimal, therefore this option was not considered further since it is unlikely to have a meaningful impact on ambient air quality. However, an additional, 500 RDP houses will be insulated at eMbalenhle and Lebohang in FY19.

Annexure 1: Sasol's 2017 GHG submission to the national GHG reporting regulations

Name of data provider		Herman van der Walt / Shamini Harrington											
Data provider identification		170500107											
Date of submission		31 March 2018											
Year of data		2017 (January to December 2017)											
Comments: Activity data has been supplied. A carbon mass balance has been used to determine GHG data. In most cases the activity data cannot be directly translated to GHG data. Flaring activity data cannot be supplied due to various streams entering the flare at any given time.													
IPCC code	Sub category (disaggregated by fuel / product type / production process)	Activity data			Emissions (tonnes/year)								
		Name of activity data	Value of activity data	Units of activity data	CO ₂			CH ₄			N ₂ O		
					Value	Tier	Reference - technical guidelines	Value	Tier	Reference - technical guidelines	Value	Tier	Reference - technical guidelines
1A1	1A1c	Boiler coal combustion	14 977 374	tonnes of run of mine coal	25 429 246	3	Page 52-54	300	1	Page 52-54	449	1	Page 52-54
1A1	1A1c	Gas to power plants	750 271	kNm ³	1 420 641	3	Page 52-54	25.3	1	Page 52-54	2.53	1	Page 52-54
1A1	1A1c	Fuel gas combustion	28 640 347	GJ	1 194 110	3	Page 52-54	21.3	1	Page 52-54	2.13	1	Page 52-54
1A1	1A1c	Fuel oil combustion	1 100 948	GJ	118 860	3	Page 52-54	4.6	1	Page 52-54	0.92	1	Page 52-54
1A1	1A1c	Sasol catalytic cracker	1 199 845	kNm ³	188 429	3	Page 52-54	7.3	1	Page 52-54	1.46	1	Page 52-54
1A1	1A1c	Wet sulphuric acid combustion emissions	177 871	kNm ³	68 055	3	Page 52-54	1.2	1	Page 52-54	0.12	1	Page 52-54
1A	1A1c	Natural gas combustion	910 988	GJ natural gas	39 454	3	Page 52-54	0.7	1	Page 52-54	0.07	1	Page 52-54
1B	1B3	Other energy industries: process emissions	30 042 216	kNm ³ (pure gas rate for CTL/GTC)	23 227 198	3	Page 52-54	96 416	3	Page 52-54			
1B	1B3	Flaring emissions	No activity data due to complexity of the process	N/A	2 027 278	3	Page 52-54	NA	NA	NA	NA	NA	NA
1B	1B3	Wet sulphuric acid process emissions	177 871	kNm ³	309 044	3	Page 52-54	NA	NA	NA	NA	NA	NA

1B	1B3	Butanol stripper	182 658	tonnes of butanol	15 323	3	Page 52-54	NA	NA	NA	NA	NA	NA
4D	4D2	Process water dams	23 360	tonnes process water feed	7 065	3	Page 52-54	3853	3	Page 52-54			
4D	4D2	Water recovery (including domestic sewage)	119 401	tonnes COD	180 962	3	Page 52-54	NA	NA	NA	NA	NA	NA
2B	2B2	Nitric acid production	643 962	tonnes of nitric acid	NA	NA	NA	NA	NA	NA	692	3	Page 52-54
2B	2B1	Ammonia production	313 043	tonnes of ammonia	241 415	3	Page 52-54	7962	3	Page 52-54	NA	NA	NA
1B	1B1	Sasol Mining	40 020 782	tonnes of coal mined	0	NA	NA	3229	2	Page 52-54	NA	NA	NA
1B2	1B2b	Natural gas venting from the pipeline	4 555 664	kNm ³ of natural gas	0	NA	NA	243	2	Page 52-54	NA	NA	NA
4C	4C2	Open burning of waste	Not applicable (NA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1A5	1A5b	Mobile combustion: Mining machinery	245 406	litres of petrol and diesel	19 410	1	Carbon budget reporting requirement	NA	NA	NA	NA	NA	NA

Annexure 2: Public consultation forum attendance list and presentation (see attached documents)

Annexure 3: Highveld Priority Air Quality Management Plan – (see attached document)

Annexure 4: Offset implementation – (see attached documents)