Sasol South Africa (Pty) Ltd

Sasolburg Operations

AEL No: FDDM-MET-2013-23-P1

Annual Emission Report

Prepared for

Fezile Dabi District Municipality

31 August 2016

Reporting period: July 2015 – June 2016

Date Submitted: 31 August 2016

DECLARATION

Unless otherwise specified in the body of the report, Sasol South Africa (Pty) Ltd, through its Sasolburg Operations, certifies that the sampling campaign for periodic emission monitoring for the entity which was formerly known as Infrachem, was conducted during normal plant operating conditions.

31 August 2016

Emission Control Officer: Ristoff van Zyl

EXECUTIVE SUMMARY

The content of this report is in alignment with the requirements of section 7.7 of the Atmospheric Emission Licence (AEL), which include the following:

- Pollutant emissions trends
- Compliance audit reports
- Major upgrades projects (i.e. abatement equipment or process equipment)
- Greenhouse gas emissions

The information pertaining to these items above are addressed in the relevant subsection in the body of the report.

Sasolburg Operations' Infrachem plants complied with its Atmospheric Emission License requirements, unless otherwise indicated and discussed under the relevant sections.

REPORT DETAILS

REFERENCE	SCI: FY16 Annual Emission Report - FDDM-MET-2013-23 P1
REPORT TITLE	Annual Emission Report
DATE SUBMITTED:	31 August 2016
PREPARED FOR:	Fezile Dabi District Municipality Metsimaholo Municipality Free State Province (Licencing Authority)
PREPARED BY:	Sasol South Africa: Sasolburg Operations Klasie Havenga Road Sasolburg 1947 Tel: +27 (0)16 920 4913 E-mail: ristoff.vanzyl@sasol.com
DESCRIPTION OF SITE (Erf)	Subdivision 6 of 2 of Driefontein No- 2 and certain subdivisions of the farm Saltberry Plain, Roseberry Plain Flerewarde and Antrim and subdivision 5 of 4 of Montrose, District of Sasolburg, Free State
INSUTRY SECTOR	Petrochemical
SITE COORDINATES	Latitude 27.84206E Longitude 26.82678S
SIGNED:	Ristoff van Zyl Signed: 
APPROVER:	Bob Kleynjan Signed: 

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ACRONYMS

The following abbreviations appear in this report:

US EPA	United States Environmental Protection Agency
GHG	Greenhouse gas
PM	Particulate Matter
VOC	Volatile Organic Compounds
NOx	Nitrogen oxides
NO_2	Nitrogen dioxide
NO	Monoxide of nitrogen
SO_2	Sulphur dioxides
CO	Carbon monoxide
CO_2	Carbon dioxides

1 INTRODUCTION

Sasol South Africa (Pty) Ltd's Sasolburg Operations (SO) are required to submit its annual atmospheric emissions compliance report 60 days after its financial yearend closure.

Based on these conditions, stipulated within SO's Atmospheric Emission Licenses, as well as the condition stipulated within Section 17 of the Minimum Emission Standards, SO herewith submits its annual compliance monitoring report for its License number FDDM-MET-2013-23-P1.

The report covers the reporting period from July 2015 to June 2016. VOC and isokinetic, together with inorganic gas, emissions monitoring were conducted by two separate and independent service providers. Since an accreditation system for stack sampling is not in place, neither of the two sampling companies are accredited, however both have expressed their desire to be accredited as soon as the accreditation system has been established. Both service providers also make use of accredited laboratories where chemical analyses are required.

Continuous Emissions Monitoring also formed part of the compliance monitoring for the plant, specifically with relation to its particulate emissions from the boilers and NOx emissions from its Nitric Acid plant. In addition to the existing online monitoring equipment, SO also installed gaseous continuous emission monitoring equipment for its Boilers to measure O_2, NO, NO_2, NOx and SO_2. This equipment should be operational towards September 2016. Continuous Emission Monitoring equipment has also been installed for the Thermal Oxidation plant's three Thermal Oxidisers. This equipment should also be fully functional towards September 2016.

A comparison with license conditions is conducted in this report to demonstrate compliance with Sasol's emission limits as specified within its Atmospheric Emission License as at the date of sampling.

2 SERVICE PROVIDERS

In accordance with Section 21 (GN 893:2013), SGS South Africa and LEVEGO were the independent companies who have performed the necessary emissions testing for Sasol, upon which the results / reports are based. The results from the sampling campaign are presented in the relevant section of the report (results section).

2.1 SGS Environmental Services

The services provided by SGS South Africa for source emission testing are as follows:

- Basic stack emission testing
- Automatic Isokinetic stack sampling for compliance, commissioning, process control and efficiency testing
- Fugitive and area specific emission assessments
- Vent emission testing
- Reports based on analysis of dust, SO_2, NO_2, metals, VOCs, SVOCs, dioxins and furans, chlorides and fluorides.

Their contact details appear in Table 2.1.1 below

Table 2.1.1: SGS Contact details

SGS Contact details	
Physical address	58 Mellville Street, Booysens Johannesburg, 2135 South Africa
Postal address	P.O. Box 82582, Southdale Johannesburg, 2135 South Africa
Telephone No:	+27 11 681 2500
Fax No	+27 11 433 365
Email	envi.africa@sgs.com

2.2 LEVEGO

Levego specialise in the consulting and provision of stationary source, air quality and process off-gas measurements and supply of specialised source monitoring equipment. Their main drive is to provide a service which meet customer requirements by utilising recognised international standards (such as ISO, B.S, EN and EPA).
Levego's members have over forty-five years combined experience in the field of air pollution monitoring and industrial pollution control.

Table 2.2.1: LEVEGO Contact details

LEVEGO Contact details	
Physical address	Building R6, Pinelands Site Ardeer Road, Modderfontein 1645
Postal address	PO Box 422, Modderfontein 1645
Telephone No:	+27 11 608 4148
Fax No	+27 011 608 2621
Email	info@levego.co.za

3 MONITORING AND SAMPLING METHODOLOGY

SO conducts online monitoring for particulates in each of its boilers and NOx for its Nitric acid plant. Ad hoc sampling is conducted by Service Providers according to the Regulations. Both the online and ad hoc sampling results are included within the following section.

Comparisons with relevant AEL conditions are done based on the applicable AEL at the time that compliance monitoring has been conducted.

4 RESULTS

4.1 Pollutant emissions

Table 4.1.1: Sampling results

Plant Name	Source Name	Units	Nm^3/hr	Am^3/hr	Mass flow kg/h	mg/Nm^3 (dry) @ 10% O_2	AEL Limit Value	Sampling Method
ATR	A-Train	PM	116 593	434 348	5.145	37.90	120	USEPA Method 5
		SO_2			0.782	5.58	1 700	USEPA Method 6C
		NOx (as NO_2)			0.647	4.61	1 700	USEPA Method 7E
	B-Train	PM	139 965	353 004	4.203	25.74	120	USEPA Method 5
		SO_2			0.571	3.40	1 700	USEPA Method 6C
		NOx (as NO_2)			0.498	2.97	1 700	USEPA Method 7E
Thermal Oxidation	B6993#	PM	16 710	51 804	2.392	155.70	180	USEPA Method 5
		NOx (as NO_2)			3.887	253.00	420	USEPA Method 7E
		SO_2			3.782	246.14	50	USEPA Method 6C
		CO			15.575	1 014	1 050	USEPA Method 3A/10
		TOC			10.638	692.38	10	USEPA Method 25A
		NH_3			0.028	1.81	10	USEPA Method 26A
		HCl			0.017	1.11	15	USEPA Method 26A
		HF			0.009	0.60	1	USEPA Method 26A

		Sum of metals			0.019	1.25	22	USEPA Method 29
		Hg			0.000	0.01	0.05	USEPA Method 29
		Cd +Tl			0.000	0.00	0.05	USEPA Method 29
		PCDD/PCDF			0.000	0.05	0.10	USEPA Method 23
	B6990*	PM	19 066	76 258	6.011	368.16	NVP	Camera
		NOx (as NO_2)			7.784	476.73	360	USEPA Method 7E
		SO_2			14.185	868.73	50	USEPA Method 6C
		CO			1.810	110.83	75	USEPA Method 3A/10
		TOC			0.171	10.50	25	USEPA Method 25A
		NH_3			0.180	11.03	10	USEPA Method 26A
		HCl			0.058	3.56	10	USEPA Method 26A
		HF			0.214	13.13	1.500	USEPA Method 26A
		Sum of metals			0.692	42.40	NVP	Camera
		Hg			0.000	0.01	NVP	Camera
		Cd +Tl			0.000	0.01	NVP	Camera
		PCDD/PCDF			0.001	0.05	Chemical analysis	Lab analyses
	B6930@	PM	73 496	139 115	0.252	4.00	50	USEPA Method 17
		NOx (as NO_2)			43.341	689	750	USEPA Method

								7E
		SO_2			239.368	3 803	1 800	USEPA Method 6C
		CO			0.177	2.81	50	USEPA Method 3A/10
		TOC			1.176	18.68	50	USEPA Method 25A
		NH_3			0.111	1.76	10	USEPA Method 26A
		HCl			0.063	1.00	10	USEPA Method 26A
		HF			0.069	1.09	1	USEPA Method 26A
		Sum of metals			1.416	22.49	1	USEPA Method 29
		Hg			0.001	0.02	0.05	USEPA Method 29
		Cd +Tl			0.006	0.09	0.05	USEPA Method 29
		PCDD/PCDF			0.002	0.03	0.10	USEPA Method 23
Prillian Plant	Prillian Scrubber 1	PM	62 982	86 914	0.299	4.75	50	USEPA Method 5
		NH_3			1.745	27.70	100	USEPA Method 26A
	Prillian Scrubber 2	PM	81 131	112 087	1.038	12.80	50	USEPA Method 5
		NH_3			1.014	12.50	100	USEPA Method 26A
	Prillian Tower (A-B-C)	PM	126 240	169 715	2.708	21.45	50	USEPA Method 5
		NH_3			0.981	7.77	100	USEPA Method 26A
Nitric Acid Plant	NAP Effluent	NOx (as NO2)	76 623	125 399	187.952	280	500	Online

	Stack							

NVP: No visible plume

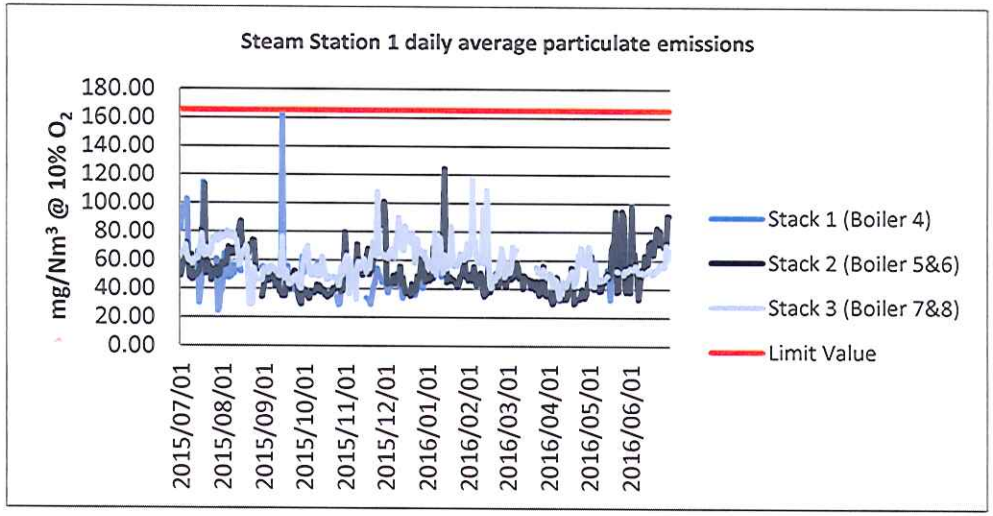
#: During more recent sampling campaigns, Sasol realised that historical measurements on which the 2015 postponement application was based, under reported certain pollutants. This will be corrected during a formal amendment process to commence during the new financial year.

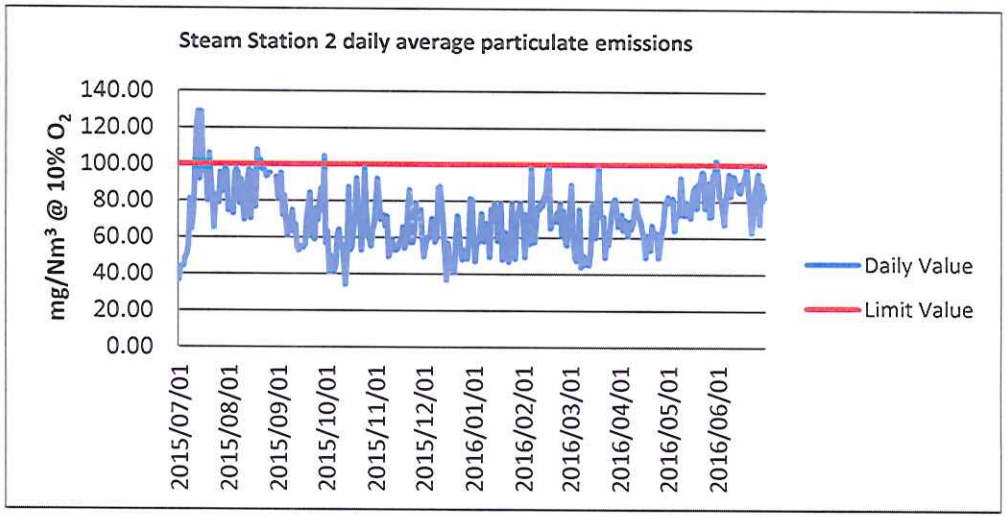
*: Historically Sasol could not successfully complete isokinetic sampling on this unit, due to the temperature in the stack. Therefore the results obtained during this isokinetic sampling run still needs to be verified. As part of improving Sasol's capabilities to sample at elevated temperatures, Sasol has purchased a titanium probe and nozzle set which seems to yield more believable results. The average emission results for the 4 quarterly sampling campaigns are reported for information.

@: The elevated SO_2 concentrations from the B6930 incinerator are not due to an increase in SO_2, but due to limited oxygen information available during the previous postponement application process. The incinerator operates at normal SO_2 levels but at 15.5% O_2, meaning that the correction to 10% O_2 causes a significant increase in the corrected SO_2 concentration, but does not add additional load to the receiving environment. The corrected value will be requested as part of the formal amendment process that will commence during the new financial year. Since oxygen correction plays a significant role in the compliance measurement and oxygen was not measured historically on all incinerators, the capability of operating within an oxygen corrected control environment will ensure better control which is expected to reduce the emissions.

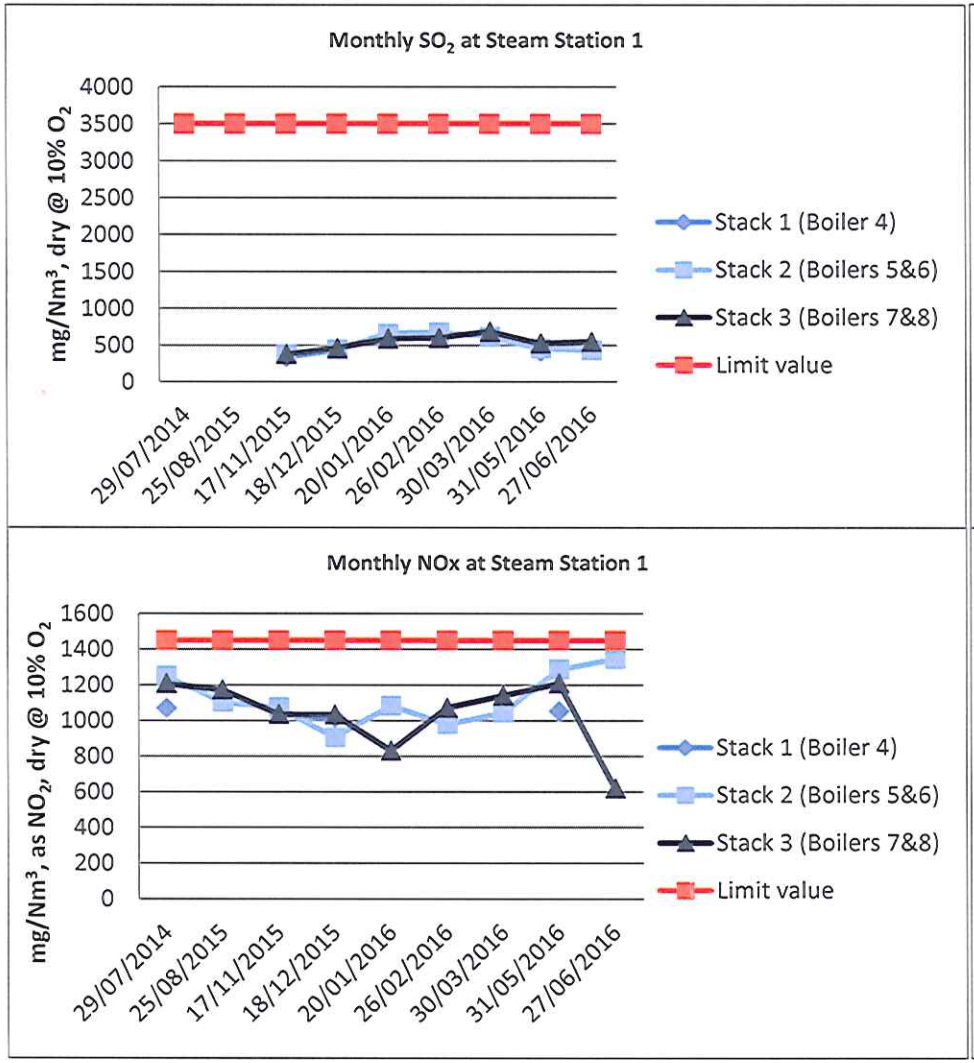
Sasol has also installed Continuous Emission Monitoring Equipment on its three thermal oxidisers. Indications are that the units will be fully functional and operational towards the end of September 2016. As soon as reliable results are obtained from the online monitoring equipment, these results will be used for optimisation of the processes to positively impact on the emissions. The Air Quality Officer will be updated on the progress in this regard.

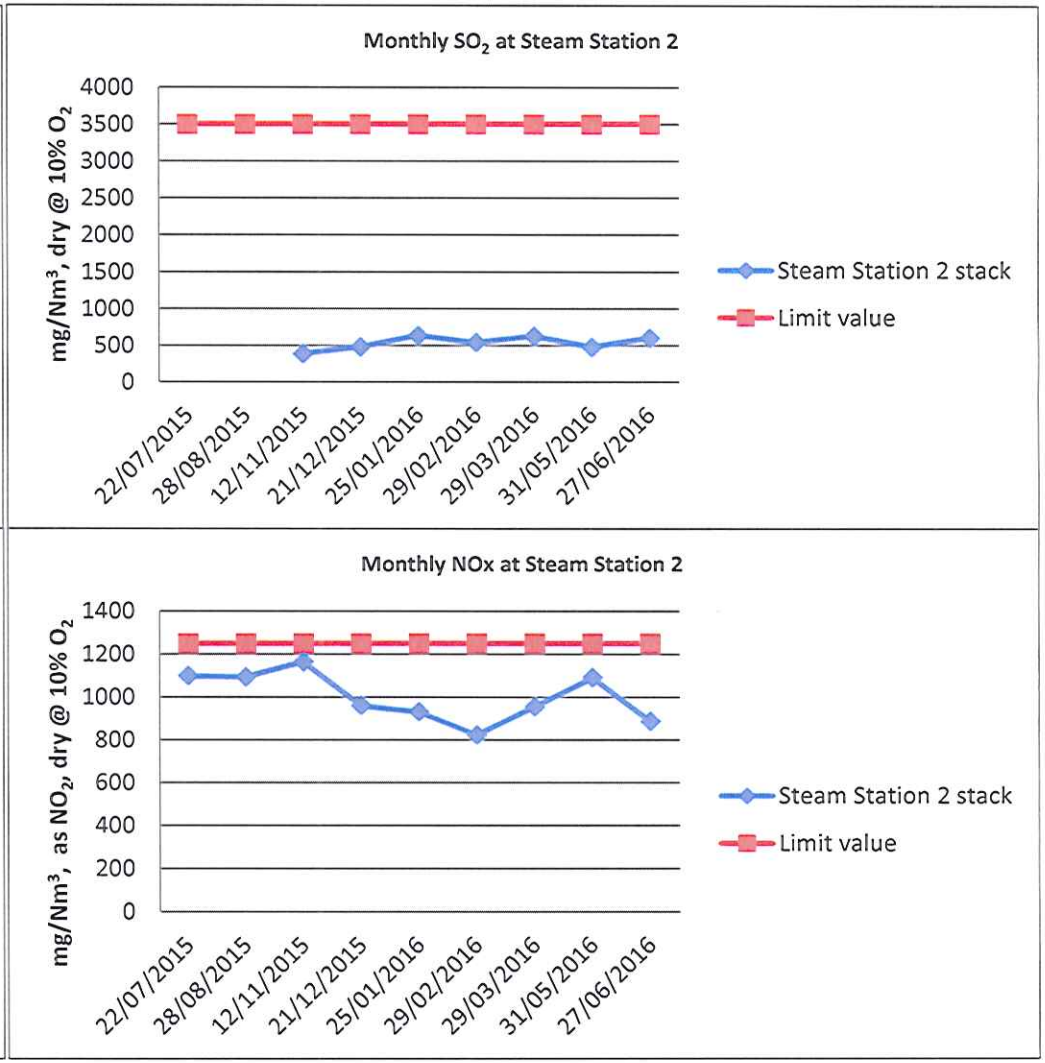
Figure 1: Steam Stations – Continuous online monitoring for PM and monthly sampling for SO_2 and NOx





Online measurements for Steam Stations 1 and 2 are indicated above. Sasol has conducted a full dynamic calibration on all the operational and stable boilers during the reporting period. At Steam Station 2 some daily exceedances due to upset conditions can be noted. This was reported in the respective months to the Air Quality Officer. No upset conditions exceeding 48-hours in duration were recorded.





Sasol has installed Continuous Emission Monitoring for NOx, SO_2 and O_2 in its boiler flue gas. The online analysers should be fully functional and operational towards the end of September 2016, where after the results and trends will be reported to the Air Quality Officer as part of Sasol's monthly reporting.

4.2 Compliance audit reports

Audit finding	Corrective action taken	Status
None for Financial Year 2016		

4.3 Major upgrades projects

Project description	Planned completion date	Status
Installation of online monitoring equipment at Thermal Oxidation and Steam Stations 1 & 2	September 2016	Installation completed. Sasol is busy with calibrations and verification of results

4.4 Greenhouse gas emissions

Total Direct CO_{2eq} emissions	5 479.614 kt

5 NON COMPLIANCE

Non-compliance description	Action to be implemented	Completion date	Status
Thermal Oxidation	The newly installed online monitoring equipment will be utilised to obtain better control over the incinerator emissions, especially oxygen corrections, which should improve emissions. The Licensing Authority will be kept updated as part of Sasol's monthly report. Historical errors will be corrected as part of the formal amendment application to be initiated during the new financial year.	To be confirmed as soon as the operational control results from the continuous emission monitoring steps are implemented	In progress

6 OFFSETS

During 2015 the National Air Quality Officer granted Sasol Postponement to comply with a number of conditions, as per Sasol Infrachem's 2014 Postponement Application. One of the conditions pertaining to the postponement granted was that Sasol had to implement an Offset Plan to reduce Particulate and SO_2 emissions in the ambient air quality around its facility. After concluding a comprehensive stakeholder engagement process, Sasol and Natref submitted a joint offset implementation plan to DEA in May 2016.

Herewith a summary of the actions taken and progress to date around the Offset Implementation Plan, focused on the community of Zamdela:

Long term Plans:

Underpinning the plan is a comprehensive baseline campaign, to set a benchmark against which the offset impacts are measured. This includes a combination of indoor and ambient air monitoring, and community surveys.

As part of the air monitoring component of the baseline:

- Sasol will undertake a Source Apportionment study in Zamdela which will identify the sources contributing the most to particulate and SO2 concentrations in the ambient air.
- As at the end of June 2016, Sasol's consultants (North West University and the NOVA Institute) have commenced with continuous sampling initiatives that will inform the baseline of the ambient air quality within Zamdela. The quality of life survey has also commenced targeting at least 800 community members with the survey to understand households' overall quality of life, including challenges, energy consumption patterns and general level of environmental education
- At the beginning of Sasol's financial year 2017, an innovative approach to bolster ambient monitoring was begun, involving a real-time "visual source survey" technique. Community members have been trained to compile a real-time inventory of sources, which are being logged as part of a series random-path walks. This data will supplement the ambient monitoring and source apportionment exercise.

After analysing all the relevant baseline information, Sasol will design and implement measures to address the problematic sources through which a reduction in ambient concentrations of particulates and SO_2 can be achieved.

During the first quarter of Sasol's new financial year, the first source apportionment sampling will be conducted and a baseline sampling campaign to determine imported pollutant concentrations into the Zamdela area will commence.

Immediate interventions:

Due to the time it will take to conduct the baseline campaign to set Sasol up for successful implementation of long term measures, Sasol has agreed to the parallel implementation of an immediate qualitative offset process. Four specific projects were identified, informed by the Vaal Triangle Airshed Priority Area Air Quality Management Plan, namely:

- Reducing pollutants emanating from veld fires
- Reducing pollutants emanating from the burning of non-recyclable waste
- Reducing pollutants emanating from the burning of recyclable waste
- Reducing pollutants emanating from vehicle emissions

All the above mentioned activities fall within the responsibility of the Municipality. Therefore the purpose of the immediate interventions is to understand the hurdles the municipality faces in removing or reducing the above mentioned pollution sources, and then to co-create solutions with the municipality to address the challenges and enable them to sustainably deliver on their mandate.

A public participation process was held where some concerns regarding the proposed immediate interventions were raised by community members. These concerns were considered and through that Sasol has had discussions with the following partners:

- Waste Pickers Association: Sasol has collaborated with the Waste Pickers Association to co-create a solution to their challenges in collecting recyclable waste. Agreement between Sasol and the Waste Pickers has been reached on the way forward. Sasol now awaits confirmation

from the Metsimaholo Municipality on the availability of resources, whereafter the solution will be implemented.

- Metsimaholo Local Municipality (MLM): Various discussions have been held with the MLM around its challenges. Solutions to the challenges are still work in progress. Feedback on progress will be given to the residents of Zamdela during the next forum to be held, which is anticipated to be held in November 2016.

7 CONCLUSIONS

With the exception of Thermal Oxidation, Sasolburg Operations through its historical Infrachem facility is compliant with its AEL requirements. The Thermal Oxidation non-compliance will be managed through the newly installed online monitoring equipment at the incinerators and regular feedback will be provided to the Air Quality Officer on the progress associated with the non-compliance.

Sasol is also busy with the implementation of immediate as well as long term offset initiatives.