

Sasol Chemical Industries

Secunda Synfuels Operations

AEL No: Govan Mbeki Sasol Chemical Industries (Pty) Ltd 0016/2014/F01

Annual Emission Report

Prepared for

Gert Sibande District Municipality

28 August 2014

Reporting period: July 2013 – June 2014

Date of submission: 29 August 2014

DECLARATION

It is hereby certified that the sampling campaign for periodic emission monitoring at the point sources of Secunda Synfuels Operations was conducted during normal plant operating conditions unless otherwise stated in this document.

28/08/2014

Date



Emission Control Officer: Estelle Marais

28/8/14

Date



Responsible Officer: Francois Malherbe

EXECUTIVE SUMMARY

The content of this report is aligned with the requirements of section 7.6.2 of the Atmospheric Emission Licence (AEL), which include the following:

- Pollutant emissions trends¹
- Compliance audit reports
- Major upgrade projects (i.e. abatement equipment or process equipment)
- Greenhouse gas emissions

The information pertaining to these items above are addressed in the relevant subsections in this report.

¹ Please note that there are no pollutant emissions trends available for the initial report.

REPORT DETAILS

REFERENCE	SSO: FY14 Annual Emission Report
REPORT TITLE	Annual Emission Report
DATE SUBMITTED:	28 August 2014
PREPARED FOR:	Gert Sibande District Municipality Govan Mbeki Municipality Mpumalanga Province (Licencing Authority)
PREPARED BY:	Sasol Chemical Industries: Secunda Chemical Operations 1 Sturdee Rosebank 2196 Tel: +27 (0)17 610 2895 E-mail: estelle.marais@sasol.com
DESCRIPTION OF SITE (Erf)	Highveld Ridge Mpumalanga
INDUSTRY SECTOR	Petrochemical
SITE COORDINATES	Latitude S26.5530 Longitude S29.16484
SIGNED	Estelle Marais Signed:  28/08/2014
APPROVER	Francois Malherbe Signed:  28/08/14

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ACRONYMS

The following abbreviations appear in this report:

AEL	Atmospheric Emission License
CO	Carbon monoxide
CO ₂	Carbon dioxides
GHG	Greenhouse gas
IPCC	International Panel of Climate Change
NH ₃	Ammonia
NO _x	Nitrogen oxides
NO ₂	Nitrogen dioxide
NO	Monoxide of Nitrogen
PM	Particulate Matter
S21 MES	Minimum Emission Standards Section 21 (NEM:AQA Act 39 of 2004)
SCI	Sasol Chemical Industries
SCO	Secunda Chemical Operations
SO ₂	Sulphur dioxides
US EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

1. INTRODUCTION

Annual reporting on the point source emissions is a requirement listed in the Atmospheric Emission License for Secunda Synfuels Operations (SSO).

As per the requirements, the annual compliance monitoring program on point sources was conducted between 7 February and 23 July 2014. Isokinetic and inorganic gas emissions monitoring were done by an independent service provider. No formal accreditation system / body currently exists for stack sampling in South Africa, as such SGS are not accredited, however all emissions monitoring performed over the reporting period was conducted in accordance with the prescribe tests method in S21 MES.

Section 3 of this document summarises the emissions measured compared to the maximum emission rates as per the Atmospheric Emission License.

2. SERVICE PROVIDERS

In accordance with Section 21 (GN 893:2013), SGS South Africa is the independent company who did the necessary emissions testing for Sasol on which the results / reports are based. The results from the sampling campaign are presented in section 3 of this report.

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, SO₂, NO₂, 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

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

3. RESULTS

3.1 POLLUTANT EMISSIONS

Table 3.1.1: Pollutant emissions (under normal operating conditions)

Point source	Volumetric flow rate (Nm ³ /h)	Pollutant	Mass flow (kg/h)	Concentration (mg/Nm ³)	Limit value on AEL	Sampling method	Sampling Date
B1 (U43): Main Stack West ²	Not measured [Note 2]	PM	Not measured [Note 2]	Not measured [Note 2]	180 mg/Nm ³	US Method 17	Not measured [Note 2]
B2 (U243): Main Stack East	6815621	PM	48,7	66,3 mg/Nm ³	180 mg/Nm ³	US Method 17	16-Apr-14
Rectisol West: Off gas to Main Stack	Refer to graph 3.1.3 & 3.1.4	H ₂ S (measured as sulphur)	Refer to graph 3.1.3 & 3.1.4		13.5 ton/hr (daily)	Mass balance	Daily
					10.5 ton/hr (monthly)		
Rectisol East: Off gas to Main Stack	Refer to graph 3.1.3 & 3.1.4	H ₂ S (measured as sulphur)	Refer to graph 3.1.3 & 3.1.4		13.5 ton/hr (daily)	Mass balance	
					10.5 ton/hr (monthly)		
CM1 (West Kiln Stack)	10455	PM	0,4	32,9 mg/Nm ³	100 mg/Nm ³	US Method 5	23-Jul-14
CM2 (West Arc Furnace Stack)	168211	PM	5,3	31,4 mg/Nm ³	100 mg/Nm ³	US Method 5	7-Feb-14

² Main Stack West was not sampled due to plant operational issue encountered during FY14; the sampling campaign is rescheduled for FY15.

Point source	Volumetric flow rate (Nm ³ /h)	Pollutant	Mass flow (kg/h)	Concentration (mg/Nm ³)	Limit value on AEL	Sampling method	Sampling Date
CM3 (East Kiln A Stack)	33906	PM	1,0	16,9 mg/Nm ³	100 mg/Nm ³	US Method 5	12-Feb-14
CM4 (East Arc Furnace Stack)	129022	PM	4,0	37,3 mg/Nm ³	100 mg/Nm ³	US Method 5	14-Feb-14
CM5 (East Kiln B Stack) ³	Not reported [Note 3]	PM	Not reported [Note 3]	Not reported [Note 3]	100 mg/Nm ³	US Method 5	13-Feb-2014
WA1 (052 WK-2102)	25794	PM	1,5	45,8 mg/Nm ³	120 mg/Nm ³	US Method 5	2-Apr-14
WA2 (052 WK-2202)	61707	PM	4,1	56,1 mg/Nm ³	120 mg/Nm ³	US Method 5	13-Jun-14
WA3 (252 WK-2102) ⁴	Not reported [Note 4]	PM	Not reported [Note 4]	Not reported [Note 4]	120 mg/Nm ³	US Method 5	18-Mar-14
WA4 (252 WK-2202)	75105	PM	4,1	104,7 mg/Nm ³	120 mg/Nm ³	US Method 5	20-June-14
SCC5, Stack ⁵	140000	PM	39,3	246,4 mg/Nm ³ [Note 5]	100 mg/Nm ³	US Method 17	5-Nov-13

³ The sampling results for Catalyst Manufacturing (East Kiln B Stack) are not reported due to the fact that the plant was unstable during the sampling tests.

A resampling is scheduled for FY15; the results of the resampling tests will be reported in the next annual emission report.

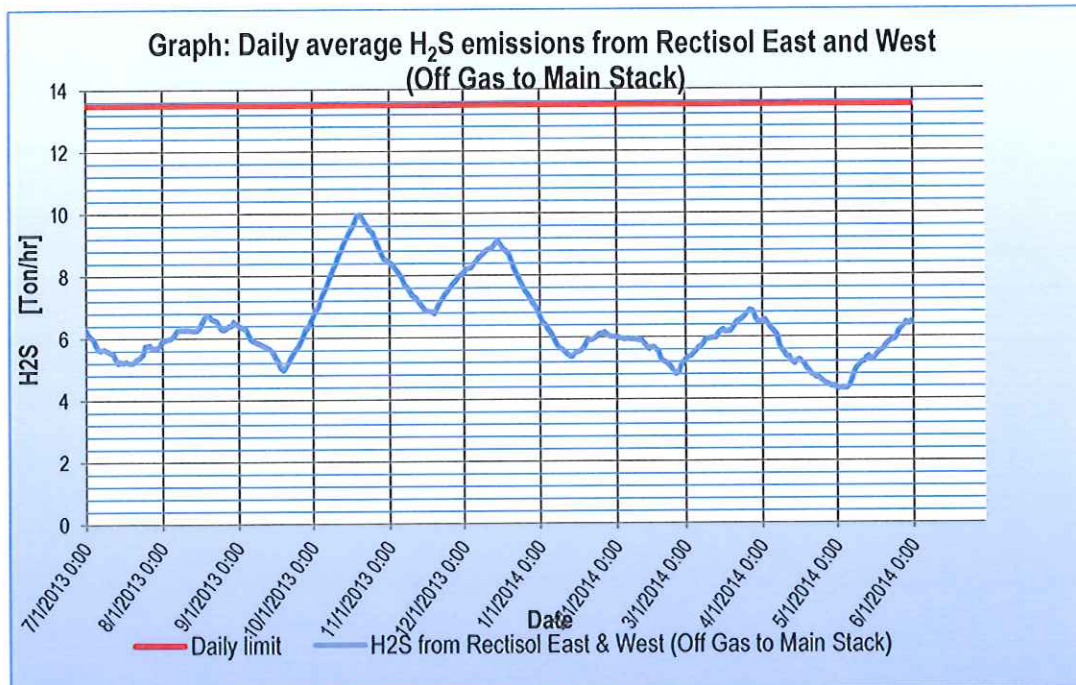
⁴ The sampling results for Water and Ash (Unit 252 WK-2102 Stack) are not reported due to the fact that the plant was unstable during the sampling tests.

A resampling is scheduled for FY15; the results of the resampling tests will be reported in the next annual emission report.

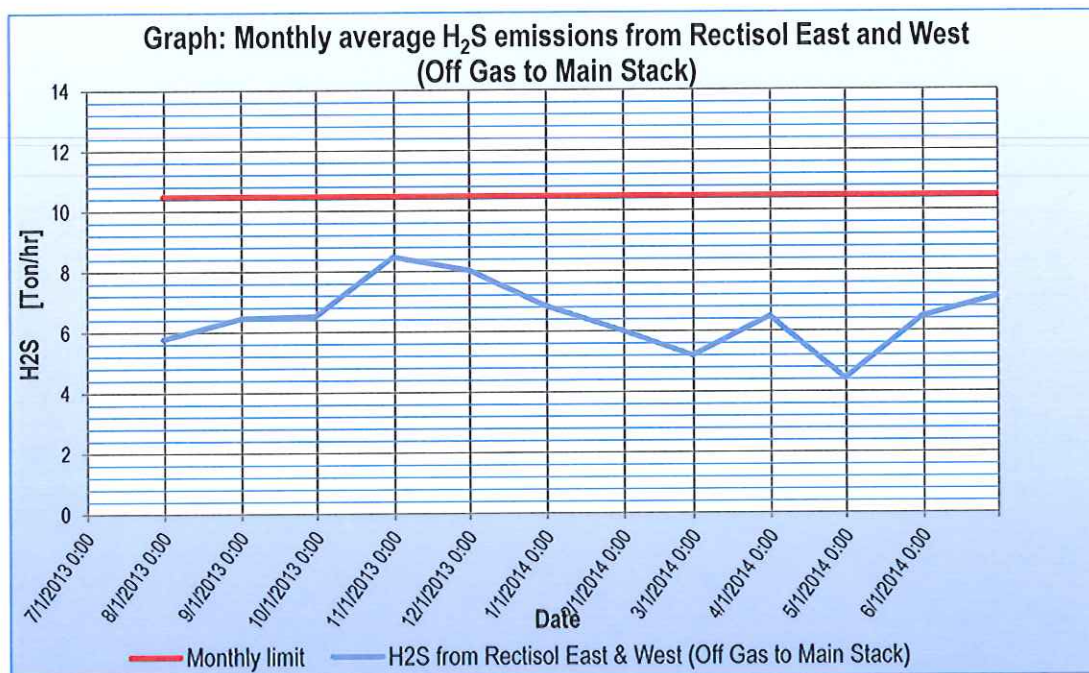
⁵ The reported sampling results exceed the limit set in Synfuels AEL for the SCC stack, however it should be noted that it was communicated to the licensing officer that a variation application will be submitted to Gert Sibande Municipality in this regard.

Point source	Volumetric flow rate (Nm ³ /h)	Pollutant	Mass flow (kg/h)	Concentration (mg/Nm ³)	Limit value on AEL	Sampling method	Sampling Date
HOW1 (052 CI-101)	78341	SO ₂	<0,06	<0,5	17 ton/year	US EPA Method 7E	11-April-14
	78341	NO _x expressed as NO ₂	1,5	6239,8 m ³ /year	7002 m ³ /year	US EPA Method 7E	11-April-14
HOW1 (252 CI-101)	66375	SO ₂	<0,06	<0,5	17 ton/year	US EPA Method 7E	25-March-14 26-March-14
	66375	NO _x expressed as NO ₂	0,5	2294,8 m ³ /year	7002 m ³ /year	US EPA Method 7E	25-March-14 26-March-14

Graph 3.1.1: Daily average H₂S emission from Rectisol East and West (off gas to main stack)



Graph 3.1.2: Monthly average H₂S emissions from Rectisol East and West (off gas to main stack)



3.2 COMPLIANCE AUDIT REPORTS

No compliance audit has been completed for the Atmospheric Emission License of Synfuels as yet. This is planned for the 2015 Sasol financial year (FY15). Related findings will be included in the next annual emission report.

3.3 MAJOR UPGRADE PROJECTS

Table 3.3.1: Major upgrades projects for Synfuels

Project description	Planned completion date	Status
Reduction of fugitive emissions by the implementation of a Leak Detection and Repair (LDAR) Program	In progress	Phase 1 (baseline measurements and database inventory) was completed in December 2012. The quantifying of emission reduction is in progress and update on the status is expected by November 2014.
Short term tar unit debottlenecking (STUD): Installation of a bypass system to prevent light oil from entering the forced feed evaporator at Coal Tar Filtration plant	Completed in November 2010	Project audited - 1450 ton BTX vapour reduction per annum

3.4 GREENHOUSE GAS EMISSIONS

Table 3.4.1: GHG emissions

GHG emissions from SSO: Synfuels Plant	
Total Direct CO ₂ equivalent emissions (Kilo ton)	48 250,36

The CO₂ equivalent is based on the Global Warming Potential as per requirements of IPCC 2nd assessment report.

4. NON COMPLIANCE

With exception of SCC main stack, the sampling results from the independent service provider indicated that the remaining Synfuels sampling sources tested under normal operating conditions are in compliance with the current AEL limits.

As communicated with the licensing officer, a variation application will be submitted to Gert Sibande Municipality for the SCC main stack.

5. CONCLUSIONS

Based on the sampling results for the campaign conducted by the independent service provider between 7 February and 23 July 2014, it is hereby concluded that with exception of the SCC main stack, Synfuels plant is in compliance with the current AEL limits for the rest of the sampling sources.