SASOL'S POLLUTION PREVENTION PLAN SUBMISSION

COMPANY NAME:

Sasol South Africa (Pty) Limited (which includes our CTL/GTL and Chemical operations) and Sasol Mining (Pty) Limited

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1. INTRODUCTION

Sasol is an international integrated energy and chemicals company. In South Africa, at the heart of our business proposition is the ability to locally beneficiate hydrocarbon feedstocks to produce a range of product streams, including liquid fuels, chemicals and lower-carbon electricity – an ability that results from a highly integrated system of production assets structured around our core Secunda and Sasolburg facilities.

Our Secunda, Sasolburg and joint venture facilities have been consciously and increasingly integrated over time, as a result of efforts to enhance production efficiencies, energy efficiency, and the 2004 conversion of our Sasolburg facility to natural gas, coupled with growth in production levels on natural gas in Secunda. Integration has yielded benefits in the form of enhanced productivity of assets as evident in our greenhouse gas (GHG) emissions profile that is below our pre-2004 emission levels, despite having grown production since then.

This pollution prevention plan has been complied in relation to Sasol's approved voluntary growth carbon budget of 302 million tons (Mt) of carbon dioxide emission equivalents as issued by the Department of Environmental Affairs ("the Department").

2. DESCRIPTION OF PRODUCTION PROCESSES

2.1. Production of liquid fuels and chemicals from coal or gas

Our Secunda operation is the world's only commercial coal and gas based synthetic fuels manufacturing facility, producing synthetic gas (syngas) primarily from low-grade coal, with a much smaller portion of feedstock being natural gas.

The coal to liquids (CTL) process involves a series of chemical reactions, collectively known as "gasification", which converts solid coal, water (in the form of steam) and oxygen into a raw (or unpurified) synthesis gas (syngas), comprising mainly of carbon monoxide (CO), carbon dioxide (CO_2) and hydrogen (H_2). The raw syngas is cleaned at a Rectisol plant to remove impurities for downstream production processes. After Rectisol, the cleaned pure syngas is sent to the SAS™ reactors. The process uses Sasol's advanced high temperature Fischer-Tropsch technology to convert the syngas into a range of synthetic fuel components, heating fuels (including industrial pipeline gas), ammonia and chemical feedstock for downstream chemical production facilities.

Our Sasolburg facility operates auto thermal reformers (ATRs), which reforms natural gas from Mozambique, into synthesis gas (also comprising carbon monoxide and hydrogen) for downstream production activities including the production of waxes, polymers and chemicals.

Steam is a critical industrial process input in both the Secunda CTL and Sasolburg gas-based processes. Process steam must be available at the right quality, in terms of temperature and pressure, and in the right quantity at all processes where steam is required, at all times. To meet these exacting steam requirements each operation runs a number of coal-fired boilers, including redundancy capacity, which enables both planned and unplanned disruptions to steam generation to be managed without compromising the supply of steam to users across the production process. In the case of the Sasolburg facility, some of the steam produced from Sasol's boilers is also sold to our joint venture and third party customers, who use the steam as an input to their own production activities.

2.2. Ammonia Production

Sasol operates two ammonia production facilities in Sasolburg and Secunda. In Secunda, ammonia is produced as a co-product from the gasification of coal. Direct GHG emissions associated with ammonia production at the Secunda site are not separated from the overall site GHG emissions and an allocation has not historically been made to the Chemicals sector.

By contrast, in Sasolburg the ammonia is produced via a conventional synthesis process attached to an unconventional production set-up. Natural gas reforming is used to produce synthesis gas for a variety of applications and lies upstream of the ammonia battery

limit. The feed gas to the ammonia plant is in fact the tail gases of a range of Fischer Tropsch production facilities and is rich in CO_2, CO and H_2, which is converted to ammonia. Additional CO_2 is produced as a product of the water-gas shift reaction, and is removed by Benfield absorption. Given the importance of the water shift reaction and its subsequent removal of CO_2, the Sasolburg Benfield CO_2 emissions have historically been allocated to the Chemicals sector.

2.3. Nitric Acid Production

Sasol operates two nitric acid plants in Sasolburg and Secunda. The Secunda plant is designed as a dual pressure process and the Sasolburg plant a medium pressure process. The production of nitric acid produces nitrous oxide (N_2O). Our nitric acid facilities are net producers of steam and therefore do not have requirements for fuel.

2.4. Coal Mining

Sasol Mining operates seven underground coal mines that supply feedstock for our Secunda and Sasolburg complexes. Our mining operations are at Bosjesspruit, Brandspruit, Middelbult, Syferfontein, Impumelelo and Twistdraai (all in the Secunda area) and Mooikraal Mine (near Sasolburg). The mining of coal results in methane emissions with the use of diesel for transportation as well as electricity in mine ventilation and illumination. Methane release is an inherent part of the mining process.

3. TYPE OF GREENHOUSE GAS GENERATED FROM EACH PRODUCTION PROCESS

Production Process	Type of Greenhouse Gas Generated		
	CO_2	CH_4	N_2O
Production of liquid fuels and chemicals from coal or gas: *fuel combustion*	Yes	No however is reported only as part of the GHG Inventory as per IPCC requirements	No however is reported only as part of the GHG Inventory as per IPCC requirements
Production of liquid fuels and chemicals from coal or gas: *fugitive emissions*	Yes	Yes	No
Ammonia Production	Yes	Yes	No
Nitric Acid Production	No	No	Yes
Coal Mining	Yes	Yes	No

4. GREENHOUSE GAS EMISSIONS FOR 2015 & 2016

Production Process	Type of Greenhouse Gas Generated in 2016			
	CO_2	CH_4	N_2O	Total (kt CO_2e)
Production of liquid fuels and chemicals from coal or gas: *fuel combustion*	29 357	0	0	29 357
Production of liquid fuels and chemicals from coal or gas: *fugitive emissions*	24 691	96	0	26 899
Ammonia Production	242	6	0	379
Nitric Acid Production	0	0	0.5	145
Coal Mining	16	3	*0*	92
Waste	210	4	0	298
Total in kt CO_2e in 2016 (rounded to nearest whole number)				**57 170**
Production Process	**Type of Greenhouse Gas Generated in 2015**			
	CO_2	CH_4	N_2O	Total (kt CO_2e)
Production of liquid fuels and chemicals from coal or gas: *fuel combustion*	30 412	0	0	30 412
Production of liquid fuels and chemicals from coal or gas: *fugitive emissions*	24 488	96	0	26 696
Ammonia Production	273	8	0	456
Nitric Acid Production	0	0	0.4	130
Coal Mining	20	7	0	173
Waste	300	4	0	389
Total in kt CO_2e in 2015 (rounded to nearest whole number)				***58 256***

**This data is based on best available information as at October 2017. Through on-going data optimisation processes, the level of residual uncertainty, over time, has reduced and is likely to continue to reduce.*

5. METHODOLOGY FOR GREENHOUSE GAS CALCULATIONS

5.1. Fuel Combustion (IPCC: 1A1c)

Sasol applies a mass balance approach to calculating its emissions associated with our fuel combustion and energy operations. A Tier 3 approach is applied.

Calculations are based on the results of measurement devices which have inherent measurement uncertainty. Regular calibrations and verifications occur to reduce the uncertainty and quality checks and balances are built into the mass balances to ensure as accurate as possible calculations.

5.2. Fugitive emissions from fuels (IPCC: 1B3)

Sasol reports emissions associated with gas production and clean-up under the Energy Sector. These process emissions are calculated utilising a stoichiometric / mass balance approach, representing a Tier 3 approach.

5.3. Ammonia Emissions (IPCC: 2B1)

The emissions associated with ammonia production are determined by means of continuous online monitoring with a subsequent flow and mass balance calculating the CO_2e released via the Benfield unit and hence falls into the category of Tier 3.

5.4. Nitric acid emissions (IPCC: 2B2)

Nitric acid production emissions have been determined through the development of emission factors based on stack emissions and production rates. Sasol's emissions are reported on a Tier 3 approach through continuous measurement.

5.5. Coal Mining (IPCC: 1A2i and 1B1ai)

Fugitive emissions are calculated according to the Tier 2 methodology which is based on country specific emission factors. The factors represent the average values for the coal being mined by Sasol.

4. MITIGATION INTERVENTIONS

Limited opportunities exist to directly influence the GHG intensity of the CTL sector operations. CO_2 originates from chemical and combustion reactions and prohibitive costs will prevent a major change in the flow scheme. However, energy efficiency is being employed as a vehicle to help facilitate the reduction in greenhouse gas intensity.

Pre 2014, a number of process improvement projects were implemented as part of the sector's growth programme and provided GHG reduction benefits. These projects are mentioned hereunder but we do not include them in the table below.

- Pressure Swing Adsorption (PSA) efficiency improvement;
- Recovery of ethane and heavier hydrocarbons (C2+) from natural gas;
- Installation of additional gas heat exchange reactors;
- Surge capacity for storage of polymer-grade propylene with a reduction in propylene flaring; and
- Heat pump installation at Syferfontein Mine.

GHG reduction initiatives based on economics and timelines as at December 2017:

Mitigation measure *(note1)*	**Description of mitigation measure**	**Anticipated implement-ation date**	**Assumptions used to estimate anticipated GHG emission reduction**	**Affected GHG**	**Anticipated emission reduction (kt CO_2e)**					
					2016	**2017**	**2018**	**2019**	**2020**	**Total over 5 years**
Sasolburg Gas Engine Power Plant - Heat Integration Project	Heat integration utilising waste heat from engines.	Installed in 2015	65.6 ton/h steam at a pressure of 26.5 barg.	Direct CO_2	82					
Propylene Expansion *(note 2)*	Upgrading capacity to utilise additional propylene from Secunda.	Installed in 2016	Based on 6000t/a flaring reduction.	Direct CO_2	9					
Fuel use management	Installed a system to better manage fuel consumption at Sasol Mining.	Installed in 2015	Reduced use of diesel for transportation.	Direct CO_2	1					
Total Direct GHG Reduction (kt CO_2e rounded to nearest whole number)					**92**					

Energy improvement roadmap *(note 3)*	Aims to deliver sustained improvements in energy efficiency. The impact of initiatives is measured against a baseline.	Progressive increase toward December 2020 target completion date	Estimated based on targeted steam and electricity savings.	Indirect CO_2	270					
Vinyl Chloride Monomer energy saving project *(note 2)*	Installation of variable speed drives and energy efficiency improvements to fans, pumps and blowers.	Installed in 2015	Electricity savings.	Indirect CO_2	2.1					
Fan replacement	Replacement of 37 kW Force fans with 22 kW Force fans throughout Sasol Mining.	Installed in 2015	Electricity savings.	Indirect CO_2	11					
Total Indirect GHG Reduction (kt CO_2e rounded to nearest whole number)					**283**					
Total GHG Reduction Anticipated (kt CO_2e rounded to nearest whole number)					**375**					**3159**

Note 1: GHG reduction from 2014 baseline per year; reductions are not additive
Note 2: Project is still in ramp-up; GHG reductions are currently estimated
Note 3: The energy efficiency roadmap consists of various operational improvements as well as capital projects and initiatives. While the roadmap has been approved in principle, not all initiatives within the roadmap have been fully assessed. Indicative target values are included for 2018 onwards which may be revised in the annual progress report submissions.