Final Motivation for Additional Postponement of Compliance Timeframes in terms of Regulation 11 of the Section 21 NEM:AQA Minimum Emissions Standards

For Public Comment

Report Prepared by

December 2014

Final Motivation for Additional Postponement of Compliance Timeframes in terms of Regulation 11 of the Section 21 NEM:AQA Minimum Emissions Standards

For Public Comment

Sasol Chemical Industries (Pty) Limited operating through its Sasolburg Operations, formerly Sasol Infrachem, a division of Sasol Chemical Industries (Pty) Limited

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December 2014

Executive Summary

This is an application in terms of Regulation 11 of Government Notice No. 893 in Government Gazette 37054 of 22 November 2013 ("GN 893") for the postponement of the compliance timeframes set in Regulations 9 and 10 of GN893. This application was previously submitted to the Minister of Environmental Affairs as an application for exemption. The application for exemption was made in terms of Section 59 of the National Environmental Management: Air Quality Act (Act No. 39 of 2004) (NEM:AQA) for an exemption from the default application of certain Minimum Emissions Standards (MES) published in Government Notice No. 893 in Government Gazette 37054 of 22 November 2013 ("GN 893"), for certain point sources at Sasol Infrachem, a division of Sasol Chemical Industries (Pty) Limited, that are unlikely to comply for key reasons. A copy of the exemption application was also provided to the National Air Quality Officer.

After the conclusion of the public commenting process, Sasol was directed to rather seek postponement from the compliance timeframes in the MES to address its challenges. Consequently the exemption application was submitted as a postponement application to the National Air Quality Officer, for the postponement of compliance timeframes for existing plant standards that come into effect on 1 April 2015. For the purposes of clarity, we refer to this application as the "additional postponement application" to distinguish it from the exemption application previously submitted to the Minister as well as to distinguish it from the final postponement applications submitted by Sasol to the DEA on 30 September 2014 ("the initial postponement applications"). In an effort to ensure this process is transparent and that stakeholders were given a fair opportunity to make representations, Sasol conducted a further notice and comment process. All comments received during comment period on the draft additional postponement applications have been included in the updated Comment and Response Report.

While this additional postponement application contains materially the same content as the exemption application, was, prior to being made available for further comment, updated in four respects. First, based on the stakeholder comments received during the public participation process, Sasol has updated some aspects of the applications. Secondly, Sasol is in the process of restructuring its corporate structure and so the Introduction has been updated to explain those changes. Thirdly, Sasol has updated this report's Chapter 7, now entitled "Sasol's roadmap to sustainable air quality improvement". This is done to consolidate information presented throughout this application to emphasise Sasol's actions toward sustainable air quality improvement, aligned with the intent of the NEM:AQA and the MES, including Sasol's commitment to the ongoing investigation of and, where feasible, implementation of sustainable compliance solutions. Lastly, the stakeholder engagement chapter reflects the further commenting period linked to this application.

Sasol Infrachem proposes alternative emissions limits and alternative special arrangements to be incorporated as licence conditions in place of the MES operating automatically during the period of the postponement.

The intended purpose of the alternative emissions limits and alternative special arrangements is to define the proposed licence conditions with which Sasol must comply for the duration of the postponement period. These proposed licence conditions have been established based on what is considered reasonable and achievable in the light of the assessments done by Sasol Infrachem's independent consultants, and are based on the information and technologies currently available to Sasol Infrachem. Sasol Infrachem does not seek to increase emission levels relative to its current emissions baseline through this application. The alternative emissions limits and alternative special arrangements proposed by Sasol have been informed by independent specialist air quality studies on the basis that these limits do not affect ambient air quality beyond the NAAQS, which have as their overarching objective, ambient air quality that is not harmful to human health or well-being.

Furthermore, these proposed limits and arrangements are aligned with the National Framework for Air Quality Management in that the technologies utilised to deliver pollution controls are technically possible and incurred at a cost which is acceptable to society in the long-term and the short-term.

This application is made in terms of Regulation 11 of GN 893 which entitles a person to apply in writing to the National Air Quality Officer for a postponement from the compliance timeframes set out in Regulations 9 and 10.

Regulation 12 prescribes that an application for a postponement must include –

a) An air pollution impact assessment compiled in accordance with the Regulations prescribing the format of an Atmospheric Impact Report (as contemplated in Section 30 of the NEM:AQA) by a person registered as a professional engineer or as a professional natural scientist in the appropriate category.
b) A detailed justification and reasons for the application.
c) A concluded public participation process undertaken as specified in the NEMA Environmental Impact Assessment Regulations.

Regulation 13 limits the period for which a postponement may be granted to 5 years per postponement.

This application complies with Regulations 12 (a) and (b). An Atmospheric Impact Report has been included as well as an independent peer review report on the modelling methodology employed in the Atmospheric Impact Report. The detailed justification and reasons are included and have been supplemented by a technical appendix outlining technology investigations with respect to the selected point sources which are the subject of this application.

With regards to compliance with Regulation 12 (c), a public participation process was undertaken as specified in the NEMA Environmental Impact Assessment Regulations when the exemption application was submitted. In addition, a further public commenting period was provided to allow, in particular, comments on the fact that this is no longer an exemption application but is now a postponement application.

Sasol respectfully requests these additional five year postponements of the compliance timeframes for various existing plant standards and associated special arrangements for Sasol Infrachem.

Progress on advancing air quality improvement roadmaps during the past year

The stakeholder engagement process on Sasol Infrachem's applications was initiated in September 2013, some 15 months ago. As discussed in Section 7.4, over this period, and independently to the postponement application process, work on implementing the air quality improvements outlined in Chapter 7 and the associated technical appendix to this application has been ongoing, aligned with Sasol's project development and governance process. A high level overview is provided on the progress achieved in these 15 months.

- Capital applications were advanced for the implementation of continuous emissions monitoring at the steam plants and incinerators;
- Pilot trials with the cement industry continued to explore the viability of diverting certain waste streams away from incinerators towards beneficial use, aligned with the waste hierarchy;
- The project development and governance process was progressed for the upgrade of electrostatic precipitators at Steam station 2 in line with the general overhaul schedule of the boilers;
- An update on Sasol Infrachem's plans to meet its VTAPA commitment was presented to the Sasolburg Implementation Task Team and Vaal Triangle Priority Area Multi Stakeholder Reference Group in November 2014, and project governance processes will be advanced on this basis, in order to achieve these commitments by the required date of July 2019. As part of

the solution tabled Sasol will further continue to investigate optimised solutions that could ensure emission load reduction on NOx and SO_2 emissions;

- Sasol's pilot retrofitting offset study, initiated within Zamdela, was advanced, and detailed analysis of results are under way, to better understand the potential of offsets as a sustainable indoor and ambient air quality improvement intervention, to inform Sasol's inputs to air quality offset policy development.
- Sasolburg's Eco-Park ambient air quality monitoring station was ISO/IEC 17025 accredited as well as the newly installed PM2.5 dust analysers installed in Sasol's residential monitoring stations in Sasolburg;
- The Leitrim ambient air quality monitoring station was successfully relocated to a more secured area where electrical power supply is more consistent as to increase the data availability from the ambient air quality monitoring station following a double burglary as well as various power outages.
- Sasolburg's ambient air quality monitoring network received continued ISO/IEC 17025 accreditation and continues to provide invaluable information aimed at informing Sasol's atmospheric impact work and subsequent mitigation strategies;
- Sasol's fallout dust monitoring network around its Sasolburg operations continues to operate in an industrial area, predominantly, within residential area limits according to the Fallout Dust Regulations specifications.

Table of Contents

List of Tables

List of Figures

Glossary

Definitions of terms as per GN 893, that have relevance to this application:

Existing Plant - any plant or process that was legally authorized to operate before 1 April 2010 or any plant where an application for authorisation in terms of the National Environmental Management Act 1998 (Act No.107 of 1998), was made before 1 April 2010.

Fugitive emissions - emissions to the air from a facility, other than those emitted from a point source.

New Plant - any plant or process where the application for authorisation in terms of the National Environmental Management Act 1998 (Act No.107 of 1998), was made on or after 1 April 2010.

Point source - a single identifiable source and fixed location of atmospheric emission, and includes smoke stacks.

Point of compliance – means any point within the off gas line, where a sample can be taken, from the last vessel closest to the point source of an individual listed activity to the open-end of the point source or in the case of a combination of listed activities sharing a common point source, any point from the last vessel closest to the point source up to the point within the point source prior to the combination/interference from another Listed Activity.

Definitions of terms as per the NEM:AQA that have relevance to this application:

Priority area - means an area declared as such in terms of Section 18.

Priority area air quality management plan - means a plan referred to in Section 19.

Additional terms provided for the purpose of clarity in this application:

Additional postponement applications – Sasol submitted draft applications for exemption in terms of Section 59 of NEM:AQA from certain MES, along with draft applications for postponement from certain MES. These exemptions were motivated on the basis that the applicable standards were presently infeasible based on, amongst others, technology, brownfields, environmental and economic constraints. Since the conclusion of the public commenting process, Sasol has been directed to rather seek postponement from the compliance timeframes in the MES to address its challenges. Consequently the exemption application will instead be submitted as a postponement application, in addition to its existing postponement applications which have already been submitted to the National Air Quality Officer. Sasol now therefore makes application for postponement in respect of those applications which were previously submitted, advertised and made available for public comment, as exemption applications. These are referred to herein as *additional postponement applications*.

Alternative emissions limits – the standard proposed by Sasol based on what is considered reasonable and achievable as a consequence of the assessments conducted and which Sasol proposes as an alternative standard to be incorporated as a licence condition with which it must comply during the period of postponement. The alternative emissions limits are specified as *ceiling emissions limits* or *maximum emission concentrations*, as defined in this Glossary. In all instances, these alternative emission limits seek either to maintain emission levels under normal operating conditions as per current plant operations, or to reduce current emission levels, but to some limit which is not identical to the promulgated minimum emissions standards. Specifically, these alternative emissions limits do not propose an increase in current average baseline emissions.

Atmospheric Impact Report - in terms of the Minimum Emission Standards an application for postponement must be accompanied by an Atmospheric Impact Report as per Section 30 of NEM:AQA. Regulations Prescribing the Format of the Atmospheric Impact Report (AIR) were published in Government Notice 747 of 2013).

Ambient standard - The maximum tolerable concentration of any outdoor air pollutant as set out in the National Ambient Air Quality Standards in terms of Section 9(1) of the NEM:AQA.

Ceiling emissions limit – Synonymous with "maximum emission concentrations". The administrative basis of the Minimum Emissions Standards is to require compliance with the prescribed emission limits specified for existing plant standards and new plant standards under all operational conditions, except shut down, start up and upset conditions, based on daily average concentrations as defined in Part 2 of the MES. Whereas average emission values reflect the arithmetic mean value of emissions measurements for a given process under all operational conditions over a 3 year period, the ceiling emission would be the highest daily average emission concentration obtained. Hence, ceiling emission values would be higher than average emission values, and the difference between ceiling and average values being dependent on the range of emission levels seen under different operational conditions. Since the Minimum Emissions Standards specify emissions limits as ceiling emissions limits or maximum emission concentrations, Sasol Infrachem has aligned its alternative emissions limits with this format, to indicate what the 100^{th} percentile emissions measurement value would be under any operational condition (excluding shut down, start up and upset conditions). It is reiterated that Sasol Infrachem does not seek to increase emission levels relative to its current emissions baseline through its additional postponement applications and proposed alternative emissions limits (specified as ceiling emission limits), but rather proposes these limits to conform to the administrative basis of the Minimum Emissions Standards.

Criteria pollutants – Section 9 of NEM:AQA provides a mandate for the Minister to identify a national list of pollutants in the ambient environment which present a threat to human health, well-being or the environment, which are referred to in the National Framework for Air Quality Management as "criteria pollutants". In terms of Section 9, the Minister must establish national standards for ambient air quality in respect of these criteria pollutants. Presently, eight criteria pollutants have been identified, including sulphur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), carbon monoxide (CO), lead (Pb), particulate matter (PM_{10}), particulate matter ($PM_{2.5}$), benzene (C_6H_6). In this document, any pollutant not specified in the National Ambient Air Quality Standards (.NAAQS.) is called a "non-criteria pollutant".

Existing plant standards - The emission standards which existing plants are required to meet. Emission parameters are set for various substances which may be emitted, including, for example, particulate matter, nitrogen oxides and sulphur dioxide.

Initial postponement applications – Consequent upon the first round of public participation which took place in September 2013, Sasol's draft applications for postponement in terms of Regulations 11 and 12 of GN 893 were made available for public comment in April 2014. These applications are referred to in this motivation report as *initial postponement applications*, and the final versions have been submitted to the NAQO. Copies of these documents are also available on SRK's website.

Listed activity - In terms of Section 21 of NEM:AQA, the Minister of Environmental Affairs has listed activities that require an atmospheric emissions licence. Listed Activities must comply with prescribed emission standards. The standards are predominantly based on 'point sources', which are single identifiable sources of emissions, with fixed location, including industrial emission stacks.

Maximum emission concentrations – Synonymous with “ceiling emissions limits”. Refer to glossary definition for ceiling emissions limits.

Minimum emissions standards – prescribed maximum emission limits and special arrangements for specified pollutants and listed activities. These standards are published in Part 3 of GN 893.

Minister – the Minister of Environmental Affairs.

New plant standards - The emission standards which existing plants are required to meet, by April 2020, and which new plants have to meet with immediate effect. Emission parameters are set for various substances which may be emitted, including, for example, particulate matter, nitrogen oxides and sulphur dioxide.

Postponement – a postponement of compliance timeframes for existing plant standards and new plant standards and their associated special arrangements, in terms of Regulations 11 and 12 of GN 893. In the context of Sasol’s applications, these postponements are referred to as *initial postponements* and *additional postponements*, as defined in this Glossary.

GN 893 – Government Notice No. 893, 22 November 2013, published in terms of Section 21 of the National Environmental Management: Air Quality Act (Act No 39 of 2004) and entitled ‘*List of Activities which Result in Atmospheric Emissions which have or may have a Significant Detrimental Effect on the Environment, Including Health and Social Conditions, Economic Conditions, Ecological Conditions or Cultural Heritage’*. GN 893 repeals the prior publication in terms of Section 21, namely Government Notice No. 248, 31 March 2010. GN 893 deal with aspects including: the identification of activities which result in atmospheric emissions; establishing minimum emissions standards for listed activities; prescribing compliance timeframes by which minimum emissions standards must be achieved; detailing the requirements for applications for postponement of stipulated compliance timeframes.

Sasol Infrachem – Sasol Chemical Industries (Pty) Limited operating through its Sasolburg Operations, formerly Sasol Infrachem, a division of Sasol Chemical Industries (Pty) Limited. To avoid unnecessary confusion, the name “Sasol Infrachem” has been retained in this report.

Special arrangements – any specific compliance requirements associated with a listed activity’s prescribed emissions limits in Part 3 of GN 893. These include, among others, reference conditions applicable to the listed activity prescribed emission limits, abatement technology prescriptions and transitional arrangements

List of Abbreviations

AEL – Atmospheric Emissions Licence

AIR - Atmospheric Impact Report

BAT - Best Available Techniques

CONCAWE – Conservation of Clean Air and Water in Europe (oil companies' European association for environment, health and safety in refining and distribution)

BID - Background Information Document

BREF - Best Available Techniques Reference documents

CRR - Comment and Response Report

CO_2 – Carbon dioxide

EET – Emissions Estimation Technique

ESP – Electrostatic Precipitator

FCC - Fluidized Catalytic Cracker

FGD - Flue-gas desulphurisation

FSS - Fourth Stage Separators

I&APs - Interested and Affected Parties

NAAQS - National Ambient Air Quality Standards

NAQF – National Framework for Air Quality Management

NAQO - National Air Quality Officer

NEMA - National Environmental Management Act (Act 107 of 1998)

NEM:AQA - National Environmental Management: Air Quality Act (Act 39 of 2004)

NO_x – Oxides of nitrogen

NO_2 – Nitrogen dioxide

MES - Minimum Emissions Standards

$PM_{2.5}$ – Particulate Matter with radius of less than 2.5 µm

PM_{10} – Particulate Matter with radius of less than 10 µm

RCD - Residual Crude Desulphurisation

SO_2 - Sulphur dioxide

SRU – Sulphur Recovery Unit

SWS – Sour Water Stripper

TSS -Third Stage Seperators

VOCs or TVOCs – (Total) Volatile Organic Compounds

VTAPA – Vaal Triangle Air-shed Priority Area

1 Introduction

Sasol is an international integrated energy and chemical company that employs more than 34 000 people working in 37 countries. In South Africa, Sasol owns and operates facilities at Secunda in the Mpumalanga Province, Sasolburg in the Free State Province and Ekandustria in Gauteng. The Sasolburg complex is made up of:

- Sasol Mining (Proprietary) Limited, which mines the utilities coal used at Infrachem;
- Sasol Chemical Industries (Pty) Limited, operating through its Sasolburg Operations, including the entity formerly known as Sasol Infrachem ("Sasol Infrachem") which supplies utilities and reformed gas for production of chemicals.
- Sasol Chemical Industries (Pty) Limited, operating through its Sasolburg Operations, including those entities formerly known as Sasol Polymers, Sasol Solvents, Sasol Wax, Merisol and Sasol Nitro, all of which produce a range of downstream chemical products.

Sasol is currently undergoing corporate restructuring which involves consolidating the majority of its operations into a single business, namely, Sasol Chemical Industries (Pty) Limited ("SCI"). However, in order to avoid unnecessary confusion, references to these entities have been kept in this report as previously described. This postponement application relates to Sasol Chemical Industries (Pty) Limited, operating through its Sasolburg Operations, formerly Sasol Infrachem.

In March 2010, the Department of Environmental Affairs (DEA) published Minimum Emissions Standards (MES), in terms of the National Environmental Management: Air Quality Act (NEM:AQA). In November 2013, the Regulations within which the MES were contained, were repealed and replaced by GN893, and this application is therefore aligned with the 2013 MES. The MES serves to define maximum allowable emissions to atmosphere for a defined range of pollutants and specific activities that can generate such emissions. In terms of GN 893, existing production facilities are required to comply with MES prescribed for existing plants by 1 April 2015 (existing plant standards) unless otherwise specified, as well as with MES applicable to new plants by 1 April 2020 ("new plant standards") unless otherwise specified. The MES apply to many of Sasol's activities including those of Sasol Infrachem at the Sasolburg complex.

It is Sasol's intention to comply with the DEA's policies to improve air quality in South Africa. For various reasons that are more fully detailed in this report, however, Sasol Infrachem will not be able to comply with the MES for certain emissions from its Sasolburg operation either within the MES timeframes or for the foreseeable future. Sasol Infrachem is therefore applying for additional postponements for selected emission sources. As part of this application, Sasol Infrachem specifically proposes compliance to alternative emissions limits and alternative special arrangements for the duration of the postponement.

The present application is made in terms of Regulation 11 of GN 893 which entitles a person to apply in writing to the National Air Quality Officer for a postponement from the compliance timeframes set out in Regulations 9 and 10.

As required by Regulation 12, this application therefore includes:

- This motivation report outlining detailed reasons and a justification for the additional postponement application, supplemented with a technical appendix outlining the technologies and constraints considered by Sasol.
- An independently compiled Atmospheric Impact Report (AIR) compiled in accordance with the Atmospheric Impact Report Regulations of October 2013, along with a further independent peer review report on the modelling methodology employed in the AIR.
- A Stakeholder Engagement Report outlining the public participation process that is being conducted in accordance with the NEMA: Environmental Impact Assessment Regulations. This includes a detailed overview of comments received thus far from Interested and Affected Parties, along with Sasol's responses.

This motivation report is accordingly structured to present more detailed information on Sasol Infrachem and associated activities at the Sasolburg complex. Thereafter, the MES are presented in general, together with the specific requirements for activities at Infrachem before the reasons motivating the additional postponement request are presented. In order to demonstrate the implications of the application for ambient air quality the key findings of the stand-alone AIR are then presented. Finally, the motivation report is concluded by summarising the public participation process that has been conducted in support of this application. A technical appendix providing further details on the specifics of each additional postponement request is a further accompanying document to this motivation report.

2 Sasol Infrachem

2.1 Overview

Sasol was established in 1950 and started producing synthetic fuels and chemicals in 1955, from the world's first commercial coal-to-liquids (CTL) complex in Sasolburg. The company privatised in 1979 and listed on the JSE Ltd in the same year. In the late 1970s and early 1980s, Sasol constructed two additional CTL plants at Secunda. Sasol's activities in South Africa are both diverse and yet highly interdependent with main activities at facilities located in Secunda, Mpumalanga and Sasolburg, Free State.

Sasol is well known both locally and internationally for its core activity of converting coal to liquid fuels (known as coal-to-liquids or 'CTL'). What is perhaps less well known is the range of other activities that are built on and around that core CTL process. These various activities serve to maximise the range of products and associated value that can be derived from the basic raw materials that are used in the Sasol process, as well as the provision of so-called utilities (most notably steam) that are critical inputs to the industrial process. Sasol describes its business as one of 'integrated value chains'. By integrated value chains is meant a high degree of integration between all the process units whereby the maximum utility (and thus commercial value) can be derived from the basic material inputs of coal, natural gas, water and air.

2.2 The Sasolburg Complex

The Sasol Infrachem site is located in Sasolburg in the Metsimaholo Local Municipality which is part of the Fezile Dabi District Municipality in the Free State Province. Sasol Infrachem supplies utilities and services (including infrastructure, waste management, site support and site governance) to various Sasol business units (those formerly known as Sasol Polymers, Sasol Solvents, Sasol Wax, Merisol and Sasol Nitro) as well as external businesses in Sasolburg. Sasol Infrachem operates and maintains an auto thermal reformer (ATR), which reforms natural gas into synthesis gas for downstream production activities. As the custodian of the Sasolburg site's gas infrastructure, Sasol Infrachem's primary responsibility is to ensure that the reformed gas demand/supply is balanced and with assurance of supply to gas users on its site.

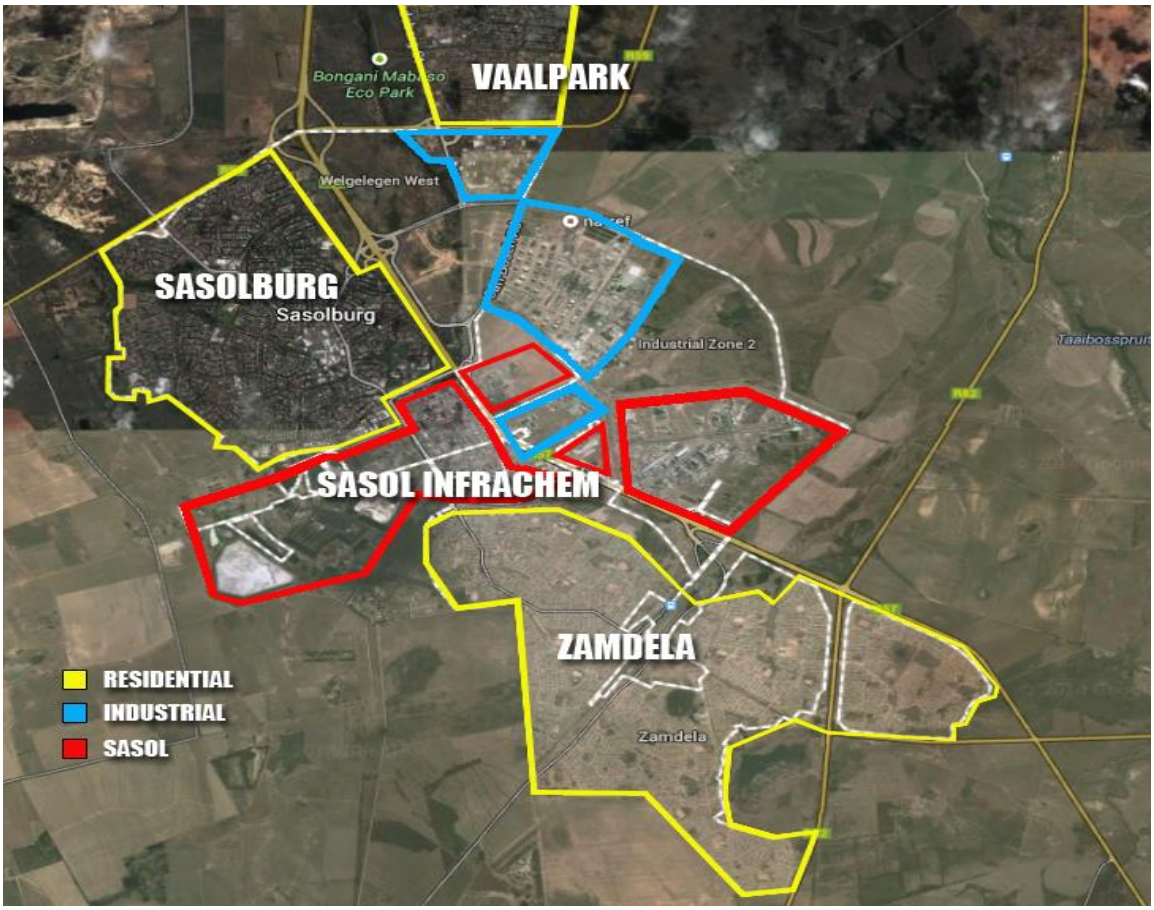

Figure 1: Map showing the position of Sasol Infrachem

2.3 Atmospheric emissions

Sasol Infrachem operations generate a range of atmospheric emissions. The emissions are presented below as a function of the activities and facilities where they are emitted. These sources include steam stations, incinerators and others. These sources are described in the following Section and illustrated schematically in Figure 2.

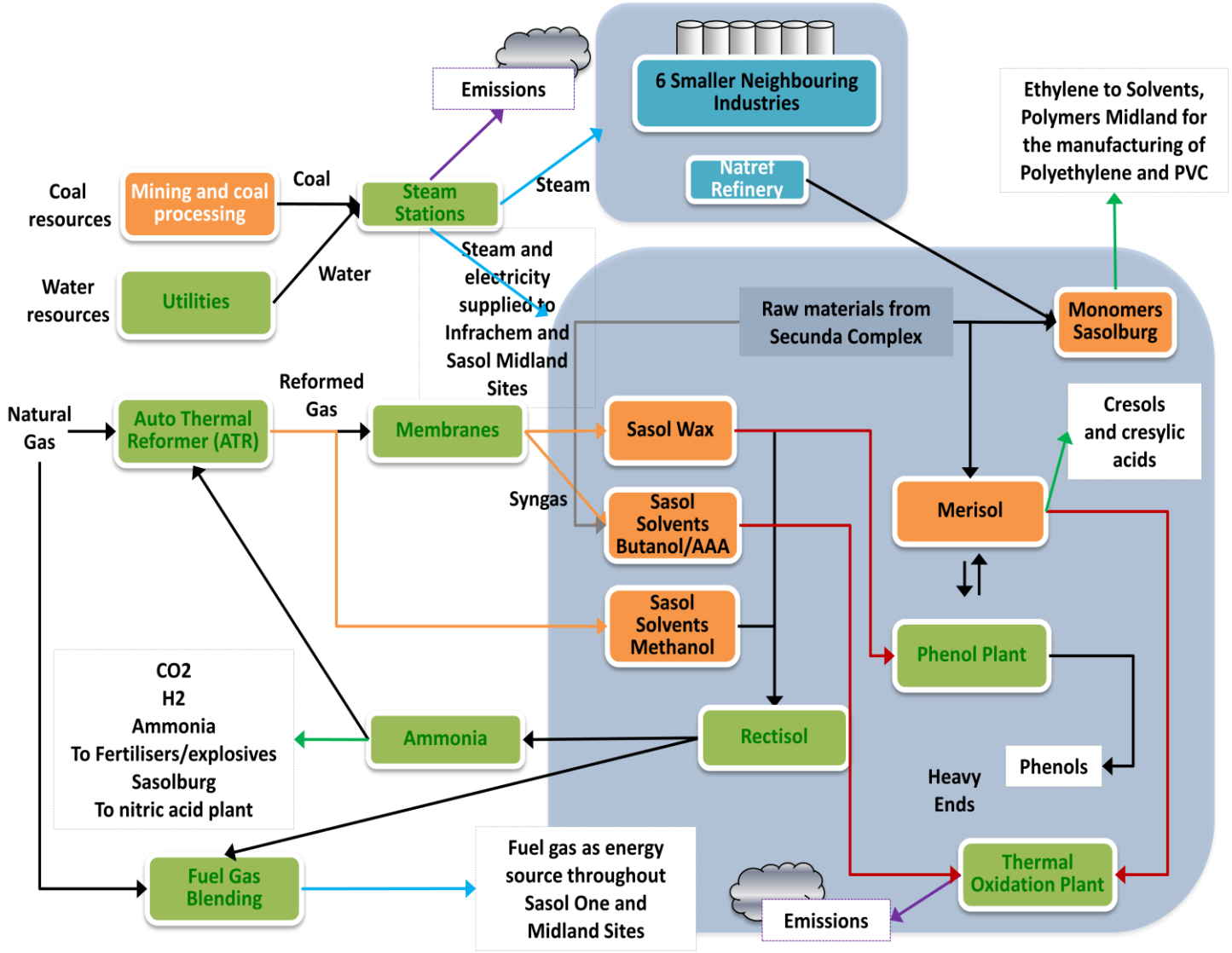

Figure 2: Schematised illustration of the industrial process at Sasolburg

What follows below is a summary of the processes which are the subject of Sasol's applications.

2.3.1 Steam Stations (Steam Station 1 and Steam Station 2)

Steam is a critical industrial process requirement for various businesses within the Sasolburg area, including Sasol business units as well as external customers. Process steam must be available at the right quality (correct temperature and pressure) and quantity (volume of steam demanded) at all times, and at all processes where steam is required. To meet these exacting steam requirements a large fleet of small boilers was built rather than a small fleet of large boilers. The fleet of boilers allows both planned and unplanned disruptions to steam generation to be managed without compromising the supply of steam to users across the complex. Steam and electricity is generated at two Steam Stations. Steam Station 1 is an older station located in close proximity to the Infrachem site while Steam Station 2 is a newer facility located to the east of the Sasol Infrachem facility in close proximity to the steam users it supplies.

Steam Station 1 comprises five boilers and supplies electricity to the Sasolburg complex, allowing the facility to produce electricity for own consumption, and also to supply power in excess of internal demand to the national grid. Steam Station 1 is an integral part of the steam and electricity distribution infrastructure for the Sasolburg complex in critically maintaining the hydraulic and thermal balance of the Sasol Infrachem site and surrounding businesses. Steam Station 2 consists of 7 boilers and in a similar manner supplies steam to various facilities within Sasolburg including Sasol Infrachem and external customers. Steam Station 1 and 2 boiler availability is critical to the production of these facilities. Additional outage time on the boilers means not only a loss in electricity production, but also a direct negative impact on production for these businesses. The integrated nature of the utilities supply to surrounding Sasol business units and external businesses is illustrated by Figure 2.

The atmospheric emissions from the steam stations include PM, SO_2, NO_x and greenhouse gases.

All boiler work, including maintenance and upgrades is driven by a strictly applied general overhaul (GO) schedule, to assure that process steam is not interrupted. The GO schedule is also aligned with other statutory inspections prescribed for pressure vessels. The net effect of the GO schedule is to ensure that boilers are shut down individually in a routine, sequential manner. A single cycle of boiler shutdowns through the entire fleet of Steam Station 1 and 2 boilers takes several years.

2.3.2 Thermal Oxidation

At the Thermal Oxidation plant, waste streams are thermally treated to produce a residue stream that can be safely landfilled. The waste streams treated at Sasol Infrachem's Thermal Oxidation facility originate from three other divisions of Sasol Chemical Industries, namely Sasol Merisol, Sasol Solvents and Sasol Monomers. These facilities can only operate if their waste streams can be addressed, as shown in Figure 2. The safe treatment and ultimate landfilling of these waste streams is critically dependent on the operation of this facility, with the waste streams being oxidised in one of three incinerators:

- B6930 Incinerator – used to incinerate mainly "High Sulphur Pitch" in a limestone fluidised bed unit. The waste stream contains High Sulphur Pitch, Organic solvents and High calorific value organic waters
- B6990 Incinerator - used to incinerate "Heavy ends B". Waste streams containing heavy oils, off-specification waxes, Sasol spent catalyst, Funda filter cake, slop solvents and high calorific value organic waste are incinerated in this incinerator. The flue gas exit temperature of the B6990 incinerator exceeds 200°C. Due to operating conditions on furnace B6990, the

flue gas temperature exceeds viable temperatures for PM, metals, and dioxin/furans sampling (US EPA method 29).

- B6993 Incinerator - used to incinerate “spent Caustic” in a down-fired incinerator.

Emissions from the incinerators could include PM, SO_2, NO_x, CO, HCl, TOCs, dioxins and furans, metals, mercury (Hg), cadmium plus thallium (Cd + Tl), hydrogen fluoride (HF) and ammonia (NH_3). While some of these emissions are high in concentration, the loads (namely quantities released to the environment) are small. Exit gas temperatures of the B6990 incinerator exceed 200°C.

Incinerator B6990 is also the subject of a postponement application, detailed in in the separate Sasol Infrachem postponement motivation report.

3 The Minimum Emissions Standards

3.1 Overview

NEM:AQA is a specific environmental management act as contemplated in the NEMA, and aims to give effect to the Constitutional right to an “environment that is not harmful to health or wellbeing and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”. In this context, therefore, Sasol makes these applications.

The Regulations identifying listed activities and prescribing MES for those activities were made in terms of Section 21 of the NEM:AQA, and promulgated in Government Notice No. 893 on 22 November 2013 (GN 893). Amongst others, Part 3 of the Regulations includes MES, which oblige existing production facilities to comply with certain emission limits and associated special arrangements by 1 April 2015 (“existing plant standards”) unless otherwise specified, as well as with certain emission limits and associated special arrangements applicable to new plants by 1 April 2020 (“new plant standards”) unless otherwise specified. GN 893 includes amongst others, the identification of activities which result in atmospheric emissions; establishing MES for the listed activities; prescribing compliance timeframes by which MES must be achieved; and detailing the requirements for applications for postponement of stipulated compliance timeframes

The 2013 Regulations of GN 893 repealed and replaced the Regulations that had been published in March 2010 under Government Notice No. 248. GN 893 contains substantial amendments to the previous MES, including changes to the listed activities and their associated special arrangements, additional activities subject to Regulation and changes to some of the prescribed emission limits. Notwithstanding the amendments, the compliance time frames prescribed in the 2010 Regulations remain unchanged.

3.2 The MES applicable to Sasol Infrachem

The applicable MES for the Infrachem facility are summarised in Table 1 together with an indication of whether or not Sasol will comply with the prescribed limits and associated special arrangements. Sasol Infrachem is applying here for an additional postponement, but has also made a parallel application for postponement of the compliance timeframes for other MES (the initial postponement applications) where compliance will be attained in the short- to medium term. In the interests of enabling an understanding of the full implications of Sasol Infrachem’s applications, both the initial and additional postponement requests are indicated in Table 1, together with the MES with which Sasol Infrachem will comply within the prescribed compliance timeframes.

Green colour coding reflects compliance with the MES, red reflects applications for additional postponements as detailed in this motivation report, and orange reflects applications for initial postponements (detailed in a separate motivation report). Blue colour coding reflects the 2020 standards for which compliance is challenging, based on the assessment of presently available technologies.

Table 1: Summary of Sasol's compliance with the MES (note that this is a summarised version of the MES)

MES Category	Substance(s)	Emission limits or special arrangements*		Applicable Sasol Activities
		New plant standards	Existing plant standards	
Category 1: Sub-category 1.1	Particulate matter	50	100	Steam Station 1 (Sasol Infrachem)
	Sulphur dioxide	500	3500	
	Oxides of nitrogen	750	1100	
Category 1: Sub-category 1.1	Particulate matter	50	100	Steam Station 2 (Sasol Infrachem)
	Sulphur dioxide	500	3500	
	Oxides of nitrogen	750	1100	
Category 1: Sub-category 1.5	Particulate matter	50	50	Gas Engine Power Plant (Sasol New Energy)
	Sulphur dioxide	1 170	1 170	
	Oxides of nitrogen	400	400	
Category 2: Sub-category 2.1	Particulate matter	70	120	Heaters and furnaces (Sasol Polymers)
	Sulphur dioxide	1 000	1 700	
	Oxides of nitrogen	400	1 700	
Category 6:	VOCs	150 (thermal) /40 000 (non thermal treatment)	150 (thermal) /40 000 (non thermal treatment)	VCM, PVC, Monomer, PE and Butanol and AAA (Sasol Polymers; Sasol Solvents, Sasol Wax)
Category 7: Sub-category 7.1	Hydrofluoric acid	5	30	HCl burners; VCM plant, Ammonia, NAP and Cyanide (Sasol Polymers)
	Chlorine	50	50	
	Ammonia	30	100	
	Hydrogen cyanide	0.5	2.0	
Category 7 Sub-category 7.2	F as HF	5	30	HCl burners (Sasol Polymers)
	Hydrochloric acid	15	25	
	Secondary hydrochloric issue	30	100	
	Sulphur dioxide	350	2 800	
	Sulphur trioxide	25	100	
	Oxides of nitrogen	350	2 000	
Category 7 Sub-category 7.3	Particulate matter	50	100	Ammonium nitrate and prillian plant (Sasol Infrachem)
	F as HF	5	30	
	Ammonia	50	100	
Category 8: Sub-category 8.1	Particulate matter	10	25	B6930 (Sasol Infrachem)
	Carbon Monoxide	50	75	
	Sulphur dioxide	50	50	
	Oxides of nitrogen	200	200	
	Hydrogen chloride	10	10	
	Hydrogen fluoride	1	1	
	Sum of Lead, arsenic, antimony, chromium, cobalt,	0.5	0.5	

MES Category	Substance(s)	Emission limits or special arrangements*		Applicable Sasol Activities
		New plant standards	Existing plant standards	
	copper, manganese, nickel, vanadium			
	Mercury	0.05	0.05	
	Cadmium + Thallium	0.05	0.05	
	Total Organic Compounds	10	10	
	Ammonia	10	10	
	Dioxins and furans	0.1	0.1	
	n/a	Exit gas temperatures must be maintained below 200ºC		
Category 8: Sub-category 8.1	Particulate matter	10	25	B6990 (Sasol Infrachem)
	Carbon Monoxide	50	75	
	Sulphur dioxide	50	50	
	Oxides of nitrogen	200	200	
	Hydrogen chloride	10	10	
	Hydrogen fluoride	1	1	
	Sum of Lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel, vanadium	0.5	0.5	
	Mercury	0.05	0.05	
	Cadmium + Thallium	0.05	0.05	
	Total Organic Compounds	10	10	
	Ammonia	10	10	
	Dioxins and furans	0.1	0.1	
	n/a	Exit gas temperatures must be maintained below 200ºC		
Category 8: Sub-category 8.1	Particulate matter	10	25	B6993 (Sasol Infrachem)
	Carbon Monoxide	50	75	
	Sulphur dioxide	50	50	
	Oxides of nitrogen	200	200	
	Hydrogen chloride	10	10	
	Hydrogen fluoride	1	1	
	Sum of Lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel, vanadium	0.5	0.5	
	Mercury	0.05	0.05	
	Cadmium + Thallium	0.05	0.05	
	Total Organic Compounds	10	10	
	Ammonia	10	10	

MES Category	Substance(s)	Emission limits or special arrangements*		Applicable Sasol Activities
		New plant standards	Existing plant standards	
	Dioxins and furans	0.1	0.1	
	n/a	Exit gas temperatures must be maintained below 200ºC		
Category 8: Sub-category 8.1	Particulate matter	10	25	VCM incinerator (Sasol Polymers)
	Carbon Monoxide	50	75	
	Sulphur dioxide	50	50	
	Oxides of nitrogen	200	200	
	Hydrogen chloride	10	10	
	Hydrogen fluoride	1	1	
	Sum of Lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel, vanadium	0.5	0.5	
	Mercury	0.05	0.05	
	Cadmium + Thallium	0.05	0.05	
	Total Organic Compounds	10	10	
	Ammonia	10	10	
	Dioxins and furans	0.1	0.1	
	n/a	Exit gas temperatures must be maintained below 200ºC		

Colour coding:

2020 standard for which no feasible technology is presently available to attain compliance and for which Sasol continues to seek reasonable measures for longer-term certainty

Additional postponements requested, on compliance timeframes for the prescribed emission limit or special arrangement

Seeks initial postponement of compliance timeframes for the prescribed emission limit or special arrangement

Will comply with the prescribed emission limit or special arrangement within prescribed compliance timeframes

**In the case of emission limits, these are specified as mg/Nm^3 under normal conditions of 273 Kelvin and 101.3 kPa, at respective O_2 reference conditions for each listed activity as specified in the MES; ng I-TEQ/Nm^3 in the case of dioxins and furans*

4 Reasons for Applying for Additional Postponements

Sasol has conducted extensive assessments on the technical, operational and financial implications of strict compliance with the existing and new plant standards. Based on these assessments, for those point sources where Sasol does not already comply with the MES, Sasol has concluded in one of three different ways:

- There are point sources for which compliance can be achieved at reasonable cost for the air quality benefits achieved; in some instances this can be achieved within the prescribed compliance timeframes and hence Sasol would comply fully with the MES;
- There are point sources for which compliance can be achieved at reasonable cost for the air quality benefits achieved; however, due to lengthy project development timeframes for developing and implementing solutions that are rendered complex on an existing brownfields facility, Sasol requires postponements of the compliance timeframes in order to study, implement and successfully commission new equipment (these are termed initial postponements and are the subject of a separate motivation report); and,
- There are certain point sources for which strict compliance with the MES is, for a variety of reasons explained below, not reasonable or achievable with presently available technology/ or other solutions. Following direction received after conclusion of the stakeholder engagement process, Sasol now seeks postponement for these point source standards instead of exemptions, and specifically proposes compliance to alternative emissions limits and arrangements for the duration of the postponement period. These point sources are the subject of this motivation report.

Legal compliance is of paramount importance to Sasol, and it is for this reason that Sasol is submitting postponement applications as provided for in law, in line with guidance received, to ensure its compliance in relation to the emission limits incorporated into its atmospheric emissions licences with which it must comply.

In the second scenario described above, Sasol commits to comply with the MES for those point sources over time, and hence it is appropriate to apply for postponement of compliance timeframes, to ensure compliance during the period required for project development and implementation. In some instances, this may take no more than the maximum allowable postponement application period of five years; in other instances, it is already known that in excess of five years of postponement will be required, and therefore multiple postponement applications will be necessary in these instances.

In the third scenario describe above and which applies here, Sasol finds itself in a challenging position. A potential approach to responding to these specific, unachievable point source standards would be to apply for multiple or “rolling” postponements to the end of the facility’s life, or until such time as a feasible technology is identified and implemented, whichever arises first. Sasol gave full consideration to this compliance approach and the potential repercussions, and therefore previously applied for exemptions in those cases where compliance is, based on presently available technologies, not feasible. This view was premised on the fact that a postponement by its design inherently offers only short-term relief, even in the face of long-term challenges to compliance for which no appropriate mechanism to provide long-term regulatory certainty is currently available to Sasol.

Sasol has now been advised that its exemption application will not be considered and that Sasol should instead apply for postponement. For this reason, and in order to ensure Sasol’s compliance with the 1 April 2015 timeframes, Sasol is now bringing the present additional postponement application. Sasol continues to seek reasonable measures to secure longer-term certainty.

4.1 Overview

The reasons for applying for additional postponements fall into several categories that are detailed below. Before presenting each of these reasons in more detail, Sasol's overarching approach to environmental management and air quality management in particular, is presented. The reasons that underpin the additional postponements applications should be read in the context of Sasol's environmental management philosophy. These reasons are specific to each listed activity, as described in the technical appendix to this motivation report, but fall into general categories, namely: the integrated nature of Sasol's activities, financial implications, industrial process compatibility, technology limitations, other unintended environmental impacts, and the challenges inherent in modifying a brownfields operation.

4.2 Sasol's environmental management philosophy

Sasol recognises that continuous improvement in environmental management performance is an important business imperative. Introducing capital intensive environmental improvements must be balanced with the focus on socio-economic sustainability of its business. Sasol has a history of proactive environmental performance improvements and in respect of air quality management has significantly reduced atmospheric emissions from its various facilities in line with its risk-based environmental improvement approach, regardless of whether or not such emissions reductions were required by law. For that reason numerous of the emissions from Sasol's various facilities already comply with much of the MES.

Prior to the promulgation of the MES, Sasol implemented a major natural gas conversion of the Sasolburg complex at a cost of R12 billion. Consequently, all coal-to-petrochemical product conversion activities have ceased, with natural gas as the sole feedstock. Sasol's emissions have been reduced significantly through this process, to the extent that the majority of the complex complies with the MES. Only the Sasol Infrachem steam stations continue to operate on coal. The reductions in emissions achieved are illustrated in Figure 3. Realised improvements were the result of sustainable, responsible operation of Sasol's facilities rather than regulatory requirements.

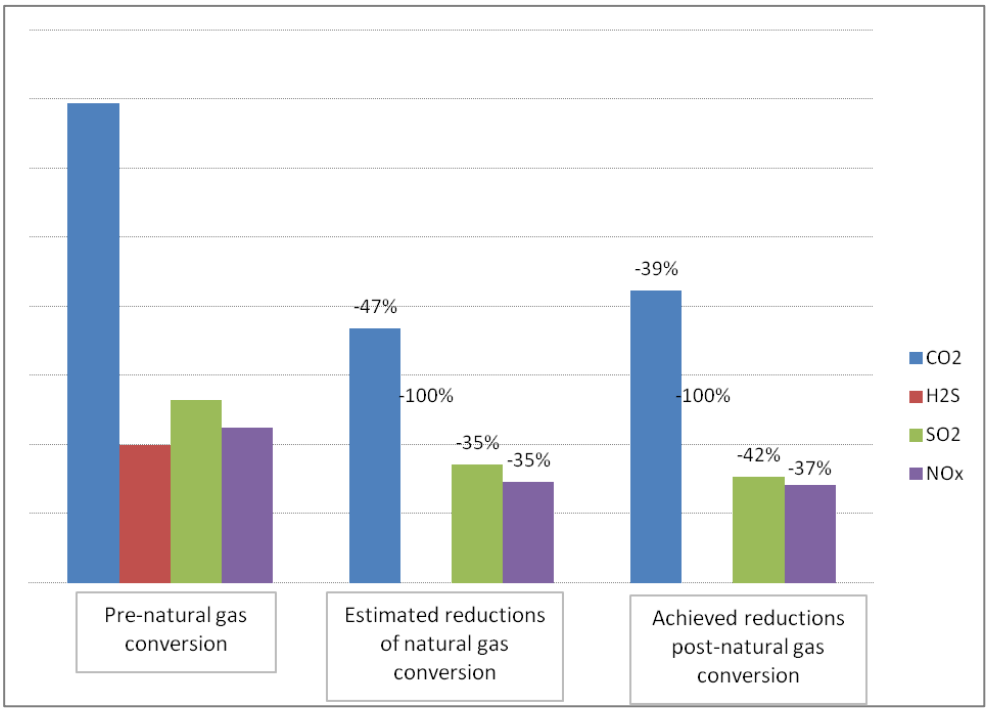

Figure 3: Emission improvement achieved at the Sasolburg complex as a result of conversion to Natural Gas

In addition to the improvements already achieved through the conversion to natural gas, Sasol Infrachem participated in the development of the Vaal Triangle Air-shed Priority Area (VTAPA) Air Quality Management Plan and the scientific determination of necessary interventions. The management plan (published in Government Notice No. 613 of 2009) showed that the airshed was experiencing a high number of exceedances of particulate matter (PM_{10}). Sulphur dioxide (SO_2) and nitrogen oxides (NO_x) concentrations in the airshed were, however, within the required limits set out in the National Ambient Air Quality Standards (NAAQS). A number of industries made commitments to emission reductions in the plan.

As part of the scientifically determined industrial interventions necessary to improve ambient air quality, Sasol Infrachem has been required to reduce its ambient impact on NO_x, SO_2 and particulate matter by 18%, 7% and 1% respectively. In order to adhere to these commitments numerous technical evaluations are underway. Sasol is required to submit Sasol's interventions to the Multi Stakeholder Implementation Group during the course of 2014, as prescribed in the VTAPA Air Quality Management Plan. Sasol Infrachem is committed to meeting the ambient air quality improvements prescribed within the management plan.

At the same time, Sasol Infrachem supports reasonable and achievable environmental performance standards being set by government, with the goal of achieving sustainable ambient air quality improvements in the most effective manner. Standards ought to be based on a defendable cost-benefit analysis which identifies and implements the most effective solutions and regulatory tools, as provided for in the regulatory framework. In the context of the MES, Sasol's view is that emissions abatement must target emissions that result in non-compliance with the NAAQS, where the costs of the abatement are justified and achieve material improvements in prevailing ambient air quality.

The MES are based on compliance with emission concentrations and not on pollution load. The effect of atmospheric emissions on ambient air quality is a direct function of pollution load and other factors, and only indirectly of emission concentrations. As an example, Sasol's approach to air quality improvement for its incinerators is to explore diversion of portions of the waste streams away from the incinerators, for beneficial use, an approach that is also aligned with the waste hierarchy. This would result in a pollution load reduction, but would not be expected to lower the concentration of pollutants measured in the incinerator emissions.

Finally, but importantly, it is strongly emphasised that Sasol Infrachem does not in any way seek to increase emissions relative to its current emissions baseline through its additional postponement applications. In the way that they have been presented, the MES compel absolute compliance with *ceiling* emission limits, or maximum emission concentrations, rather than *average* emission limits. The MES make provision for exceedance of the limits only for extraordinary events (including shut down, start up and upset conditions), and not for the variability that is inherent in day-to-day operations. These ceiling limits mean that emitters must be capable of complying with the prescribed ceiling limits, or maximum emission concentrations, under all operational circumstances, including normal production and feedstock variability. To demonstrate its commitment to compliance with sustainable standards, Sasol Infrachem has proposed alternative emissions limits as conditions to be included in its Atmospheric Emission Licences, which it commits to comply with, for the period of the postponement. The alternative emissions limits that Sasol Infrachem is proposing are thus not to increase emissions in any way but to simply reflect the new administrative conditions applied in the MES, i.e. are expressed as maximum emission concentrations, to accommodate normal production variability. Without exception, for the emission sources seeking additional postponements, Sasol Infrachem's average baseline emissions will not increase, and in some cases will be reduced to sustainably improved levels.

4.3 Integrated nature of Sasol's activities

As previously described, Sasol Infrachem supplies a range of utilities and services (including infrastructure, waste management, site support and site governance) to various Sasol business units (Sasol Polymers, Sasol Solvents, Sasol Wax, Merisol and Sasol Nitro) as well as external businesses in Sasolburg. Steam is a critical industrial process requirement for all these internal and external customers in the Sasolburg area. Process steam must be available at the right quality (correct temperature and pressure) and quantity (volume of steam demanded) at all times, and at all processes where steam is required. Furthermore, Steam Station 1 is an integral part of the steam and electricity distribution infrastructure for the Sasolburg complex as it is critical to the hydraulic and thermal balance of the Sasol Infrachem site.

At Thermal Oxidation, waste streams are thermally treated to mitigate risk to the environment. The waste streams that derive from the Sasol Merisol, Sasol Solvents and Sasol Monomers must have an option for safe disposal, or else there would be major disruptions to the production process, or the necessity to landfill waste streams that pose potential environmental risks. Neither is a tenable option for Sasol Infrachem, which means that the thermal oxidation option cannot be compromised.

The linkages between Sasol Infrachem, other Sasol business units and external customers are critical and extensive, which means that decisions to retrofit or modify components of the process have to consider all possible upstream and downstream knock-on effects. These knock-on effects, if not properly assessed and managed, could result in significant process disruptions for a whole range of other activities. Abatement options for the Steam Stations and Thermal Oxidation plant have to be developed in a manner cognisant of the up- and down- stream consequences of such abatement.

4.4 Financial implications

Compliance with the MES comes at significant financial costs, which is supported by Sasol when the decision takes into account a risk-based approach. Technologies such as flue gas desulphurisation (FGD) options on the Steam Stations would incur prohibitive capital and operating costs, with utility input cost repercussions for all customers. For the Thermal Oxidation facility, only end of pipe abatement or replacement of the incinerators themselves will result in full compliance with the MES, but with significant capital costs. By contrast, an approach aligned with the waste hierarchy to divert portions of the waste streams to these incinerators and thereby reduce pollutant load, would realise an improvement in air quality impacts (albeit not meeting the MES) in a significantly more cost-effective manner.

Sasol has argued that it is not the costs *per se* but rather the limited air quality benefits that will be realised as a result of implementing technology for compliance, which supports its additional postponement requests. The air quality benefits of full compliance with the MES have been assessed in the AIR and compared with the current emissions baseline, where in most cases the air quality risk of current emissions is low and the benefit of full compliance is marginal.

Sasol respectfully submits that there is no benefit to industry, government and society for industry to be imposed with compliance costs which – if implemented – did not appear to take a risk-based approach and delivered no meaningful improvements in ambient air quality.

On this basis, therefore, Sasol commits to taking the reasonable measures aimed at sustainable air quality improvement outlined in Chapter 7 of this application.

4.5 Alternative means of achieving ambient air quality improvements

Sasol Infrachem's willingness to effect interventions that result in improved ambient air quality has already been described in respect of the commitments made as part of the VTAPA. In line with that commitment it needs to be recognised that the VTAPA reduction targets could be achieved by means other than reducing point source emission concentrations. Sasol Infrachem believes that alternative means of improving ambient air quality should be considered, although no provision has been made for this in the MES. Interventions such as improved dispersion of emissions, changes in plant operating philosophies and changes in feedstock could ultimately equal, if not better, the ambient impact of the MES, which aligns with the objective of the NAQF.

Similarly, Sasol Infrachem is committed to a continuing search for alternative uses for the waste streams that feed the incinerators in line with best practice in the waste industry. These studies are expected to demonstrate a sustainable reduction in volumes of material fed to the incinerators, but not a reduction in the concentration of pollutants.

4.6 Technology limitations

Although there are many emissions abatement technologies available to Sasol these technologies will often not result in the level of emissions reductions required by the MES, particularly the new plant standards. For example, it is unlikely that low NO_X burners retrofitted into the Steam Station 2 boilers (which in themselves would require significant additional coal feed) nor selective non-catalytic reduction would achieve compliance with the new plant standards for boiler NO_X emissions as outlined in the technical appendix. Due to the size of the Steam Station 1 boilers, the installation of these technologies was established to be technically infeasible.

While renewal of the electrostatic precipitators can be implemented to sustainably and consistently achieve the existing plant standards, the same would not reduce emissions to the limits prescribed by the new plant standards. Another example is the de-stoning of feed coal as an abatement option for SO_2 emissions, which would not result in compliance with the new plant MES and would increase carbon containing discard coal volumes.

4.7 Other unintended environmental impacts

Some of the emissions abatement options may result in compliance with the MES but would result in a range of additional unintended or undesired environmental consequences. This inevitably requires that the impacts be balanced against each other. The use of FGD for example to limit SO_2 emissions from the Steam Stations has not inconsiderable negative environmental impacts. For one, it would require a significant additional volume of water, which would have to be diverted from other existing users. FGD would furthermore require the mining and transport of large volumes of lime or limestone, and would result in additional carbon dioxide emissions and additional waste production. Many of the abatement technologies identified result in reduced process efficiencies, such as low NO_x burners that require a higher coal throughput. De-stoning of coal feed for gasification would require increased volumes of water, and would increase the ratio of mined coal that would need to be discarded; therefore reducing the lifetime of existing mines. Emissions from the incinerators could be reduced by rather landfilling the waste to divert it from the incinerators, but that transfers the potential impact to another medium, and is contrary to the intent of the waste hierarchy.

4.8 Modifying a brownfields operation

Sasol supports the principle that new plants should be required to comply with new plant standards. In the case of an existing brownfields operation however, modification is considerably more challenging than building a new greenfields plant. In the case of greenfields plant the entire plant can

be designed in a manner that caters for all requirements and the plant can be conceptualised and 'packaged' in a specific way. In the case of a brownfields operation that benefit does not exist, and every modification or retrofit has to be developed around the existing plant. In the case of Sasol Infrachem, there is very little available space around the Steam Station 1 plant and the Thermal Oxidation Plant. The use of wet, dry or semi-dry FGD for limiting SO_2 emissions from the steam plants are all constrained by limited space as is Selective Catalytic Reduction (SCR) for reducing NO_x emissions. That lack of space is challenging enough in its own right, but it also creates further access problems for construction teams. Not only is access a problem for workers but bringing in the kind of plant and equipment that would be required to install retrofits is even more challenging.

On-going maintenance requirements of an operational plant mean that there will be competition for both access to the plant and working space. Construction crews would have to be very carefully scheduled and coordinated so that the construction process did not limit the ability of teams to complete their maintenance obligations. This is not to say that such coordination is not possible, but simply that the timeframes for implementation are, in practice, considerably longer. A brownfields site also presents multiple occupational health and safety hazards that do not exist on a greenfields site. These hazards relate principally to having energised systems, in terms of electricity, gas, steam and other utilities, as well as pipelines transporting flammable or explosive products around the site.

5 Alternative Emissions Limits

5.1 Overview

Given the various reason cited above, Sasol Infrachem is of the view that compliance with certain of the MES is not possible now or indeed in the foreseeable future based on presently available technologies. Refer to the note on the assessment of feasibility of compliance with the prescribed MES, provided in this report's associated technical appendix, for an explanation of how this determination is reached Sasol Infrachem therefore seeks postponement of the compliance timeframes from those MES where compliance is not foreseeable based on presently available technologies.

Sasol Infrachem supports the principle of being held to reasonable emissions limits. Proposals are presented here on what are considered to be justified, reasonable and achievable alternative emissions limits, which Sasol believes could be enforced by the authorities and which could be included as conditions in its Atmospheric Emission Licence (AEL), to prevail during the period of postponement. Before presenting those alternative emissions limits, it is necessary to briefly present some of why Sasol believes these alternative emissions limits are aligned with a risk-based approach to sustainable ambient air quality improvement.

5.2 Alignment between the MES and a risk-based approach to ambient air quality improvement

International best practice in setting emissions standards is to critically consider Best Available Technique (BAT), not as a standard in its own right but as a guiding principle and philosophy that has a limit value attached to what best available technology could potentially achieve without severe technical and economic consequences being imposed on the industry in question. Even where BAT does form the basis of the standards setting process, it is seldom applied retrospectively due to the difficulty and uncertainties of retrofitting old facilities with new equipment. Typically, time frames coupled to these reductions for existing plants are more flexible than the rigid approach taken in the MES. As such the trend globally is to create clear distinctions between existing facilities and new facilities, in recognition of the technical and economic challenges that lie in retrofitting existing industrial facilities.

The MES as they stand are not aligned with the NAAQS, as various modelling studies indicate that the MES imply ambient concentrations that are significantly below the corresponding NAAQS. There is no flexibility for local authorities to apply discretion to emission standards for licence holders in their jurisdiction as a function of the risks posed by the emissions.

The stringency of emission limits cannot be assessed in isolation from *how* those limits should be applied. Such specifications include, for example, the conditions under which the limit applies (e.g. 100% of the time during normal operations), whether it is a ceiling or an average limit and similarly what measurement averaging period constitutes compliance, for instance 10-minute values, 1-hour values, daily values, monthly values, annual values). The MES as they stand, compel substantial redundancy in emissions abatement, with significant cost implications and marginal benefit to that additional capital investment. If there was scope to agree compliance conditions with the authorities, again as a function of risk, then the MES would have been much more practicable in implementation. Unfortunately no such scope exists in the MES as they stand.

Applying emissions limits or maximum emission concentrations, as ceiling limits in the way stipulated currently in the MES makes the limits more stringent than they appear at face value, and setting such limits as ceiling limits is not usual practice in all jurisdictions. The European approach, for example, provides for the natural variability of emissions during normal operations. Some of the alternative emissions limits proposed by Sasol are higher than the MES. As explained above, it must be remembered that the administrative basis of the MES is to comply under all operational circumstances, with exceedances of the MES only being tolerated for shut down, start up and upset conditions. That administrative requirement means that Sasol Infrachem must request ceiling emission limits rather than average emission limits to ensure that it can comply given the variability of emission that the process experiences evens under normal operational circumstances.

It is important to stress that a difference in ceiling emissions limits and average emissions limits does not necessarily imply differences in pollution load to the ambient environment. Sasol Infrachem will not, through this additional postponement application, increase its pollution load by altering its average emissions concentrations. Rather it seeks to align its AEL conditions with sustainable limits, specified as the MES requires, i.e. in the form of ceilings emissions limits also known as maximum emission concentrations.

5.3 Proposed alternative emissions limits

The MES contain emission limits which have been incorporated into Sasol Infrachem's atmospheric emission licences and which must be complied with by 1 April 2015. However, as Sasol Infrachem seeks here to postpone compliance with these emission limits, it proposes alternative emissions limits which could be incorporated into its atmospheric emissions licences (AELs) instead of the minimum emission standards currently contained therein. The intended purpose of the alternative emissions limits and alternative special arrangements is to define the proposed licence conditions with which Sasol must comply for the duration of the postponement period. The proposal is that these will therefore be substituted for the MES emission limits which are currently contained in the AELs. Where applicable, these are at least aligned with current licence emission limits, and where licence conditions do not currently regulate particular emission parameters, Sasol's proposed licence conditions have been established based on what is considered reasonable and achievable in the light of the assessments done by Sasol Infrachem's independent consultants, and are based on the information and technologies currently available to Sasol Infrachem. This is consistent with the requirements of the NAQF, namely that pollution controls are technically possible and incurred at a cost which is acceptable to society in both the short and long-term. Sasol Infrachem does not seek to increase emission levels relative to its current emissions baseline through this application. The alternative emissions limits and alternative special arrangements proposed by Sasol have

furthermore been informed by independent specialist air quality studies on the basis that these limits do not affect ambient air quality beyond the NAAQS, which have as their overarching objective, ambient air quality that is not harmful to human health or well-being. The proposed alternative emissions limits are summarised in Table 2.

As described in this report, this application relates to postponement of the 2015 existing plant standard only. However, for completeness' sake, the limits which Sasol could meet in the longer term, based on current available information, are included, which extend beyond the five-year timeframe.

Table 2: Summary listing of the MES for which Sasol Infrachem is applying for additional postponement together with alternative emissions limits proposed by Sasol Infrachem for incorporation into its Atmospheric Emissions Licence

Applicable Sasol Infrachem Activities	Substance(s)	MES*		Alternative emissions limits (maximum daily average concentration)
		New	Existing	
Steam Station 1	Particulate matter	50	100	165
	Sulphur dioxide	500	3 500	From 1 April 2020: 2 000
	Oxides of nitrogen	750	1 100	1 450
Steam Station 2	Particulate matter	50	100	From 1 April 2020: 100
	Sulphur dioxide	500	3 500	From 1 April 2020: 2 000
	Oxides of nitrogen	750	1 100	1250
B6930 (High Sulphur Pitch incinerator)	Particulate matter	10	20	50
	Carbon Monoxide	50	75	Compliant
	Sulphur dioxide	50	50	1800
	Oxides of nitrogen	200	200	750
	Hydrogen chloride	10	10	Compliant
	Hydrogen fluoride	1	1	Compliant
	Sum of Lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel, vanadium	0.5	0.5	1
	Mercury	0.05	0.05	Compliant
	Cadmium + Thallium	0.05	0.05	Compliant
	Total Organic Compounds	10	10	50
	Ammonia	10	10	Compliant
	Dioxins and furans	0.1	0.1	Compliant
Incinerator B6990 (Heavy Ends B incinerator)	Particulate matter	10	20	Opacity Measurements
	Carbon Monoxide	50	75	Compliant
	Sulphur dioxide	50	50	Compliant
	Oxides of nitrogen	200	200	360

Applicable Sasol Infrachem Activities	Substance(s)	MES*		Alternative emissions limits (maximum daily average concentration)
		New	Existing	
	Hydrogen chloride	10	10	Compliant
	Hydrogen fluoride	1	1	1.5
	Sum of Lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel, vanadium	0.5	0.5	Opacity Measurements
	Mercury	0.05	0.05	Feed Analysis
	Cadmium + Thallium	0.05	0.05	Opacity Measurements
	Total Organic Compounds	10	10	25
	Ammonia	10	10	Compliant
	Dioxins and furans	0.1	0.1	Feed stream analysis (prohibition of chlorinated compounds fed to incinerator)
	n/a**	Exit gas temperatures must be maintained below 200ºC		Operate at current exit gas temperature. No chlorinated compounds to be fed to incinerators.
B6993 (Spent caustic incinerator)	Particulate matter	10	20	180
	Carbon Monoxide	50	75	1050
	Sulphur dioxide	50	50	Compliant
	Oxides of nitrogen	200	200	420
	Hydrogen chloride	10	10	15
	Hydrogen fluoride	1	1	1.2
	Sum of Lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel, vanadium	0.5	0.5	22
	Mercury	0.05	0.05	Compliant
	Cadmium + Thallium	0.05	0.05	Compliant
	Total Organic Compounds	10	10	Compliant
	Ammonia	10	10	Compliant
	Dioxins and furans	0.1	0.1	Compliant

**mg/Nm^3 under normal conditions of 273 Kelvin and 101.3 kPa, at respective O_2 reference conditions for each listed activity as specified in the MES; ng I-TEQ/Nm^3 in the case of dioxins and furans.*

***included in initial postponement application*

The emission abatement technologies and constraints attaching to each of these plants are detailed in the technical appendix (Annexure D).

6 The Atmospheric Impact Report

6.1 Overview

The AIR is a regulatory requirement and has to be compiled and submitted as part of an application for postponements. Sasol Infrachem has aligned its additional postponement applications with the requirements for postponements contained in the MES, and hence has prepared an AIR which supports both the initial and additional postponement applications. The purpose of the AIR is to provide an assessment of the implications for ambient air quality and associated potential impacts, of the emissions that will occur if the additional postponement application and proposed alternative emissions limits were to be granted. The AIR was completed by independent consultants and not Sasol itself. Airshed Planning Professionals was appointed to this end. The full AIR is included in Annexure A, with key elements of the report and the findings being summarised in this Section of the motivation.

6.2 Study approach and method

6.2.1 Dispersion modelling

Dispersion modelling is a key tool in assessing the ambient air quality implications of atmospheric emissions. A dispersion model serves to simulate the way in which emissions will be transported, diffused and dispersed by the atmosphere and ultimately how they will manifest as 'ground-level' or 'ambient' concentrations. For the purposes of this assessment, the "Regulations Regarding Air Dispersion Modelling" (Government Gazette No. 533 published 11 July 2014) were used to guide dispersion model selection. The CALPUFF model was selected mainly because it can simulate pollution dispersion in low wind (still) conditions. In addition CALPUFF can be used to model chemical transformations in the atmosphere, specifically in relation to the conversion of NO to NO_2 and the secondary formation of particulates.

6.2.2 Peer review of dispersion modelling methodology

The dispersion modelling methodology was reviewed by E^{x}ponent Inc, which was identified as the appropriate peer reviewer in light of its extensive international experience in the design, development, and application of research and regulatory air quality models. One of E^{x}ponent's directors played a significant role in the development of the CALPUFF modelling system. The peer reviewer was provided with a plan of study and the draft AIR, which was prepared by Airshed in accordance with the Dispersion Modelling Regulations, as referenced by the AIR Regulations of October 2013.

The peer reviewer's findings were assessed in terms of their potential impact on air quality. For cases where the peer review findings were identified as having a potentially significant impact on the dispersion model's results, the dispersion model inputs or settings were revised and the model was re-run taking into account the recommendations. Conversely where the findings were expected to have very marginal effects on the results, the findings were noted. Airshed's plan of study, the peer reviewer's report and Airshed's comments on each of the findings are included as Annexure B.

Two key comments were considered material for the purposes of the study, and actions were taken to address the findings.

The first relates to the use of the Probability Density Function (PDF) for dispersion from tall stacks under convective conditions, typical of the Highveld. This is of significance for tall stacks in convective conditions since it better considers short-term elevated concentrations that typically occur

during down draught conditions. This finding was not deemed to be significant for the Sasolburg simulation, since convective conditions are less likely than in the Highveld and good model correlation with measured values was already achieved.

The second relates to the peer reviewer's aim of replicating Airshed's results independently. Errors in the initial input files sent to the peer reviewer meant that Airshed's updated modelled results could not be replicated. Since it was important for the peer reviewer's assessment to independently model and obtain similar results to Airshed, updated input files were sent to E^{x}ponent for a re-run to ensure that the results were satisfactory.

The remainder of findings and comments on these are detailed in Annexure B. They relate to, among others, land use category data, wet and dry deposition of emissions and chemical transformation of NOx.

6.2.3 Ambient air quality monitoring stations

As opposed to predicted ambient concentrations using a dispersion model, ambient air quality monitoring serves to provide direct physical measurements of selected key pollutants. Sasol operates three ambient air quality monitoring stations in and around Sasolburg, namely at AJ Jacobs, Leitrim and Ecopark. Data for 2010, 2011 and 2012 from AJ Jacobs and Leitrim were included in the AIR investigation, since operation of the Ecopark station only commenced in 2012. NO_2, NO and NO_x observations made at Ecopark monitoring station for 2012 were, however, included in the analysis of NO_2/NO_x ratios. The monitoring stations are accredited (ISO/IEC17025) to ensure data quality and availability, with 90% data availability for the three years.

6.2.4 Emissions scenarios

In order to assess the impact of each of the additional postponements for which Sasol has applied, five emissions scenarios were modelled, with the results throughout the AIR presented as illustration in Figure 4.

- **Current baseline emissions,** reflective of the impacts of present operations, which are modelled as *averages* of measurements taken from continuous emission monitoring (where available) or periodic emission monitoring. This scenario is represented by the first column in the presentation of all AIR graphs (shown in blue in Figure 4). Baseline emissions were derived from accredited (ISO/IEC17025) third parties and laboratories. Emissions measurements follow the requirements prescribed in Schedule A of GN 893. The reason baseline emissions were modelled as averages of measured point source emissions was to obtain a picture of long-term average impacts of Sasol's emissions on ambient air concentrations, which could be reasonably compared with monitored ambient concentrations, as a means of assessing the representativeness of the dispersion model's predictions. Modelling baseline emissions at a ceiling level which is seldom reflective of actual emissions would over-predict ambient impacts, and therefore doesn't allow for reasonable assessment of the model's representativeness.

The following three scenarios are modelled to reflect the administrative basis of the MES, being ceiling emission levels. These scenarios are therefore theoretical cases where the point source is constantly emitting at the highest expected emission level possible under normal operating conditions, for the given scenario (i.e. the maximum emission concentration).

- **Compliance with the 2015 existing plant standards**. This is modelled as a ceiling emissions limit (i.e. maximum emission concentration) aligned with the prescribed standard, and reflects a scenario where abatement equipment is introduced to theoretically reduce emissions to conform to the standards. This scenario is represented by the second column in the presentation of all AIR graphs (shown in red in Figure 4). For example, this considers the renewal of ESPs and the

implementation of low NO_x burners to meet Steam Station existing plant standards to theoretically achieve compliance with existing plant standards.

- **Compliance with the 2020 new plant standards**. This is modelled as a ceiling emissions limit (i.e. maximum emission concentration) aligned with the prescribed standard, and reflects a scenario where abatement equipment is introduced to theoretically reduce emissions to conform to the standards. This scenario is represented by the third column in the presentation of all AIR graphs (shown in green in Figure 4). For example, this considers the implementation of FGD at the Steam Station's boilers, which would result in lowered flue gas temperatures from the boilers with a resulting detrimental effect on the co-dispersion of other pollutants including NO_x and PM.
- **Compliance with VTAPA commitments**. This scenario is reflective of the ambient impact that can be expected once the VTAPA commitments have realised. The reductions prescribed for the priority area have been applied to the predicted baseline at each of the receptor points for each of the pollutants. This scenario is indicative of the expected ambient impact from the Sasol Infrachem facility which Sasol Infrachem is likely to operate at post 2020, based on assessments of presently available technologies.
- In addition to the above scenarios, a **worst-case scenario of operating constantly at the requested alternative emissions limits**, which have been specified as ceiling emissions limits (i.e. maximum emission concentrations). This scenario is represented by the fourth column in the presentation of all AIR graphs (shown in purple in Figure 4). In some instances the scenario appears higher than the baseline, only because it portrays the worst case outcome where the maximum emission concentration occurs under the 99^{th} percentile worst meteorological conditions – and this is modelled assuming these conditions prevail for the entire duration of the modelling period. Sasol seeks alternative emissions limits which are aligned with the manner in which the MES are stated and which accommodate the natural variability inherent in emissions under different operating conditions and feed conditions, and hence must request a ceiling emissions limit rather than an average emissions limit. The alternative emission limit is hence simply a different way of expressing current baseline emissions (in cases where further abatement is not possible), or may even reflect a reduction in average baseline emissions (in cases where further abatement is possible, but not to a level which achieves compliance with the MES ceiling emissions limits). These limits are not reflective of the ambient impact that is expected from the Sasol Infrachem facility, but have nonetheless been included per source in the technical appendices.

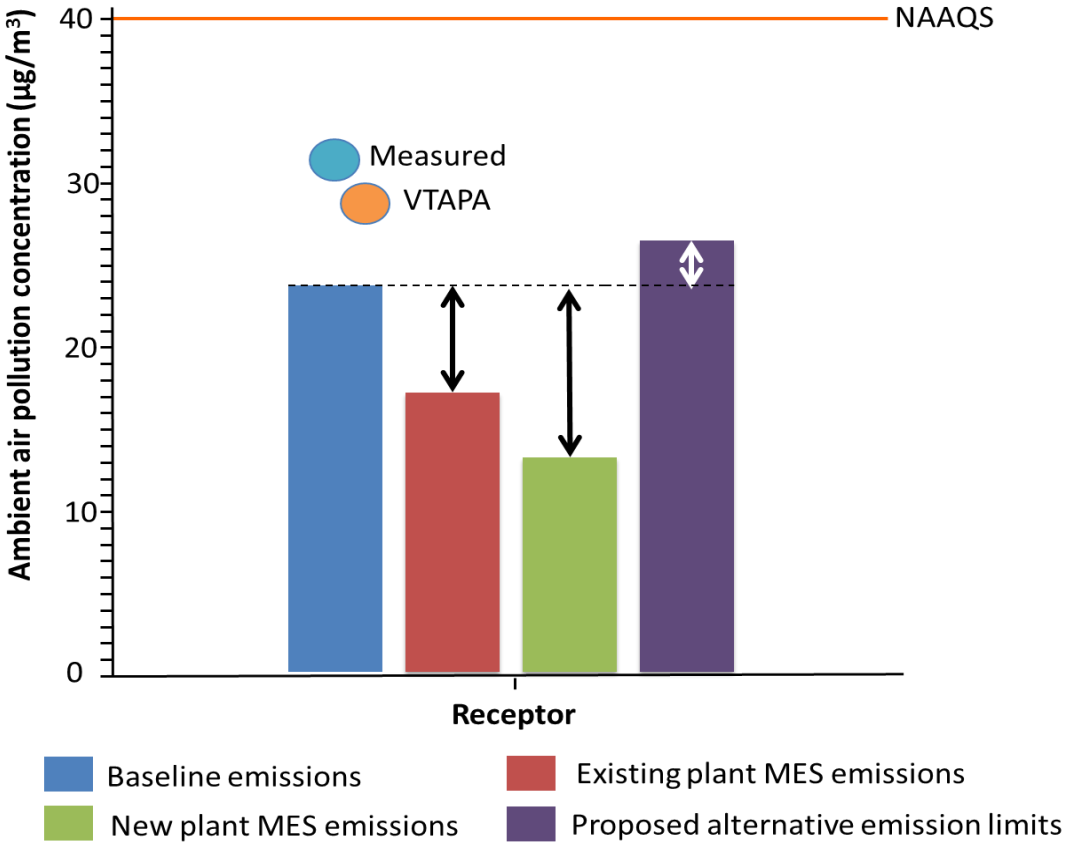

Figure 4: Schematic displaying how the dispersion modelling scenarios are presented in the AIR, for each receptor point in the modelling domain

In Figure 4, the black arrows above the red and green bars reflect the predicted delta (i.e. change) in ambient impacts of Sasol Infrachem's baseline emissions versus the given compliance scenario. At a practical level, the white arrow on the purple bar represents the theoretical delta increase in short-term ambient impacts, where maximum emission concentrations occur, compared with the predicted impact of average current baseline emissions.

The blue dot in Figure 4 represents physically measured ambient air quality, reflective of the total impact of all sources in the vicinity, as the 99th percentile recorded value over the total modelling period. On a given day, there is a 99% chance that the actual measured ambient air quality would be lower than this value, but this value is reflected for the purpose of aligning with modelling requirements.

The orange line represents the applicable National Ambient Air Quality Standard (NAAQS), or, where not available, relevant international benchmark, used for interpretation of the dispersion modelling results, as described in Section 6.2.5.

6.2.5 National Ambient Air Quality Standards

Once ambient concentrations have been predicted using the dispersion model, or direct physical measurements sourced, the predicted or measured concentrations are typically compared to defined standards or other thresholds to assess the health and/or environmental risk implications of the predicted or measured air quality. In South Africa, NAAQS have been set for criteria pollutants at limits deemed to uphold a permissible level of health risk and the assessment has accordingly been based on a comparison between the predicted concentrations and the NAAQS. The measured concentrations have been used to ascertain the representativeness of the modelling and to assess compliance with the NAAQS as a function of all sources of emissions.

For non-criteria pollutants where NAAQS have not been set, health effect screening levels that could be used for assessing the non-criteria pollutants emitted by Sasol Infrachem have been identified from literature reviews and internationally recognised databases. These non-criteria pollutants for which screening levels were identified, include various emissions from incinerators, namely lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel and vanadium. The screening levels used are listed in Table 3.

Table 3: Most stringent health-effect screening level identified for non-criteria pollutants assessed

Compound	Acute exposure[(a)] [units: µg/m^3]	Chronic exposure[(b)] [units: µg/m^3]
Lead (Pb)	(c)	(d)
Arsenic (As)	0.2 (g)	0.015 (g)
Antimony (Sb)	(c)	(d)
Chromium (Cr)	(c)	0.1 (e)
Cobalt (Co)	(c)	0.1 (f)
Copper (Cu)	100 (g)	(d)
Manganese (Mn)	(c)	0.05 (e)
Nickel (Ni)	0.2 (g)	0.014 (g)
Vanadium (V)	0.8 (f)	0.1 (f)
Ammonia (NH_3)	1184(f)	(d)
HCl	2100(g)	(d)
HF	240(g)	(d)

(a) Hourly concentrations compared with short-term / acute exposure health effect screening level
(b) Annual concentrations compared with long-term / chronic exposure health effect screening level
(c) No hourly health screening level
(d) No annual health screening level
(e) US-EPA IRIS Inhalation Reference Concentrations (µg/m³) – chronic
(f) US ATSDR Maximum Risk Levels (MRLs) (µg/m³) - acute
(g) Californian OEHHA (µg/m³) – acute
(h) No annual health screening level

6.2.6 Sensitive receptors

Twelve sensitive receptors were defined in and around the Sasolburg complex and at various distances from the sources within the 50 km-by-50 km modelling domain. The twelve receptors include residential areas, ambient air quality monitoring stations and points of maximum predicted pollutant concentrations, and are illustrated in Figure 5. The predicted ambient concentrations for each of the four emissions scenarios have been presented as bar charts relative to the NAAQS (where these exist) and to measured ambient concentrations (also where these exist) for each sensitive receptor. The sensitive receptors are listed in Table 4.

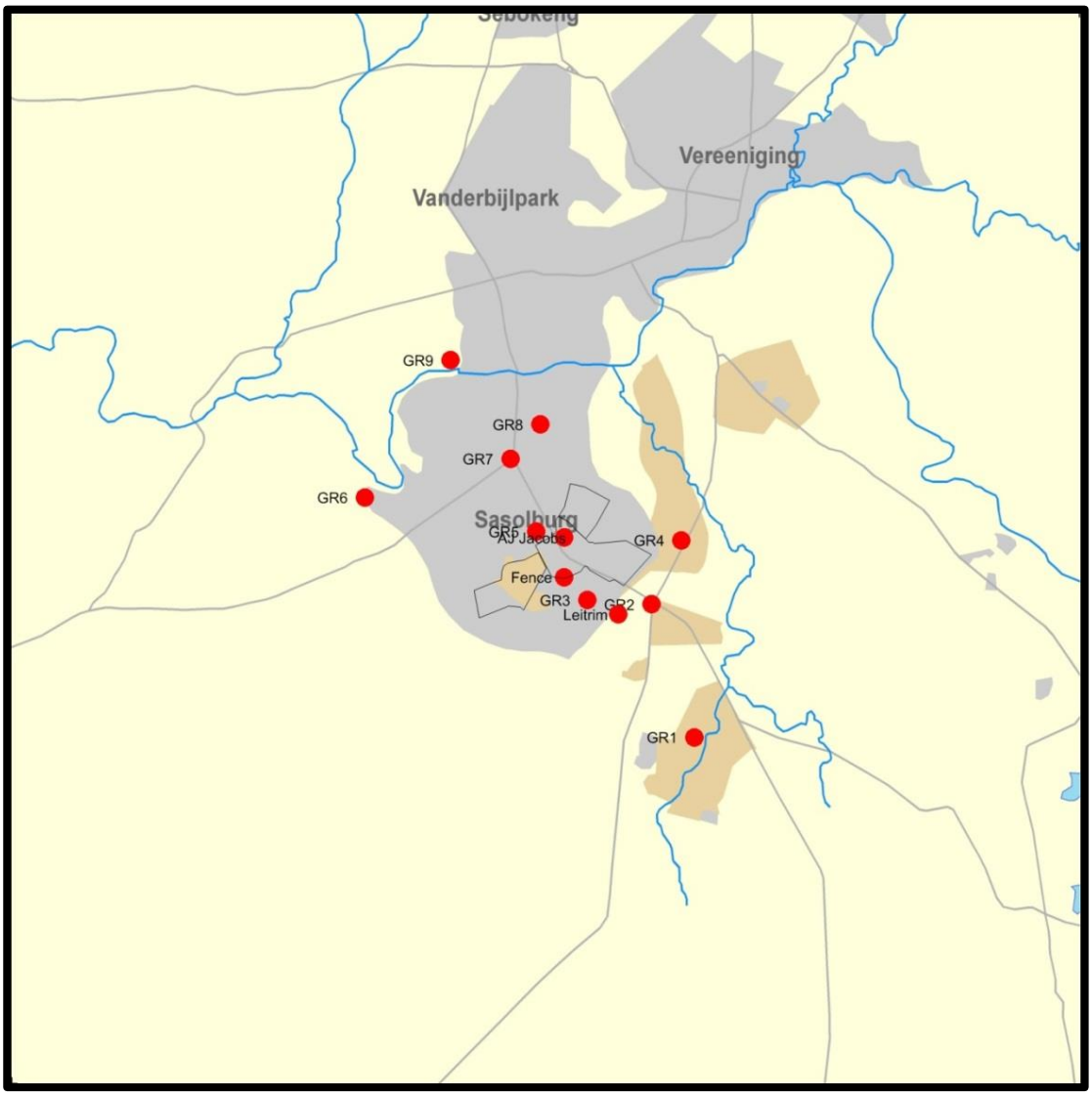

Figure 5: **Map showing the positions of the fifteen sensitive receptors identified for presenting the predicted ambient air quality for the different pollutants referenced in this application and for each emissions scenario**

Table 4: Summary listing of the sensitive receptors illustrated in Figure 5

Receptor code name [(a)]	Receptor details	Distance from source (metres) [(b)]
GR5	Sasolburg - point of maximum	1 176
AJ Jacobs	SASOL AJ Jacobs monitoring station	1 391
Fenceline	SASOL Fence-line monitoring station	1 410
GR3	Zamdela - point of maximum	2 858
Leitrim	SASOL Leitrim monitoring station	4 268
GR7	SASOL Eco-Park monitoring station	4 668
GR2	Zamdela (boundary)	5 224
GR8	Vaalpark	5 817
GR4	Edge of industrial zone (East of plant)	5 930
GR6	Marlbank river estate AH	9 195
GR9	Vanwaarshof AH	10 044
GR1	Edge of impact plume (South East of plant)	10 968

6.2.7 Model performance

Although atmospheric models are indispensable in air quality assessment studies, their limitations should always be taken into account. As detailed in the AIR, dispersion modelling has inherent uncertainty. The accuracy of the model predicted ambient concentrations are vulnerable to three main sources of errors resulting from: incorrect input emissions data; inaccurate meteorological data and inadequate scientific formulation of the model.

The emphasis in this assessment has been on the ‘delta’, being the difference in predicted ambient concentrations under the four emissions scenarios modelled. The model uncertainty is therefore a constant factor among the scenarios, and the delta can be considered, with a reasonable degree of confidence, as representative of the differences in ambient concentrations that would materialise under different emissions scenarios. The intention behind the atmospheric impact modelling for this motivation has therefore been to show the contribution of each source applying for additional postponement or postponement to ground level concentrations of applicable criteria pollutants in the vicinity of the Sasol Infrachem facility. The delta approach is consistent with the risk based approach that underpins Sasol Infrachem’s environmental management philosophy. The modelled contribution of the baseline scenario is compared with the modelled contributions of the scenarios depicting compliance with existing and new plant standards, to determine the difference that compliance with the MES will make to ambient concentrations of these pollutants in relation to the NAAQS. Since the aim of the dispersion modelling was to illustrate the change in ground level concentrations from the current levels (the baseline emission scenario) to those levels resulting from compliance with the prescribed emission limits (the existing and new plant standards), the intention was not comprehensively to include all air emissions from Sasol Infrachem or those associated with activities other than Sasol Infrachem. Unaccounted emissions include those from unintended emissions within the plant (fugitive emissions) and small vents, as well as air emissions from other industries, emissions from activities occurring within the communities and domestic fuel burning (especially during the winter season), as well as long-range transport of pollutants into the local air shed.

Since model inputs are only estimates, even the most sophisticated models will have inherent uncertainties and will have the potential to underestimate or overestimate actual concentrations. Model performance was assessed by using the fractional bias method, as recommended by the US Environmental Protection Agency, which concluded that model predictions lay well within a factor of

two when compared with the measured data, and hence was considered reasonably representative. Further detail on this analysis is included in the AIR.

6.2.8 Compliance with AIR Regulations

As far as practically possible, and as summarised in Appendix B-1 of the AIR, the air quality assessment was compiled in accordance with the Regulations prescribing the format of the Atmospheric Impact Report (as contemplated in Section 30 of the NEM:AQA). Due to the nature of this application process, the procedure prescribed by these Regulations was adapted to reflect the purpose of the assessment, as described above, and thus represents a "fit for purpose" assessment. This notwithstanding, as also explained in the preface to the AIR, further detail on our point sources which do not form part of the postponements have been incorporated into the AIR in light of stakeholder comments received. This information does not alter the conclusions arising from the initial air quality assessment.

Baseline Modelling

The dispersion modelling was conducted using baseline emissions representative of normal operating conditions. The MES regulates normal operating conditions; therefore only normal operating conditions were included in the assessment. Maximum emissions and emissions during start-up, shut-down, maintenance or upset conditions are in many cases not available as measurements are not conducted during these upset conditions. Due to safety concerns and practical considerations, emissions are measured during operations representative of normal operating conditions during planned, scheduled measurement campaigns.

Fugitive Emissions

Sasol manages fugitive emissions from its facilities, which includes both fugitive VOC and fallout dust in the case of Sasolburg Operations. The dust fallout management approach is described further in the AIR.

Modelling of the B6990 Incinerator emissions

Due to operating conditions on furnace B6990, the flue gas temperature exceeds viable temperatures for PM, metals, and dioxin/furans sampling (US EPA method 29). As no reliable data for these emissions is available, the PM, metals and dioxins/furans emissions from the B6990 incinerator have not been included in the dispersion model. Measurements are however available (and included in the model) for CO, SO_2, NOx, HCl, HF, TOC and NH_3.

Since the materials fed into the incinerator originate from within the factory, and are homogenous with regards to their composition, Sasol Infrachem believes the impact of PM, metals and dioxins/furans is no greater than for B6993 and B6930, which have been modelled. Work is ongoing to improve measurement of emissions within such a high stack temperature domain and will form part of the technical evaluation going forward.

6.3 Key findings

In presenting these findings it is necessary to briefly describe the use of the 99^{th} percentile to show predicted and measured ambient air pollution concentrations. As a simulation (and simplification) of reality, dispersion models will always contain some degree of error. Model validation studies elsewhere have indicated that typically the highest predicted concentrations are overestimated as a result of the way that meteorological processes are parameterised in the model.

At the same time the NAAQS include both a limit value and the requirement that the limit value be met for at least 99% of the time. For hourly average values (such as the ambient SO_2 and NO_2 standards) that implies that the limit value can be exceeded for up to 88 hourly average values (or

1% of the time). Equivalently for daily averages (such as the ambient PM_{10} standard) up to 4 daily average values can be exceeded. For annual averages the limit value is the standard with no exceedances being allowed. All the predicted and measured values shown in this report are based accordingly on the 99th percentile values except for annual averages.

6.3.1 Particulate Matter (PM_{10})

The PM sources included in the AIR cumulatively account for approximately 99% of Sasol Infrachem's total point source PM emissions. As described in further detail in Section 5.1.4.3 of the AIR, the CALPUFF modelling suite enabled inclusion of the impact of the chemical conversion of sulphur dioxide and nitrogen oxides to secondary particulates within the dispersion model results. Thus, the predicted PM_{10} concentrations reflected in the AIR dispersion modelling results include direct emissions of PM_{10} plus secondary particulates formed from Sasol's emissions.

Predicted daily average PM_{10} concentrations resulting from PM emissions from all PM sources at Sasol Infrachem are shown in Figure 6. It can be seen from the figure that the PM emissions result in predicted concentrations that are well within the NAAQS limit values and are significantly less than the measured ambient concentrations at each of the monitoring stations. None of the predicted ambient PM_{10} concentrations are seen to exceed 10% of the NAAQS limit value with the remaining off-site sensitive receptors being less than 5% of the NAAQS limit value. The predicted concentrations imply that full compliance with even the new plant standards at Sasol Infrachem will result in negligible improvements in ambient PM_{10} concentrations.

Measured PM_{10} concentrations are seen, however, to be well in excess of the NAAQS PM_{10} limit values. The measured concentrations obviously reflect all the sources in the airshed and these sources would include the many other industries operating in the VTAPA but also ground level sources. Key sources of ground level emissions include domestic fuel burning (especially during the winter season) and veld fires. Given the negligible change in ambient PM_{10} concentrations predicted for full compliance with the MES, MES compliance by Sasol Infrachem's sources would be immaterial to compliance with the PM_{10} NAAQS, given the contributions from other sources.

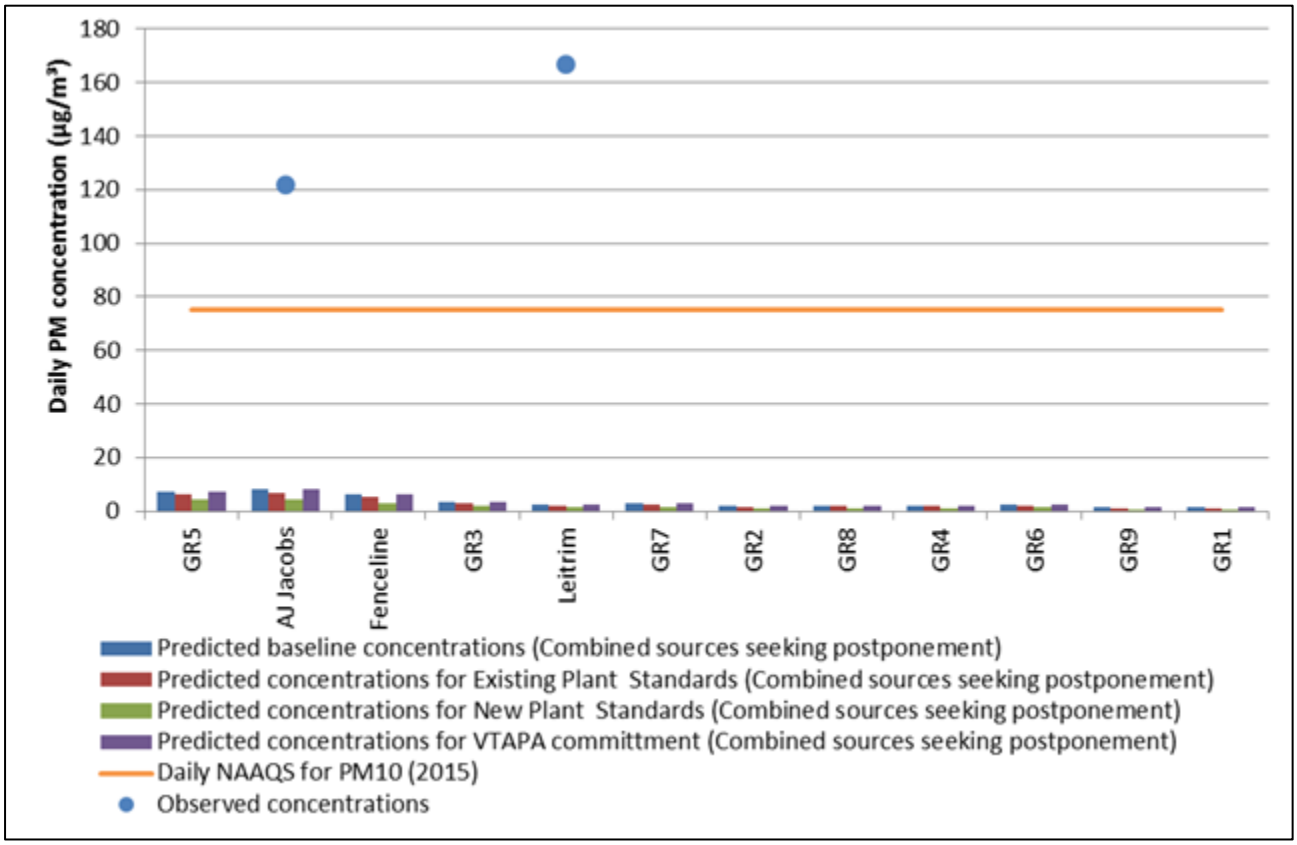

Figure 6: Predicted ambient concentrations of PM_{10} at the fifteen sensitive receptors, for each of the four emissions scenarios modelled

Sasol Infrachem intends to operate at below the ambient concentrations required by the VTAPA commitments. This implies an improvement in Sasol's ambient PM_{10} impact to below at least 1% of current baseline operations. The VTAPA reduction will not materially improve ambient air quality, due to the relatively minor contribution from Sasol Infrachem to ambient PM, but does imply that Sasol Infrachem will not increase its PM impact. As argued above, reductions beyond the VTAPA commitments are unlikely to improve ambient air quality appreciably.

6.3.2 Sulphur dioxide

The SO_2 sources included in the AIR cumulatively account for more than 99% of Sasol Infrachem's total SO_2 emissions.

Predicted ambient hourly average SO_2 concentrations resulting from emissions from the Sasol Infrachem sources are shown in Figure 7. It can be seen from the figure that the highest predicted ambient concentrations are predicted to occur as a result of existing plant MES emissions. The lowest predicted concentrations are seen to occur under the new plant MES, but these differ only in small percentage changes from the baseline, especially in respect of off-site receptors. Reductions of up to 15% in ambient SO_2 concentrations are predicted between the baseline and the new plant MES emissions in close proximity to the Sasolburg complex, but the reductions represent significantly less than 10% of the NAAQS.

Measured ambient SO_2 concentrations are seen to comply with the SO_2 NAAQS for all averaging periods, except for the daily standard during area specific incidents. At the same time it can be seen that Sasol is a significant contributor to the measured ambient concentrations with the two most significant sources of SO_2 emissions at Infrachem, being the two steam stations (both of which already comply with the existing plant MES). In addition the modelling indicates that the relative contribution from Steam Station 1 is more pronounced than the contribution from Steam Station 2.

Even with a relatively high contribution of SO_2 from the Sasolburg complex to ambient concentrations, there is still full compliance with the hourly NAAQS with the difference between the measured and the predicted concentrations being deemed to originate from other sources. These "background" sources are many and varied in the VTAPA. What is most likely to transpire should the authorities grant the alternative emissions limits, are ambient concentrations that fall within the range between the predicted concentrations under baseline emissions and those predicted under the alternative emissions limits, which will be well less than the SO_2 NAAQS, until Sasol's implementation of the interventions to deliver compliance with the VTAPA commitments.

Sasol Infrachem intends to operate at below the ambient concentrations required by the VTAPA commitments. This implies an improvement in Sasol's ambient SO_2 impact to below at least 7% of current baseline operations.

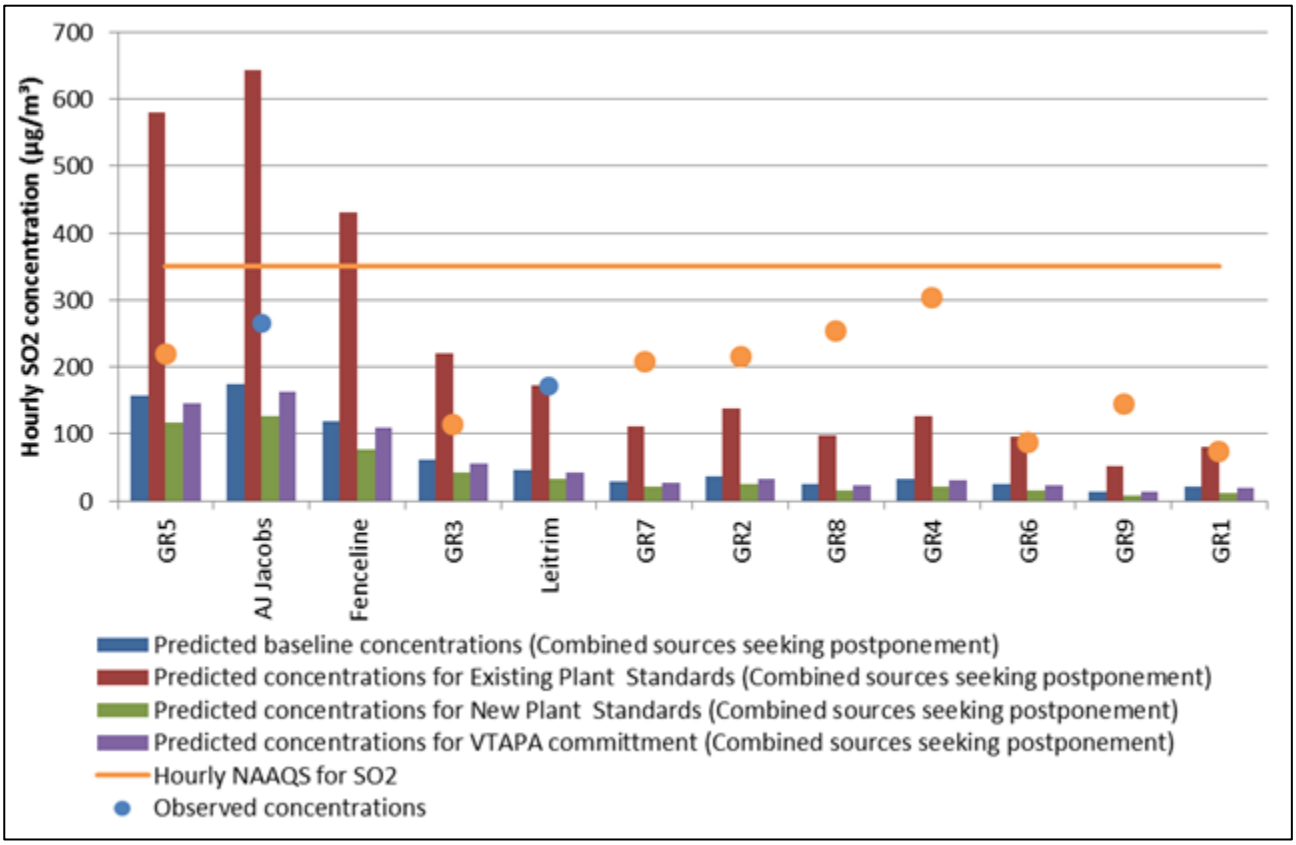

Figure 7: Predicted hourly average ambient concentrations of SO_2 for combined sources at the fifteen sensitive receptors, for each of the four emissions scenarios modelled

6.3.3 Nitrogen dioxide

The NO_x sources included in the dispersion modelling cumulatively account for more than 95% of Sasol Infrachem's total NO_x emissions for the modelling period.

Emissions that have not been included in the modelling arise from other Sasol business units operating in the complex, small burners and heaters, as well as flares. Predicted ambient hourly average NO_2 concentrations resulting from NO_x emissions from Sasol Infrachem are shown in Figure 8. It can be seen from the figure that the highest predicted ambient concentrations are predicted to occur under the existing baseline emissions except at the AJ Jacobs monitoring station where the new plant MES result in the highest predicted ambient concentrations. Emissions under the VTAPA obligations are predicted to result in the lowest predicted concentrations in close proximity to the site, but the with increasing distance from the source, new plant MES results in the lowest predicted ambient concentrations. The reason for the higher predicted concentrations under the new plant MES, is that the effect of FGD (required to meet the new plant SO_2 MES), would be to cool and thereby reduce the buoyancy of the NO_x emissions. The dispersion of NO_2 would thus be impeded and result in higher predicted ambient concentrations for the new plant MES, than for the VTAPA commitment emissions.

Measured ambient NO_2 concentrations at Sasol's monitoring stations are seen to be less than 40% of the NAAQS limit value at both the AJ Jacobs and Leitrim monitoring stations. It is also evident from the assessment that the Steam Stations, particularly Steam Station 1, are the dominant sources of NO_2 measured at the monitoring stations. From the modelling it can also be seen that the ambient air quality improvements associated with full MES compliance would be a small percentage of the NAAQS limit value. The reductions in ambient NO_2 concentrations that will be brought about by Sasol's implementation of its VTAPA commitments (to be implemented by 2019) will in fact see the best resultant ambient air quality at the points where the predicted concentrations are highest.

Sasol Infrachem intends to operate at levels below the ambient concentrations required by the VTAPA commitments. This implies an improvement in Sasol's ambient NO_x impact to below at least 18% versus its current baseline operations. This improvement is even greater than the ambient impact should the new plant standards be complied with, for receptors closest to the Sasol facility, as evident in Figure 8.

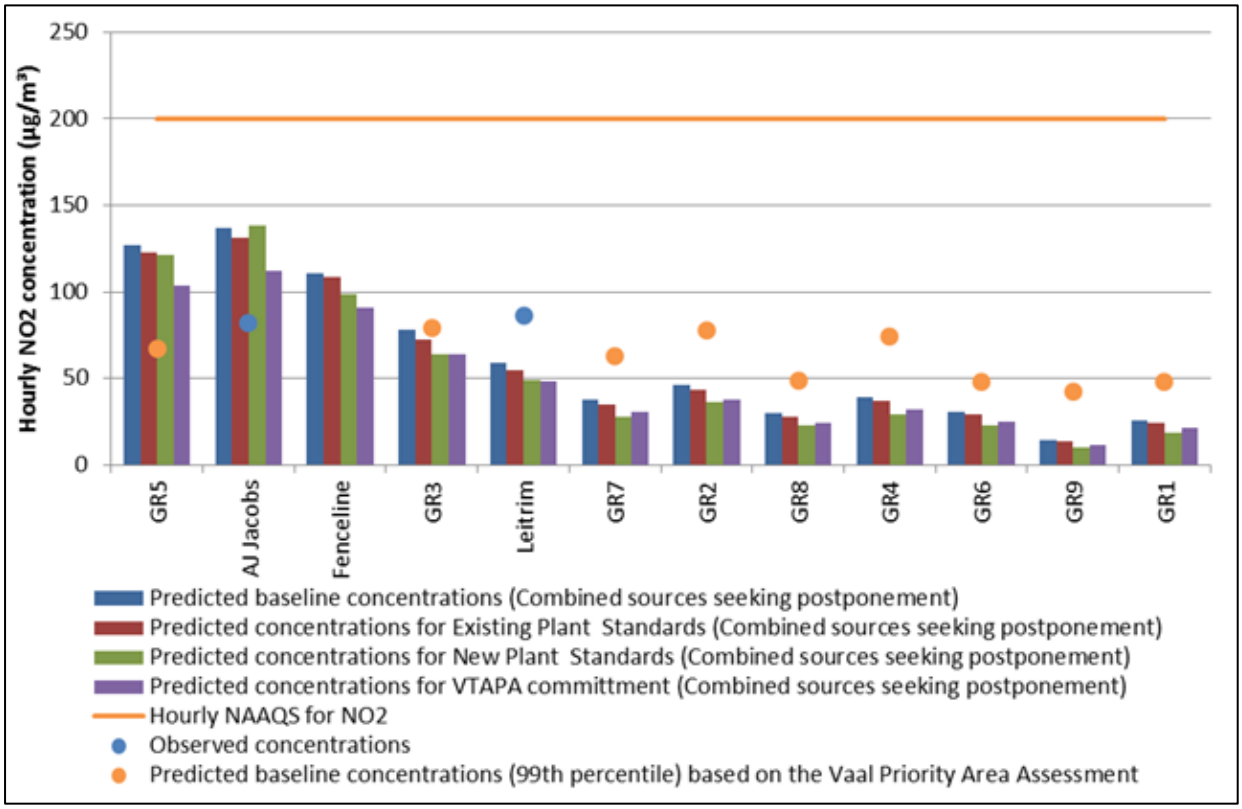

Figure 8: Predicted ambient concentrations of NO_2 at the fifteen sensitive receptors, for each of the four emissions scenarios modelled

6.3.4 Non-criteria pollutants - Incinerator emissions

Ambient concentrations of the criteria pollutants SO_2, PM_{10} and NO_x arising from emissions from the incinerators were included in the results for these pollutants described above. These ambient concentrations would be negligible since the emissions load of from incinerators is small relative to the Steam Stations. For the non-criteria pollutant emissions health effect screening levels were sourced by identifying the strictest World Health Organisation (WHO); US-EPA IRIS inhalation reference concentrations; Californian OEHHA; and US ATSDR Maximum Risk Levels. The derived limit values for the non-criteria pollutants are listed in Table 5.

Predicted ambient pollutant concentrations resulting from the combined emissions from the Thermal Oxidation plant are shown in Table 5 relative to these strictest health effect screening levels for non-criteria pollutants. This is a summary of the screening exercise for the non-criteria pollutants that would possible exceed the screening level concentrations, namely manganese (Mn), ammonia (NH_3), hydrogen chloride (HCl) and hydrogen fluoride (HF). The maximum predicted concentrations are significantly lower than the health screening limits with most at least an order of magnitude below the commensurate health effects screening level. The complete results for predicted concentrations of all non-criteria pollutants assessed are provided in the Atmospheric Impact Report.

Table 5: Summary listing of the maximum predicted concentrations of selected non-criteria pollutants compared to the strictest health effect screening levels (see Table 3). The predicted concentrations derive from combined emissions from the three incinerators

Compound	Maximum concentration[(a)]	Screening level
Baseline operations		
Mn*	0.0005	0.05 [(b)]
NH_3	0.550	1184 [(c)]
HCl	0.174	2100 [(c)]
HF	0.050	240 [(c)]
Benzene	0.079	5 [(d)]
Existing and New Plant Standards		
Mn*	0.0001	0.05 [(b)]
NH_3	0.480	1184 [(c)]
HCl	0.147	2100 [(c)]
HF	0.050	240 [(c)]
Benzene	0.039	5 [(d)]
Alternative emissions limit scenario		
Mn*	0.0016	0.05 [(b)]
NH_3	0.542	1184 [(c)]
HCl	0.105	2100 [(c)]
HF	0.050	240 [(c)]
Benzene	0.03	5 [(d)]

(a) Maximum predicted concentration across the 12 receptors
(b) Chronic exposure level, µg/m^3
(c) Acute exposure level, µg/m^3
(d) South African NAAAQS
* *Includes Mn emissions from B6930 and B6993, not B6990*

6.4 Overall findings of the AIR

6.4.1 Compliance with the NAAQS

The purpose of the MES is to achieve the intent of the NEM:AQA which means ensuring that ambient air quality is achieved that does not threaten the health or well-being of people and the environment. To all intents and purposes that means ambient air quality that complies with the NAAQS. Thus in assessing the request for additional postponement, the effect of granting such a request has to be assessed in terms of the implication for ambient air quality.

Regarding compliance with NAAQS, measured ambient air quality from the three Sasol monitoring stations is seen to comply with the NAAQS and other health risk screening limits, the exception being for PM_{10} and the daily standard for SO_2 during area specific incidents. The compliance in respect of the NAAQS in the vicinity of Sasol's plant suggests that current emissions from Sasol and other emitters in the airshed are broadly acceptable in regulatory terms. In respect of PM_{10} it is known that there are multiple sources of PM including other industries, vegetation burning, dust, discard coal combustion and domestic fuel use.

Given the high background loading of PM_{10}, Sasol Infrachem limits PM emissions from the Sasolburg complex. The various emission scenarios all result in low predicted ambient

concentrations of PM_{10}, even when the chemical transformation of SO_2 and NO_x into particulates is considered. Predicted ambient PM_{10} concentrations are seen to be less than 10% of the NAAQS and an even smaller fraction of the measured concentrations. This implies that reducing PM_{10} emissions from Sasol Infrachem activities will not reduce ambient concentrations of PM_{10} significantly, and will not result in compliance with the NAAQS in the airshed given the other dominant sources of PM.

Predicted ambient concentrations highlight Sasol Infrachem as a significant source of the other criteria pollutants most notably SO_2 and NO_2, but again the measured concentrations particularly in the short term are all seen to comply with the NAAQS. Reducing the concentrations of these emissions will certainly result in further reductions in ambient concentrations but in an airshed where there is already compliance with the NAAQS, bar specific SO_2 related incidents which tends to marginally exceed the daily SO_2 standard due to a couple of elevated hourly concentrations, which does not exceed the specific hourly standard, in an affected day. There will be a further improvement in ambient impact through the implementation of projects to achieve compliance with the VTAPA commitments, which is more aligned with the facility's true impacts in the VTAPA.

6.4.2 The effect of the alternative emissions limits

The alternative emissions limits proposed by Sasol Infrachem are in some instances significantly higher than the MES, i.e. as reported on a concentration basis. It is reiterated that the administrative basis of the MES is to comply under all operational circumstances, with emissions exceeding the MES only being tolerated for shut down, start up and upset conditions. That administrative requirement means that Sasol Infrachem must request ceiling emissions limits rather than average emissions limits to ensure that it can comply under all operating conditions given the known variability of emissions under normal operational circumstances.

The predicted ambient concentrations for the alternative emissions limits are a worst-case depiction because they have been modelled as if the emission will be maintained at those levels continually, which they will not. Yet even under the worst-case emissions scenario full compliance with the NAAQS is predicted in all circumstances. In the case of the incinerator emissions, resultant ambient concentrations are a fraction of the respective limits.

The key finding is that compliance with the MES will in most (but not all) circumstances reduce ambient concentrations, but in a circumstance where there is already compliance with the NAAQS under normal conditions. In the case of PM_{10}, compliance with the MES will not achieve compliance with the NAAQS and other measures are more likely to be more effective in this regard.

6.4.3 Health effects

The AIR Regulations prescribe an assessment of the health effects of the emissions for which relief is sought from the MES based on the degree to which there is compliance with the NAAQS. It cannot be argued that compliance with the NAAQS means no health risk. Indeed the World Health Organisation indicates that there is no safe limit in respect of exposure to PM. The NAAQS prescribe, however, a permissible or tolerable level of health risk. The overall findings of the AIR are that the alternative emissions limits requested by Sasol Infrachem will result in permissible health risks.

6.4.4 Ecological effects

An assessment of air pollution impacts on soil, water and receptors other than human were not formally included in the AIR. Nonetheless, the AIR includes a brief literature review of available studies on deposition of atmospheric sulphur and nitrogen on South African ecosystems.

Sasol has furthermore conducted its own literature study of the ecological impacts of atmospheric emissions in the Mpumalanga Highveld air shed, which is hereunder summarised.

Anthropogenic emissions of sulphur and nitrogen are a relatively new phenomenon in South Africa which became prominent once large scale coal fired power plants were introduced during the 1960s. Sasol estimates that it contributes about 15% of the total sulphur and nitrogen emissions into the Mpumalanga Highveld air shed. It is, however, currently not considered possible to isolate any single point source contribution from the deposition impacts from the other sources, either anthropogenic or natural. Due to this contribution to the total sulphur (S) and nitrogen (N) emission load in the Mpumalanga Highveld, Sasol has for many years actively supported research efforts to quantify the ecological impact of these atmospheric pollutants in South Africa where there are large differences between the European situation where most of this type of research has taken place.

The research work to date has focused on: (1) better understanding the transport and fate of atmospheric pollutants in order to determine the spatial deposition rates; and (2) measuring directly deposition impacts to water, soil and ecosystems. The critical load mapping approach developed for the European situation has been extensively used as a proxy for assessing risk. Recent critical load mapping has identified some areas in the inland region of South Africa where critical threshold limits have been exceeded although for the majority of the sites pollutant concentrations have been found to be well below the critical thresholds considered necessary for environmental damage to occur.

While sulphur emissions are the dominant acidification inputs, nitrogen emissions are responsible for the formation of low level ozone through the reaction between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) - both from human and natural sources –in the presence of sunlight. Ozone is known to cause damage to vegetation and be harmful to materials. Despite the ozone concentrations in South Africa being above the European critical levels for crop damages, no vegetation damages have to date been reported. Reasons suggested for this are varied including the view that impacts have either not been identified due to a lack of local research attention on this topic; or vegetation, as in some known species to have adapted to the high ozone levels.

The observed evidence to date indicates that, there have been no widespread ecological impacts which can directly be attributed to atmospheric deposition. The majority of soils in the inland region of South Africa have a sufficiently large capacity to buffer the additional acidifying inputs but less so the additional sulphate making salt build and flux a more important criterion. The salt loads need to be assessed against the other water quality drivers of the catchment. According to the work reviewed there has at most been some limited changes to soil and water quality which can be linked to atmospheric deposition of sulphate and nitrate species.

While the evidence tends to suggest that the South African situation is not at a tipping point the understanding of the linkage between atmospheric emission concentrations and ecological impacts remains an important area of research. Sasol continues to actively support joint research on this issue. In addition to continued assessments of atmospheric dry and wet deposition of sulphur and nitrogen species, further studies on the effects of ozone, a secondary pollutant, on local forests and agriculture in South Africa are thought to be necessary to better quantify ozone impacts on ecosystems. The current knowledge base needs to be expanded to permit reliable quantification of air pollution impacts on people, crops and natural systems and to enable accurate assessment of industrial activity impacts in order for a rational basis for cost effective strategies on reducing air pollutants to be implemented.

6.4.5 Assessment of Costs and Benefits

In concluding the findings of the AIR assessment, it must be emphasised that Sasol Infrachem has exhaustively investigated abatement measures that could reduce the emissions targeted for reduction by the MES. The principle of cost-benefit is recognised in the NAQF and must be considered in decisions regarding compliance with the MES, and applications for additional postponement as is the case here. At a qualitative level, the overarching objective of the MES is to ensure compliance with the NAAQS, which is already the case for all criteria pollutants save PM_{10}. On this basis, there is no material benefit to be obtained with the implementation of high cost abatement technologies to comply with the MES. If the gains are predicted, as is the case for the listed activity emissions from Sasol Infrachem, to be small percentage changes in ambient concentrations, then the benefits are even more marginal. The overarching conclusion of the AIR is that it suggests that the cost of strict compliance with the MES for these listed activities is not commensurate to the benefits that would be realised. A marginal cost-benefit case is not aligned with the stated objectives of the NAQF.

7 Sasol's roadmap to sustainable air quality improvement

Sasol follows a Group-wide risk-based approach to identifying and managing its priority environmental risks. Sasol's environmental policies, targets, standards and guidelines are all then driven as a function of the identified risks in a systematic focus on continuous environmental improvement.

This Chapter outlines the holistic approach to sustainable air quality improvement, while the specifics of interventions implemented and planned per point source, are summarised in Figure 9.

7.1 Commitment to continued implementation of Sasol's risk-based approach

Sasol prioritises emission reductions as a function of addressing risk and identifies emissions abatement opportunities which will realise the greatest improvements in onsite or ambient air quality. Often these interventions are win-win outcomes, with other benefits such as improving production efficiencies, reducing waste and demand for raw materials and generating new products from streams that would otherwise have been wastes.

Over the past decade, Sasol has spent in excess of R20 billion, or R2 billion per year, on various environmental improvements. This expenditure excludes very significant investments in the Department of Energy's Clean Fuels 1 programme (and imminent Clean Fuels 2 programme), which has resulted in, and will further result in reduced motor vehicle emissions. The natural gas conversion in Sasolburg in 2004 delivered material improvements in the Sasolburg air emission footprint, and was driven by Sasol's business objectives of delivering sustainable returns to shareholders in a socially and environmentally responsible manner.

7.2 Upholding Vaal Triangle Air-shed Priority Area Plan commitments

Sasol Infrachem is committed to honouring its VTAPA commitments. Sasol Infrachem is required to reduce its ambient impact on NO_x, SO_2 and Particulates by 18%, 7% and 1% respectively and has committed to these reductions. Sasol Infrachem is currently reviewing different technology options to achieve the emissions reduction commitment, and will submit a plan to the VTAPA Multi Stakeholder Implementation Group during November 2014, as prescribed in the Vaal Triangle Air-shed Priority Area Air Quality Management Plan.

7.3 Commitment to compliance with reasonable and achievable standards which achieve sustainable ambient air quality improvements

Sasol is committed to comply with all applicable environmental laws, including air quality laws such as the MES.

Sasol's roadmap for compliance with air quality law involves a multi-faceted approach, aligned with a risk-based philosophy:

7.3.1 Compliance with point source standards along achievable timelines

For some point sources, through Sasol's proactive environmental improvement approach, Sasol will comply with the point source standards within the prescribed timeframes for existing plant standards and new plant standards.

For one incinerator, as detailed in this motivation report, compliance with prescribed flue gas exit temperatures is achievable within the short to medium term, but the implementation of compliance solutions has a schedule that extends beyond the compliance timeframes. In this case, Sasol has applied for a postponement. With the passage of time, this source's exit gas temperature will comply with the applicable special arrangement for sub-category 8.1.

7.3.2 Approach to compliance in respect of additional postponement applications

Sasol Infrachem had previously applied for exemption from default application of the MES in cases where compliance cannot feasibly be achieved with presently available technologies, and will not materially improve ambient air quality. As described elsewhere in this report, Sasol is making an application for additional postponements in these cases. While Sasol's concerns with the MES remain, Sasol proposes three commitments to assure its stakeholders that sustainable environmental improvements will continue to be implemented and that, where reasonably feasible and achievable in the longer term, it will comply.

A. Commitment to compliance with alternative emissions limits

Sasol does not propose that for the duration of its additional postponement period its atmospheric emissions licences contain no emissions limits. Instead, for this period Sasol seeks alignment of the NEM:AQA's future emission limits prescribed in its atmospheric emission licences with alternative emissions limits (specified as maximum emission concentrations) that have been informed by integrated environmental management principles. Sasol Infrachem asserts that the alternative emission limits requested in this additional postponement application are the best that can feasibly be achieved on its facility, with presently available technology. Sasol furthermore intends that all the legal obligations associated with licence conditions, be attached to these alternative emissions limits, if incorporated in its licences. As described in the AIR, these alternative emissions limits will not cause exceedances of the NAAQS.

B. Commitment to periodic technology scans for sustainable compliance solutions

Despite not being able to comply using currently available technologies in the short to medium term, Sasol commits that, throughout the postponement period, it will conduct continued technology scans to investigate any future solutions that emerge which may enable it to comply over the longer term. Where promising new technologies are identified, Sasol commits to embarking on more detailed technical investigations, in accordance with Sasol's project governance framework. In this manner, it may be possible that in future, feasible solutions are identified, and that compliance is eventually achieved with the standards, albeit in the longer term. In order to ensure that the National Air Quality

Officer (NAQO) is kept abreast of developments, Sasol proposes providing annual feedback to the NAQO as well as a comprehensive status report on its investigations and conclusions at the end of the postponement period.

C. Commitment to engage with the DEA to advance the regulatory implementation of alternative compliance mechanisms

Sasol is supportive of appropriate alternative compliance mechanisms to achieve the objectives of the Constitution, the NAQF and the NEM:AQA. Evident from the AIR prepared for this application, as well as other air quality assessments, is the significant air quality challenge in the Vaal Triangle arising from ground-level emissions of PM from domestic fuel use and the exposure of communities to the same.

Sasol believes that air quality offsets could provide significant air quality improvements with associated community health and socio-economic benefits, particularly in priority areas. Sasol will conclude a detailed assessment of the potential ambient air quality improvements that can be attained through a pilot offset study by the end of 2014. It is hoped that the pilot may demonstrate more holistically sustainable improvements in ambient air quality, particularly toward PM_{10} challenges in the VTAPA where Sasol's Infrachem facility is located and in which respect there are exceedances of the NAAQS which are not, on the basis of the AIR, attributable to Sasol's activities. Sasol will grow its knowledge of how off-site projects might work from this pilot investigation. Offsets, if clearly defined in scope and properly supported by Regulations providing appropriate incentives for investment, may provide a significant lever to improve ambient air quality. To this end, Sasol commits to engage with the Department to advance the regulatory implementation of offsets as an alternative compliance mechanism.

D. Summary of roadmap to sustainable air quality improvement

In summarising this chapter, Sasol follows a Group-wide risk-based approach to identifying and managing its priority environmental risks. Sasol's environmental policies, targets, standards and guidelines are all then driven as a function of the identified risks with a systematic focus on continuous environmental improvement.

Figure 9 presents a summary of the information contained within the Sasolburg Operations motivation reports and associated technical appendices, demonstrating the roadmap to air quality improvement, described by emission source.

A short description is provided for the seven types of air quality improvement actions depicted in Figure 9, which Sasol has adopted in past years, and which Sasol will continue to act on. The labelling below corresponds to the labels included in Figure 9's legend. These actions include:

a) Proactive investments informed by a risk-based approach and aligned with voluntary internal targets. For example:

   - Investments on upgrading of ESP systems to reduce PM emissions to levels significantly lower that initial design.

b) The implementation of commitments to the Vaal Triangle Airshed Priority Area air quality management plan. Technical investigations have been undertaken to inform Sasol's plan to reach the VTAPA commitments. These will be presented in November 2014.

c) Implementation of solutions to reach compliance with existing or new plant standards, where feasible solutions for compliance have been identified. For example:

   - Renewal of steam plant electrostatic precipitators to reach existing plant PM standards under all normal operating conditions.

d) Implementation of solutions to reach compliance with existing or new plant standards, where feasible solutions for compliance have been identified, and where the initial postponement applications were made, to allow for the successful implementation of projects. For example:

- Renewal of steam plant electrostatic precipitators to reach existing plant PM standards under all normal operating conditions.

e) Implementation of solutions driven by MES compliance, which are aligned with NEMA sustainable development principles and which result in point source emission improvements, but which are unlikely to reach the prescribed emission limits set by the MES. For example:

- Solutions informed by the waste hierarchy either to avoid waste incineration or divert portions of waste streams from incinerators for beneficiation.

f) Technical investigations driven by MES compliance. For example:

- Investigations initiated recently due to November 2013 amendments to the MES, for reduction in flue gas temperature of the B6990 incinerator.

g) Studies implemented to investigate the feasibility and potential for air quality offsets to deliver sustainable ambient air quality improvements. For example:

- Sasol's current air quality offset pilot study, investigating the feasibility of RDP house insulation to reduce winter domestic coal burning.

Through these actions, Sasol will in most cases comply with the MES, as identified technical solutions are implemented. For 3 incinerators and the steam plants, while sustainable emission reduction interventions have and will continue to be implemented along the lines summarised above, feasible compliance with the new plant standards is not foreseen with presently available technologies. For these limited cases, Sasol's approach will be to responsibly manage its emissions while striving towards the desired environmental outcome of ambient air quality improvement, by upholding its commitments outlined in Section 7.3.2 (a) - (c).

Air quality improvement actions	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	Pollutant of focus (ambient)
Converting the site from coal to gas (Eliminating Category 3.6)																												
Conversion from coal gasification to gas reforming																												PM, SO2, NOx, H2S, VOCs (including additional benefit of greenhouse gases)
Nitric acid plant																												
Installation of selective catalytic reduction to reduce emissions of N2O																												N2O (a greenhouse gas)
Steam stations 1 and 2 - MES sub-category 1.1																												
Ammonia dosing implemented to improve PM10 collection efficiency																												PM10
Implementation of high frequency inverters (Steam Station 2 pilot)																												PM10
Replacement of ESP internals Steam Station 1 (pre-2004, therefore not shown on timeline)																												PM10
Replacement of ESP internals Steam Station 2																												PM10
Grow power generation on natural gas, to back out of coal-based electricity imports																												PM10, SO2, NOx (including additional benefit of greenhouse gases)
Heat integration to increase power generation from waste heat																												PM10, SO2, NOx (including additional benefit of greenhouse gases)
Vaal Triangle Priority Area Commitment approval and implementation																												PM10, SO2, NOx
Incinerator B6930 (high sulphur pitch) - MES sub-category 8.1																												
Conclude trial run on HSP as an alternative fuel to cement industry																												All regulated incinerator emissions
Subject to successful pilot, scale up on alternative fuels solution to reduce waste incinerated																												All regulated incinerator emissions
Incinerator B6990 (Heavy Ends B) - MES sub-category 8.1																												
Consequent upon a sucecsful trial on HSP as an alternative fuel, conclude trial run on heavy ends A and B as an alternative fuel to cement industry																												All regulated incinerator emissions
Subject to successful pilot, scale up on alternative fuels solution to reduce waste incinerated																												All regulated incinerator emissions
Incinerator B6990 - MES sub-category 8.1																												
Investigate and implement, if feasible, flue gas outlet temperature reduction technology																												Outlet temperature reduction (not emission related)
Off-site solutions for ambient air quality improvement																												
Ad hoc Sponsorship of Basa Magogo intervention in Zamdela																												Ambient and indoor PM10, SO2, carbon monoxide, greenhouse gases
Trial implementation of household insulation on 12 homes in Zamdela																												Ambient and indoor PM10, SO2, carbon monoxide, greenhouse gases
Triple bottom line economic modelling of potential offset opportunities																												Ambient and indoor PM10, SO2, carbon monoxide, greenhouse gases
Possible implementation of offsets, subject to approval of regulations for offsets as an alternative compliance mechanism																												Ambient and indoor PM10, SO2, carbon monoxide, greenhouse gases

Action linked to voluntary initiative or internal target (described under (a) of Section 7)

Action linked to Vaal Triangle Airshed Priority Area air quality management plan commitment (described under (b) of Section 7)

Action linked to MES compliance project, where existing and/or new plant standard will be achieved (described under (c) of Section 7)

Action linked to MES air quality footprint improvement, but unlikely to reach limits specified by MES (described under (d) of Section 7)

Technical investigation to explore environmental improvement options linked to MES point sources (described under (e) of Section 7)

Investigations to off-site investments as means to contribute to NEM:AQA ambient air quality improvement objectives (described under (f) of Section 7)

Figure 9: Roadmap to sustainable air quality improvement for Sasol Infrachem

7.4 Progress on advancing air quality improvement roadmaps during the application process

The stakeholder engagement process on Sasol Infrachem's applications was initiated in September 2013, some 15 months ago. At the same time as, but independently to the postponement application process, work on implementing the air quality improvements outlined above in the roadmap, and the associated technical appendix to this application, has been ongoing, aligned with Sasol's project development and governance process. A high level overview is provided on the progress achieved since the commencement of the process.

- Capital applications were advanced for the implementation of continuous emissions monitoring at the steam plants and incinerators;
- Pilot trials with the cement industry continued to explore the viability of diverting certain waste streams away from incinerators towards beneficial use, aligned with the waste hierarchy;
- The project development and governance process was progressed for the upgrade of electrostatic precipitators at Steam station 2 in line with the general overhaul schedule of the boilers;
- An update on Sasol Infrachem's plans to meet its VTAPA commitment was presented to the Sasolburg Implementation Task Team and Vaal Triangle Priority Area Multi Stakeholder Reference Group in November 2014, and project governance processes will be advanced on this basis, in order to achieve these commitments by the required date of July 2019. As part of the solution tabled Sasol will further continue to investigate optimised solutions that could ensure emission load reduction on NOx and SO_2 emissions;
- Sasol's pilot retrofitting offset study, initiated within Zamdela, was advanced, and detailed analysis of results are under way, to better understand the potential of offsets as a sustainable indoor and ambient air quality improvement intervention, to inform Sasol's inputs to air quality offset policy development.
- Sasolburg's Eco-Park ambient air quality monitoring station was ISO/IEC 17025 accredited as well as the newly installed PM2.5 dust analysers installed in Sasol's residential monitoring stations in Sasolburg;
- The Leitrim ambient air quality monitoring station was successfully relocated to a more secured area where electrical power supply is more consistent as to increase the data availability from the ambient air quality monitoring station following a double burglary as well as various power outages.
- Sasolburg's ambient air quality monitoring network received continued ISO/IEC 17025 accreditation and continues to provide invaluable information aimed at informing Sasol's atmospheric impact work and subsequent mitigation strategies;
- Sasol's fallout dust monitoring network around its Sasolburg operations continues to operate in an industrial area, predominantly, within residential area limits according to the Fallout Dust Regulations specifications.

8 Stakeholder engagement

Sasol has structured its public participation process in support of postponement applications along the Environmental Impact Assessment (EIA) Regulations published under the National Environmental Management Act (Act 107 of 1998) (NEMA), as specified in the November 2013 Minimum Emissions Standards (MES) Regulations.

The stakeholder engagement process is an important component of the application process and is closely linked to the technical steps and activities required in the preparation of Motivation Reports (Figure 10).

The initial stakeholder engagement process comprised two rounds of engagement; public meetings that took place during the announcement phase and a second round of public meetings and focus group meetings that took place when the Draft Motivation Reports in support of postponement applications were made available for public comment.

Since the conclusion of the initial stakeholder engagement process in June 2014, the Minister of Environmental Affairs has formally notified Sasol that she will not consider its exemption applications, and has advised that postponement applications should be made instead. Sasol will therefore submit its previous exemption applications as additional postponement applications. While the additional applications contain materially the same content as the original exemption applications, a further opportunity will be provided to stakeholders to comment on these as additional postponement applications.

The final postponement applications that have not been affected by the Minister's notification were submitted to the National Air Quality Officer (NAQO) for decision-making in September 2014. Stakeholders were notified that their comments on final postponement applications could be submitted directly to the NAQO.

A copy of the Stakeholder Engagement Report is attached in Annexure C.

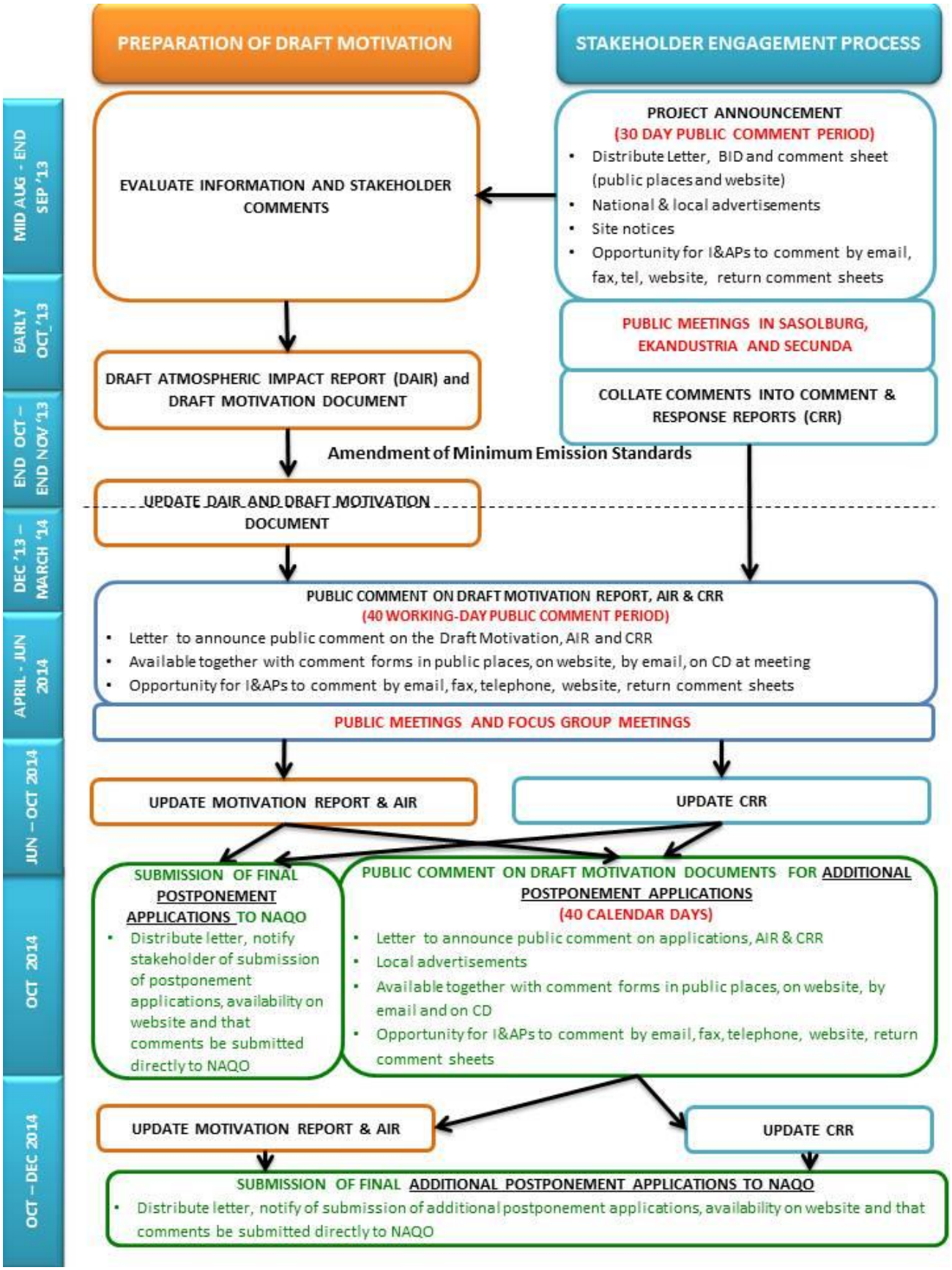

Figure 10: Technical and Stakeholder Engagement Process

8.1 Project announcement

Sasol's application process was announced between **15 September 2014 and 15 October 2014.** Stakeholders were invited to separate public meetings which were held from 7 – 10 October 2013 for the different Sasol operations. The public meeting for the Sasolburg operation took place on Monday, 7 October 2013, between 13:00 and 15:00, at the Boiketlong Community Hall in Sasolburg. Stakeholders received notification of public meetings and were invited to participate in the process as follows:

- A letter of invitation was sent to stakeholders to invite them to the public meetings and register as stakeholder.
- The invitation letter was accompanied by a Background Information Document (BID), providing more information on Sasol's operations and a comment form for stakeholders to submit their comments.
- Advertisements were placed in national and local newspapers to announce Sasol's application process.
- The BID, invitation letter and comment forms were made available in public places and on the SRK website www.srk.co.za.
- Telephonic and sms notification were made to stakeholders to inform and remind them of public meetings and opportunities to comment.

Key issues and comments raised by stakeholders

The key comments, concerns and suggestions raised by stakeholders for the Sasolburg operation are summarised below. For a comprehensive record of stakeholder comments, please refer to Annexure D.

- **Comments relating to Sasol's application process** – Stakeholders' comments focused on Sasol's reasons for applying for postponement, legal requirements, timeframe for compliance, and requests for details regarding which plants and processes require postponement.
- **Stakeholder engagement** - It was noted that the BID did not provide sufficient information for meaningful stakeholder comment. Stakeholders commented on the poor attendance at the public meeting and made suggestions for more convenient venues and meeting times. Some stakeholders requested an extended public comment period.

  The Sasol Community Working Group thanked Sasol for its efforts and demonstrating care for the surrounding communities.
- **Environmental concerns** - Stakeholders expressed concern regarding Sasol's air emissions and actual contribution to air pollution in the area. Other environmental concerns regarding the impact of Sasol's emissions on water quality, health and socio-economic aspects, such as Sasol's obligation to re-invest in communities in their area of operation, and to empower communities to care for the environment, were also raised.

8.2 Public comment on the Draft Motivation Report

Due to the fact that the public meetings held during the first round of stakeholder engagement was poorly attended, despite reasonable efforts, it was proposed to hold focus group meetings with key stakeholders, in addition to public meetings during the second round of engagement to encourage greater stakeholder participation in Sasol's application process.

The public meeting for the Sasolburg operation took place on Monday, 19 May 2014, between 13:00 and 15:00, at the Ingwe Conference Centre in Van der Bijl Park. Stakeholders received notification of public meetings and were invited to comment on the Draft Motivation Report during the comment period from **15 April 2014 to 13 June 2014**, as follows:

- Distribution by email and mail, of an invitation letter to attend public meetings, accompanied by a Comment Form in English. These documents were available in, Afrikaans and Sotho upon request.
- Posting the letter, Comment Form and Draft Motivation Reports on the SRK website (www.srk.co.za).
- Placing the letter, Comment Form and the Draft Motivation Reports in publicly accessible venues close to the Infrachem operation, as during the announcement phase.
- Advertisements in two national newspapers to announce the availability of the Draft Motivation Report for public comment:
    - Sunday Times (English), Sunday 30 March 2014;
    - Beeld (Afrikaans), Tuesday 1 April 2014;
- Advertisements in local newspapers
    - Sasolburg Ster (English), Wednesday 2 April 2014;
    - Puisano (Sesotho), Friday 11 April 2014; and
    - Vaal Weekblad (Afrikaans, Wednesday 2 April 2014);
- Telephonic and SMS notifications were sent to stakeholders to notify them of opportunities to comment.

Focus group meeting with key stakeholders

A focus group meeting was held with key stakeholders such as NGOs, environmental and conservation groups and organised sectors of society (business and labour, organised civil society groups and community based organisations) on 23 May 2014, at the Hacklebrooke Conference Centre in Johannesburg. All comments made at this meeting have been included in the CRRs of all Sasol operations.

Key issues and comments raised by stakeholders

The key issues, comments and concerns raised by stakeholders during the comment period on the draft Motivation Reports are summarised below. For a comprehensive record of stakeholder comments, please refer to Annexure D.

- **Application process** - Stakeholders were of the opinion that Sasol was in direct violation of the Bill of Rights, which stipulates that every citizen is entitled to an environment that is not harmful to their health and questioned why Sasol was delaying compliance as it had since 2010 to comply with the MES. In addition, that Sasol had no right to apply for postponement when the area in which they operate was not in compliance with national ambient air quality standards.
- **Environmental concerns** – Questions relating to the amount of money that Sasol has spent to reduce PM_{10} emissions in Zamdela and questions regarding Sasol's contribution to emission of greenhouse gases and climate change. Concerns were expressed that Sasol's emissions causes serious respiratory problems, headaches and asthma. Stakeholders wanted to know what Sasol's impact was on health of residents and how this impact was going to be addressed.
- Some stakeholders felt that Sasol was shifting the blame for non-compliance with ambient air quality standards to communities. In addition, that Sasol has been afforded sufficient opportunity to comply with the MES.
- Some stakeholders were of the opinion that postponements from the MES should not be granted for Sasol operations as there was no legal basis for their application and that Sasol has

not addressed the adverse health impacts of their operations, or cumulative impacts. Applications have not been submitted within the appropriate time of compliance date postponement should not be allowed for hazardous air pollutants, such as PM and other hazardous emissions.

- **Stakeholder engagement** – Questions were asked regarding the methods used to involve stakeholders in Sasol's application process and the success of public meetings to engage stakeholders. It was noted that the information presented at public meetings were too technical and that capacity building initiatives should have been engaged to assist stakeholders to contribute more meaningfully to this process. In addition, that the 40 day comment period was not sufficient to comment on reports and consult with specialists.
- It was noted that advertisements were not the most effective way of advertising public meetings and suggestions were made for more effective ways of notifying communities of public meetings in future. Questions were raised as to how stakeholders were to provide comment on reports when it is stated in the draft motivation reports that it was a criminal offence to publish any part of the document without written consent of the author.

8.3 Way forward on application process

Stakeholders were informed in writing (email, fax, post) that the Minister of Environmental Affairs formally notified Sasol that she would not consider its exemption applications, and advised that postponement applications should be made instead. In line with the Minister's notification, Sasol submitted the following to the NAQO for decision-making:

- final postponement applications that have not been affected by the Ministers' notification; and
- previous exemption applications as additional postponement applications.

8.4 Notification of public comment on draft Motivation Reports in support of additional postponement applications

Stakeholders were notified in writing (mail, email, fax) and advertisements in local newspapers of the availability of draft Motivation Reports in support of additional postponement applications for public comment for a period of forty (forty) days. The documents were available on the SRK http://www.srk.co.za/en/za-sasol-postponements for viewing in public places, and on request from the stakeholder engagement office.

8.5 Notification of submission of final additional postponement applications

Stakeholders were notified in writing (mail, email and fax) that the final additional postponement applications have been submitted to the NAQO for decision-making and that comments on the applications can be submitted directly to the NAQO within 21 days. Final Motivation Reports in support of additional postponements where made available electronically for stakeholder's information, on the SRK website http://www.srk.co.za/en/za-sasol-postponements, or on request from the stakeholder engagement office.

8.6 Comment and Response Report

All comments, concerns, questions and suggestions raised for the Sasolburg operation during the stakeholder engagement process, including comments during public meetings and written comments received from stakeholders were recorded in the Comment and Response Report (CRR). The CRR provides a consolidated record of stakeholder comments, as well as responses from the SRK, Airshed and the Sasol project team members. The CRR is attached as Annexure D.

9 Conclusions

Sasol operates large complex industrial facilities in Sasolburg and Secunda both of which generate atmospheric emissions due to the nature of the activities. The publication in 2010 and the subsequent amendment in 2013 of Minimum Emissions Standards (MES) has meant that Sasol is obliged to reduce many of its emissions to comply with the MES requirements.

Sasol Infrachem is the supplier of utilities and services (including infrastructure, waste management, site support and site governance) to various Sasol business units (Sasol Polymers, Sasol Solvents, Sasol Wax, Merisol and Sasol Nitro) as well as external businesses in Sasolburg. Sasol Infrachem operates and maintains an auto thermal reformer (ATR), which reforms natural gas into synthesis gas for downstream productions activities. The net effect is an industrial process that has multiple product streams all of which are highly dependent on one another, with similarly highly integrated utilities, most especially heat and steam.

The critical nature of the services provided by Sasol Infrachem means that emissions abatement cannot be considered without a thorough understanding of the up- and down-stream effects of the abatement option in question. Sasol Infrachem has provided a range of reasons as to why it seeks these additional postponements that mostly stem from the technical risks associated with retrofitting of the plants, but also includes financial implications, technology limitations and importantly other unintended environmental impacts, stemming from its assessments of presently available technologies.

Sasol Infrachem seeks in terms of this additional postponement application to operate in terms of limits that are reasonable, achievable and most importantly provide a benefit in air quality improvement which is commensurate to the costs of compliance. Sasol Infrachem has accordingly proposed alternative emissions limits to which it could be held and which would underpin its atmospheric emissions licence during the period of postponement. Sasol Infrachem furthermore commits to conducting periodic technology scans to identify reasonable measures to reduce emissions that may emerge over time.

Since the administrative basis of the MES are ceiling limits, or maximum emission concentrations, Sasol's proposed alternative emissions limits are aligned with this approach. Maximum emission concentrations are, by definition, higher than reported average baseline emission concentrations, but this does not mean that Sasol is applying for any increases in its current atmospheric emissions. Sasol Infrachem has assessed the ambient air quality implications of the alternative emissions limits that it has proposed, conducted by an independent third party and published as an AIR. That AIR has been based largely, but not exclusively on, atmospheric dispersion modelling where different emissions scenarios are modelled to see what the effects will be on ambient concentrations of the pollutants in question.

Key findings of the AIR include that there is compliance with the NAAQS at all of the ambient air quality monitoring stations operated by Sasol, except in the case of PM_{10} where non-compliance is evident as well as daily SO_2 standards at one monitoring station. Modelling of the ambient concentrations that would derive from PM emissions from Sasol Infrachem indicate that Sasol Infrachem contributes less than 10% to the ambient concentrations implying that other sources in the VTAPA including ground level emissions from especially domestic fuel use make up the bulk of the measured concentrations. Predicted ambient concentrations as a result of differing emissions regimes including current emissions, the MES, proposed alternative emissions limits and alternative emissions commitments made in respect of the VTAPA are all seen to be in compliance with the NAAQS (Table 6). In many instances the predicted reductions in ambient concentrations brought about by achieving the MES, compared to current emissions, alternative emissions limits and the VTAPA commitments are small and even negligible. Indeed, compliance with the new plant MES

would in fact result in higher ambient concentrations as a result of poorer dispersion of emissions. Incinerator emissions have concentrations that exceed the MES but the loads are so small that the resultant predicted concentrations are negligible. Sasol is committed to supporting government in efforts to manage, and where required, reduce atmospheric emissions in the priority areas where its major operations are located. Compliance with the MES is a priority, and where this can be achieved through feasible technologies, identified solutions will be implemented. Where short to medium term compliance is not feasible, Sasol believes that its roadmap to sustainable air quality improvement will ensure that Sasol's emissions are responsibly managed and practicably minimised, in a manner aligned with the intent of the Constitution, the NEM:AQA and the NAQF. The possibility of offsets where more meaningful sustainable development benefits in terms of improved air quality and corresponding improvements in health and socio-economic outcomes may potentially be achieved is an area of interest that Sasol would like to fully explore.

Table 6: Concluding summary of Sasol's compliance with the MES

MES Category	Substance(s)	Emission limits or special arrangements*		Applicable Sasol Activities
		New plant standards	Existing plant standards	
Category 1: Sub-category 1.1	Particulate matter	50	100	Steam Station 1 (Sasol Infrachem)
	Sulphur dioxide	500	3500	
	Oxides of nitrogen	750	1100	
Category 1: Sub-category 1.1	Particulate matter	50	100	Steam Station 2 (Sasol Infrachem)
	Sulphur dioxide	500	3500	
	Oxides of nitrogen	750	1100	
Category 1: Sub-category 1.5	Particulate matter	50	50	Gas Engine Power Plant (Sasol New Energy)
	Sulphur dioxide	1 170	1 170	
	Oxides of nitrogen	400	400	
Category 2: Sub-category 2.1	Particulate matter	70	120	Heaters and furnaces (Sasol Polymers)
	Sulphur dioxide	1 000	1 700	
	Oxides of nitrogen	400	1 700	
Category 6:	VOCs	150 (thermal) /40 000 (non thermal treatment)	150 (thermal) /40 000 (non thermal treatment)	VCM, PVC, Monomer, PE and Butanol and AAA (Sasol Polymers; Sasol Solvents, Sasol Wax)
Category 7: Sub-category 7.1	Hydrofluoric acid	5	30	HCl burners; VCM plant, Ammonia, NAP and Cyanide (Sasol Polymers)
	Chlorine	50	50	
	Ammonia	30	100	
	Hydrogen cyanide	0.5	2.0	
Category 7 Sub-category 7.2	F as HF	5	30	HCl burners (Sasol Polymers)
	Hydrochloric acid	15	25	
	Secondary hydrochloric issue	30	100	
	Sulphur dioxide	350	2 800	
	Sulphur trioxide	25	100	
	Oxides of nitrogen	350	2 000	
Category 7 Sub-category 7.3	Particulate matter	50	100	Ammonium nitrate and prillian plant (Sasol Infrachem)
	F as HF	5	30	
	Ammonia	50	100	
Category 8: Sub-category 8.1	Particulate matter	10	20	B6930 (Sasol Infrachem)
	Carbon Monoxide	50	75	
	Sulphur dioxide	50	50	
	Oxides of nitrogen	200	200	
	Hydrogen chloride	10	10	
	Hydrogen fluoride	1	1	
	Sum of Lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel, vanadium	0.5	0.5	
	Mercury	0.05	0.05	
	Cadmium + Thallium	0.05	0.05	

MES Category	Substance(s)	Emission limits or special arrangements*		Applicable Sasol Activities
		New plant standards	Existing plant standards	
	Total Organic Compounds	10	10	
	Ammonia	10	10	
	Dioxins and furans	0.1	0.1	
	n/a	Exit gas temperatures must be maintained below 200ºC		
Category 8: Sub-category 8.1	Particulate matter	10	20	B6990 (Sasol Infrachem)
	Carbon Monoxide	50	75	
	Sulphur dioxide	50	50	
	Oxides of nitrogen	200	200	
	Hydrogen chloride	10	10	
	Hydrogen fluoride	1	1	
	Sum of Lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel, vanadium	0.5	0.5	
	Mercury	0.05	0.05	
	Cadmium + Thallium	0.05	0.05	
	Total Organic Compounds	10	10	
	Ammonia	10	10	
	Dioxins and furans	0.1	0.1	
	n/a	Exit gas temperatures must be maintained below 200ºC		
Category 8: Sub-category 8.1	Particulate matter	10	20	B6993 (Sasol Infrachem)
	Carbon Monoxide	50	75	
	Sulphur dioxide	50	50	
	Oxides of nitrogen	200	200	
	Hydrogen chloride	10	10	
	Hydrogen fluoride	1	1	
	Sum of Lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel, vanadium	0.5	0.5	
	Mercury	0.05	0.05	
	Cadmium + Thallium	0.05	0.05	
	Total Organic Compounds	10	10	
	Ammonia	10	10	
	Dioxins and furans	0.1	0.1	
	n/a	Exit gas temperatures must be maintained below 200ºC		
Category 8: Sub-category 8.1	Particulate matter	10	20	VCM incinerator (Sasol Polymers)
	Carbon Monoxide	50	75	
	Sulphur dioxide	50	50	

MES Category	Substance(s)	Emission limits or special arrangements*		Applicable Sasol Activities
		New plant standards	Existing plant standards	
	Oxides of nitrogen	200	200	
	Hydrogen chloride	10	10	
	Hydrogen fluoride	1	1	
	Sum of Lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel, vanadium	0.5	0.5	
	Mercury	0.05	0.05	
	Cadmium + Thallium	0.05	0.05	
	Total Organic Compounds	10	10	
	Ammonia	10	10	
	Dioxins and furans	0.1	0.1	
	n/a	Exit gas temperatures must be maintained below 200ºC		

**In the case of emission limits, these are specified as mg/Nm^3 under normal conditions of 273 Kelvin and 101.3 kPa, at respective O_2 reference conditions for each listed activity as specified in the MES; ng I-TEQ/Nm^3 in the case of dioxins and furans*

2020 standard for which no feasible technology is presently available to attain compliance and for which Sasol continues to seek reasonable measures for longer-term certainty

Additional postponements requested, on compliance timeframes for the prescribed emission limit or special arrangement

Initial postponements of compliance timeframes for the prescribed emission limit or special arrangement

Will comply with the prescribed emission limit or special arrangement within the prescribed compliance timeframes

Annexures

Annexure A: Atmospheric Impact Report

(Identical to the AIR submitted as part of the Final Initial Postponements)

Annexure B: Peer Review Report on the approach to the Atmospheric Impact Report

(Identical to the Peer Review submitted as part of the Final Initial Postponements)

Annexure C: Volume 1: Stakeholder Engagement Report

Annexure D: Volume 2: Comments and Response Report

Annexure E: Further Technical Information in support of the additional postponement application