Fezile Dabi
District Municipality

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Atmospheric Emissions Licence Holder: NATIONAL PETROLEUM REFINERS OF SOUTH AFRICA (PTY) LTD

Atmospheric Emissions Licence Reference Number: FDDM-MET-2013-17-P3-R4

ATMOSPHERIC EMISSIONS LICENCE ISSUED IN TERMS OF SECTION 13 OF REGULATION No.893 of 22 NOVEMBER 2013 READ WITH 43 OF THE NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY AMENDMENT ACT, 2014, (ACT NO. 20 OF 2014)

This Atmospheric Emissions Licence issued to **NATIONAL PETROLEUM REFINERS OF SOUTH AFRICA (PTY) LTD.** in terms of section 13 of the National Environmental Management: Air Quality Amendment Act, 2014 (Act No. 20 of 2014), read together with the List of Activities which result in atmospheric emissions which have or may have significant detrimental effects on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage.

The licence is issued in respect of following Listed Activities:

- Subcategory 2.1: Combustion Installations
- Subcategory 2.2: Catalytic Cracking Units
- Subcategory 2.3: Sulphur Recovery Units
- Subcategory 2.4: Storage and Handling of Petroleum Products

The Atmospheric Emissions Licence is issued on the basis of information provided by National Petroleum Refiners of South Africa (Pty) Ltd on the application for Atmospheric Emissions dated 8 July 2024 and information that became available during processing of the application.

The Atmospheric Emissions Licence is effective from **1 April 2025 valid until 31 March 2030**.

The reason for issuance of the current licence is **renewal** of the previous Atmospheric Emissions Licence: FDDM- MET-2013-17-P3-R3.

The Atmospheric Emissions Licence is issued subject to the conditions and requirements set out below which form part of the Atmospheric Emissions Licence, and which are binding on the holder of the Atmospheric Emissions Licence, National Petroleum Refiners of South Africa (Pty) Ltd hereinafter referred to as the ("the licence holder").

1. ATMOSPHERIC EMISSIONS LICENCE ADMINISTRATION

Name of the Licensing Authority	Fezile Dabi District Municipality
Atmospheric Emissions Licence Number	FDDM-MET-2013-17-P3-R4
Atmospheric Emissions Licence Issue Date	Date of signature by AQO
Atmospheric Emissions Licence Type	Atmospheric Emissions Licence
Review Date, not later than	Six months before the AEL expiry date.

2. ATMOSPHERIC EMISSIONS LICENCE HOLDER DETAILS

Enterprise Name	National Petroleum Refiners of South Africa (Pty) Ltd.
Trading as	NATREF
Type of Enterprise, e.g. Company/Close Corporation/Trust, etc.	Company
Enterprise Registration Number (Registration Numbers if Joint Venture)	1967/012994/04
Registered Address	Northern Industries, Jan Haak Road, Sasolburg
Postal Address	P.0 Box 234, Sasolburg, 1947
Telephone Number (General)	016 - 940 9111
Industry Sector	Petroleum Refinery
Responsible Person Name or Emission Control Officer (Where appointed)	[redacted]
Telephone Number	016 960 2921
Cell Phone Number	[redacted]
Fax Number	016 940 2503
Email Address	[redacted]
After Hours Contact Details	[redacted]
Land Use Zoning as per Town Planning Scheme	Industrial
Land Use Rights if outside Town Planning Scheme	N/A

3. SITUATION AND EXTENT OF PLANT

3.1 Location and extent of the plant:

Physical Address of the Plant	Northern Industries, Jan Haak Road, Sasolburg
Description of Site (Where No Street Address)	N/A
Coordinates of Approximate Center of Operations	North-south: S26°48'21.46" East-west: E27°51'26.87"
Extent (km²)	2.037
Elevation Above Mean Sea Level (m)	1498
Province	Free State
Metropolitan/District Municipality	Fezile Dabi District Municipality
Local Municipality	Metsimaholo Local Municipality
Designated Priority Area	Vaal Triangle Airshed Priority Area

3.2 Description of Surrounding Land Use within 5 km radius

- North of Natref: Agriculture (Currently limited to horse, cattle & crop farming activities). Boundary of Vaalpark residential area is 2.5 km North of Natref
- South of Natref: Open land owned by Sasol with Zamdela Township 8 km South of Natref.
- East of Natref: Industrial Area occupied by Safripol, Clariant (formerly called SÜD Chemie), Sascrete and Omnia. These industries are all within a 1-km radius of Natref with open agricultural farmland 2 to 5 km further East.
- West of Natref: There is partially occupied Light Industrial Area with a truck stop on the southwest. The closest residential home is in Sasolburg which is 2 km west of Natref's main stack.

Figure 4.1: Aerial photograph of the area around Natref facility

4. GENERAL CONDITIONS

4.1. Process and ownership changes

4.1.1 The holder of the atmospheric emissions licence must ensure that all unit processes and apparatus used for the purpose of undertaking the listed activity in question, and all appliances and mitigation measures for preventing or reducing atmospheric emissions, are at all times properly maintained and operated.

4.1.2 Building, plant or site works related to the listed activity or activities used by the licence holder shall be extended, altered or added subject to the applicable requirements for an environmental authorisation from the competent authority as per the provisions of the National Environmental Management Act 1998 (Act No. 107 of 1998) (NEMA), as amended, read with the Environmental Impact Assessment Regulations thereunder. The investigation, assessment and communication of potential impact of such an activity must follow the required assessment procedure as prescribed in the Environmental Impact Assessment Regulations published in terms of section 24(5) of the National Environmental Management Act.

4.1.3 Any changes in processes or production increases which may have an impact on atmospheric emissions, by the licence holder, will require prior approval by the licensing authority.

4.1.4 Any changes to the type and quantities of input materials and products, or to production equipment and treatment facilities which may have an impact on atmospheric emissions will require prior written approval by the licensing authority.

4.1.5 The licence holder must, in writing, inform the licensing authority of any change of ownership of the enterprise. The licensing authority must be informed within 30 (thirty) days after the change of ownership.

4.1.6 The licence holder must immediately on cessation or decommissioning of the listed activity inform, in writing, the licensing authority.

4.2. General duty of care

4.2.1 The holder of the licence must, when undertaking the listed activity, adhere to the duty of care obligations as set out in section 28 of the NEMA.

4.2.2 The licence holder must undertake the necessary measures to minimize or contain the atmospheric emissions. The measures are set out in section 28(3) of the NEMA.

4.2.3 Failure to comply with the above conditions is a breach of the duty of care, and the licence holder will be subject to the sanctions set out in section 28 of the NEMA.

4.3. Sampling and/or analysis requirements

4.3.1 Measurement, calculation and/or sampling and analysis shall be carried out in accordance with Annexure A of National Environmental Management Air Quality Act (2004). A different method may be acceptable to the licensing authority as long as it has been consulted and accepted by the National Air Quality Officer, been provided with the documentation necessary to confirm the equivalent test reliability, quality and equivalence of analyses and has agreed to such method.

4.3.2 The licence holder is responsible for quality assurance of methods and performance. Where the holder of the licence uses external laboratories for sampling or analysis, accredited laboratories shall be used.

4.4. General requirements for licence holder

4.4.1 The licence holder is responsible for ensuring compliance with the conditions of this licence by any person acting on his, her or its behalf, including but not limited to, an employee, agent, sub-contractor or person rendering a service to the holder of the licence.

4.4.2 The licence does not relieve the licence holder to comply with any other statutory requirements that may be applicable to the carrying on of the listed activity.

4.4.3 A copy of the licence must be kept at the premises where the listed activity is undertaken. The licence must be made available to the environmental management inspector representing the licensing authority who requests to see it.

4.4.4 The licence holder must inform, in writing, the licensing authority of any change to its details including the name of the emissions control officer, postal address and/or telephonic details.

4.4.5 The license holder is required to report annual emissions on the National Atmospheric Emissions Inventory System (NAEIS) as per National Atmospheric Emission Reporting Regulations (2015), as amended.

4.5. Statutory obligations

The licence holder must comply with the obligations as set out in Chapter 5 of the Act.

4.6 Variation of Atmospheric Emissions Licence

The Air Quality Officer reserves the right to, by notice, in writing, set and adjust the emissions limit value or any operation condition after consultation with the holder of the licence.

4.7 Non- Compliance with Conditions

If the holder fails to comply with the conditions or requirements of this Atmospheric Emissions Licence, the Air Quality Officer may by notice in writing call upon such a holder to comply with such conditions or requirement within a reasonable period specified in the notice, and in the event of failure on the part of such holder to comply with the said conditions or requirement within the period so specified, the Air Quality Officer may cancel the Atmospheric Emissions Licence or suspend the operation thereof for such period as he or she may deem fit.

5. NATURE OF PROCESS

5.1. Process description

General

NATREF serves a market that has a limited requirement for heavy fuel oil products. The refinery therefore has a process configuration that allows significant conversion of the bottom-of-the-barrel crude to products, e.g. sulphur, Liquid Petroleum Gas (LPG), gasoline, jet fuel, diesel, and fuel oil. With its inland location and due to the abundance of coal, the refinery's market for heavy fuel oil is quite limited. As a result, it was designed to get the most out of crude oil and equipped with suitable technology. The refinery uses the bottoms up-grading refining process using medium gravity crude oil and giving the refinery the capability of producing 20 percent more white products than other refineries that have market outlets for heavy fuel oil. Conversion of vacuum residue (VR) to white products (diesel, petrol, jet fuel and LPG) was a necessity from the start. Thus, in addition to a conventional fluid catalytic cracking (FCC) unit, the refinery is equipped with a Distillate Hydro Cracker (DHC) and black oil Reduced Crude Desulphurisation (RCD) Unit.

5.1.1 Crude Distillation Unit (CDU) - [redacted]

The Crude Distillation Unit comprises 4 distillation columns, i.e. the Crude Preflash Column [redacted] the Crude Distillation Column [redacted] the Debutaniser Column [redacted] and the Splitter Column [redacted]

Raw Crude Oil (incorporating all fractions from LPG Gas, i.e. C3, C4 gas, Light and Heavy Naphtha, Kerosene, Diesel, Gas Oils, Vacuum Gas Oils (VGO) and Vacuum Residues (VR)) is fed into the unit. The Crude Oil feed is heated and at various stages within the plant, different products are fractionated from the feed stream. LPG Gas and Light Naphtha (LSR) are the first to be separated in the Crude Preflash Column. Within the Crude Distillation Column itself, Heavy Naphtha is recovered at the top, Kerosene at the 2nd product draw tray, Light Diesel at the 3rd product draw tray, Heavy Diesel at the 4th product draw tray and Atmospheric Gas Oil (AGO) at the 5th product draw tray. The remainder, Atmospheric Residue (AR), is fed through to the Vacuum Distillation Unit. The nameplate design feed of the CDU is [redacted] however this is dependent on the type of Crude Oil fed to the unit.

- The LPG, Light Naphtha and Heavy Naphtha are fed through to the Debutaniser where the LPG (C3's and C4's) are removed. This stream is sent to the LPG Merox for Sulphur compound removal.
- The Light and Heavy Naphtha fractions are split in the Splitter Column. Light Naphtha (LSR) is sent through the LSR Mericat for conversion of mercaptan compounds (Sulphur compounds with a strong odour) to disulphides (low smell).
- The Heavy Naphtha is routed to the Naphtha Unifiner (NU) and Platformer.
- Kerosene is routed through the Kero Meroxes for mercaptan conversion and removal of water. It is then routed to the final product tanks.
- Light Diesel can be routed to Diesel Unifiner (DU) or blended into final product.
- Heavy Diesel is routed through the Diesel Unifiner to reduce the concentration of Sulphur.
- AGO is routed to Distillate Hydrocracker (DHC) for cracking and Sulphur removal.

5.1.2 Vacuum Distillation Unit

The Vacuum Distillation Unit (VDU) comprises the Vacuum Preflash Column [redacted] and the Vacuum Column [redacted] where both columns operate under vacuum conditions (-15 mmHg and -10 mmHg respectively). Atmospheric Residue (AR) is initially fed to the Vacuum Preflash Column where Vacuum Heavy Diesel and Gas Oil are recovered.

Most of the remaining product, Vacuum Preflash Bottoms, is heated further and fed to the Vacuum Column where Medium Vacuum Gas Oil (MVGO), Heavy Vacuum Gas Oil (HVGO) and Slop Wax are recovered. Approximately 12% of the feed is recovered as Vacuum Preflash Bottoms.

- Vacuum Heavy Diesel is routed to the Diesel Unifiner to reduce the concentration of Sulphur.
- Gas Oil and MVGO are routed to the Diesel Unifiner to reduce the concentration of Sulphur.
- HVGO is normally routed to the FCC for cracking.
- Vacuum Residue (VR) is routed to RCD for metals, nitrogen and some Sulphur removal and part cracking.

5.1.3 The LSR Mericat - [redacted]

The LSR Mericat is used to convert the mercaptans in the LSR (light Naphtha)

5.1.4 Kero Merox - [redacted]

The Kero Merox is used to convert mercaptans present in Kerosene into disulphides. Each Kero Merox (2 trains) can process [redacted] of Kerosene, although the combined throughput is limited to [redacted]

5.1.5 Bitumen Blower

The Bitumen blower is used to change the penetration grade of Bitumen feed (VR) to a new desired penetration grade.

5.1.6 Sour Water Stripper (SWS) - [redacted]

The Sour Water Stripper (SWS) is used to remove H_2S and NH_3 from different process waters produced as by-products within the refinery. The capacity of the SWS is [redacted]

5.1.7 Fluid Catalyst Cracking (FCC) - [redacted]

The Natref FCC is a resid-type cracker, whereby the predominant part of the FCC feed is resid material, i.e. RCD products HFL + CFL (Hot Flash Liquid + Cold Flash Liquid). [redacted] of the FCC's feed is resid and [redacted] is gas oils (MVGO + HVGO).

The resid material is converted to various products in the reactor. Predominant reactions are cracking reactions whereby paraffins are converted to shorter paraffin's and olefins. The various products that are produced from the reactor undergo separation and processing via the main column and Gascon unit. The products from the FCC are the following:

- Tailgas to refinery fuel gas system
- LPG to Alkylation Unit
- LFCC to Petrol Blending

- LCO to Diesel Unifiner or refinery fuel oil
- Slurry to refinery fuel oil or Sasol Carbo Tar to produce anode coke.

5.1.8 Platformer - [redacted]

The Naphtha Unifiner (NU) and Platformer units are designed to upgrade low octane naphtha into high octane motor fuels. In the complete unit, two different processes are incorporated, Unifying and Platforming.

5.1.8(a) Naphtha Unifiner

The main purpose of the Naphtha Unifiner is to remove or convert components in the Naphtha stock which will have a deleterious effect on the reforming over [redacted] catalyst, thereby contributing to better catalyst performance as well as prolonging the Platformer catalyst life. Unifining is a hydrogenation process (hydrogen consuming) employing a catalyst comprised of [redacted] and [redacted]

5.1.8(b) Platformer Unit

Platforming is a catalytic reforming process employing a select [redacted] catalyst, to convert low quality and straight run naphtha in the presence of hydrogen, into high octane motor fuel. Octane improvement, the main function of the platforming process is brought about by the chemical re-arrangement of the low octane molecules into hydrocarbon components of a high-octane value.

5.1.9 Diesel Unifiner - [redacted]

Diesel unifining is a catalytic refining process employing a [redacted] catalyst, together with a hydrogen rich gas to:

- decompose sulphur, nitrogen, oxygen compounds;
- to remove metallic compounds found in the hydrocarbon fractions; and
- to provide hydrogen saturation of olefinic compounds found in the feedstock.

Diesel unifiner (DU) is mainly employed to refine high Sulphur diesel product to low Sulphur. The charge stock improvements are attended to with little or no volume yield loss. Feed to the unit can be from either or all of the following to obtain saleable diesel oil on the consumer market:

- Atmospheric gas oil (AGO) from the crude distillation unit;
- Diesel oil from the crude distillation unit;
- Light cycle oil (a diesel fraction) from the main column of the FCC (Fluid catalytic cracking unit) can be blended with AGO or diesel as a valuable diesel blending component. Because of the high Sulphur content and the unsaturated nature of the light cycle oil (LCO) and with the high heat of reaction in the reactor accompanying the use of LCO, it is advisable to use LCO only as a feedstock to the diesel unifiner.

Feed to the diesel unifiner can also be straight run kerosene from the CDU ex storage to make aviation-, power- or illumination kerosene. Kerosene is only charged to the unit on its own.

The diesel unifiner catalyst employed is the same as that employed in the naphtha unifiner and the

reaction processes are similar in activity and results.

One important fact which should be understood at the outset is that the gas streams associated with the diesel unifiner, contain high concentrations of hydrogen sulphide (H_2S), an extremely toxic and hazardous gas. The gas stream which contains a high concentration of H_2S is routed to the Amine section which absorbs the H_2S from the gas then recycled back to the reactor with the hydrocarbon. The H_2S rich amine is then routed to the Amine unit where the H_2S is stripped off and routed to Sulphur Unit.

5.1.10 Reduced Crude Desulphurisation (RCD) - [redacted]

The Reduced Crude Desulphurisation (RCD) process is a catalytic hydrogenation process, which upgrades the heavy petroleum fractions by removing contaminants (Sulphur, metals, etc.). Feed to the RCD unit can be obtained from the following sources:

- VR and AR from storage
- AR as rundown from CDU

Hydrogen rich recycled gas is heated in the reactor charge heater and is combined with the residue feed which then enters the guard reactor. The reactor system consists of 4 reactors and five catalyst beds. The first two reactors are responsible for demetallizations. The third reactor contains transition catalyst for both demetallization and Sulphur removal. The final reactor consists of two catalyst beds which remove Sulphur and reduce Conradson carbon.

After the reactor section, the product enters a fractionation section. Here the liquid and vapour streams pass through a series of flash drums to obtain the following:

- Recycle gas is scrubbed and sent to the recycle gas compressor. Make-up hydrogen is also fed into the recycle gas loop;
- Off gas which is sent to the Amine treatment unit;
- Cold flash liquid (CFL) which can be routed to the FCC;
- Hot flash liquid (HFL) is the main feed source of the FCC;
- Sour water which is sent to the wastewater stripper.

5.1.11 Distillate Hydrocracker (DHC) – [redacted]

Fresh feed to the Distillate Hydro Cracker (DHC) is brought into the unit from storage or directly from the CDU. After the feed is filtered it passes into the surge drum. The high-pressure feed pump [redacted] takes suction from the feed surge drum. Its discharge combines with the net recycle gas and make-up hydrogen. The combined feed stream is then preheated in the feed/reactor effluent heat exchangers [redacted] and then in the reactor charge heater [redacted] The charge heater raises the reactor inlet temperature to 370 - 400˚C.

The combined gas oils and recycle gas feed mixture enters the "treating" reactor (D-17002), a two-bed reactor with recycle gas quench at the inlet (normally not used) and in between the beds.

The effluent from the first reactor is quenched with recycle gas before entering the "cracking" reactor [redacted] a three-bed reactor with a recycle gas quench between each bed to control the exothermic reactions.

The effluent from the second reactor exchanges heat with the combined gas oil and recycle gas feed mixture in the feed/reactor effluent heat exchangers [redacted] The reactor effluent is then further cooled down in the reactor effluent air cooler [redacted] The cooled product then enters the HP separator [redacted]

The gas leaving the HP separator passes through the recycle gas compressor [redacted] to be used as reactor quench and "net" recycle gas to the front-end of the unit. This net recycle is mixed with hydrogen make-up ex booster compressors [redacted] and routed upstream the feed/reactor effluent heat exchangers where it combines with the fresh feed.

The liquid from the HP separator is fed on level control to the LP separator [redacted] with the HP separator operating at a pressure of [redacted] and the LP separator at [redacted] The flashed gas ex LP drum is routed to the refinery saturated gas system (via a MEA absorber).

The liquid leaving the LP separator is routed via the debutanizer feed heat exchangers [redacted] to the debutanizer [redacted] Slops and Cold Flash Liquid (CFL - from RCD unit) can enter the DHC prior to the debutanizer feed heat exchangers (normally not used).

The debutanizer produces a liquid overhead product ("LPG"), routed to the Platformer depropaniser, and an overhead off-gas, routed to the refinery fuel gas (via a MEA absorber). A fired reboiler [redacted] controls the debutanizer bottom temperature.

The debutanizer bottom are pre-heated in the fractionator feed heater [redacted] before being fed to the fractionator [redacted] The DHC fractionator produces a liquid overhead product (sent to the naphtha splitter [redacted] kerosene and diesel as side-draw products and DHC bottoms (routed to FCC feed).

The naphtha splitter produces a light naphtha ("LSR" - routed to petrol blending via the Merox unit) and Heavy naphtha ("naphtha" - routed to the Platformer unit and/or Naphtha Unifiner).

5.1.12 HF Alkylation - [redacted]

The aim of the HF Alkylation unit is to produce high octane motor fuel. The HF alkylation unit receives its feed supply of olefinic material from the Olefin Depropaniser to the alkylation reactor system while isomerate from the Butamer unit, and saturated feed from other refinery sources, bypass the reaction process and are charged directly to the iso- stripper.

The normal butane in these olefin-free streams is enriched with iso-butane in the iso-stripper, the iso-butane being used along with the olefinic material from storage as feed to the alkylation reactor.

Commercially, alkylation processes usually take place in the presence of a strong acidic catalyst such as hydrofluoric acid (HF), sulphuric acid, phosphoric acid or aluminium chloride. In Natref however, hydrofluoric acid (HF) is the preferred catalyst for the Alkylation process.

In addition to the alkylate produced, normal butane used as a feed to the Butamer, and propane as a marketable product is also produced.

5.1.13 Butamer [redacted]

The Butamer unit is designed to convert normal butane feed into an isomerate product, rich in isobutene. This is accomplished by catalytic isomerisation in which the normal butane feed along with a hydrogen gas recycle is passed through two fixed bed reactors in series.
The process employs a [redacted] catalyst and the total amount of required catalyst is split into two, each reactor containing [redacted] of the total amount.
Hydrogen gas for recycling purposes is supplied to the unit from the platformer/unifiner and distillate hydrocracking sections of the refinery.
The reactor products are separated, and the hydrogen is again recycled through the unit, the liquid product is stabilized by fractionation and charged to the HF alkylation unit.

5.1.14 Olefin Depropaniser and Propylene Purification Unit 4 (PPU4) - [redacted]

This section consists of the olefin depropaniser and the PPU4 units.

5.1.14(a) Olefin Depropaniser

The olefin depropaniser receives its olefinic feed from sphere [redacted] The purpose of this unit is to separate the C3's (propane and propylene) from the C4's (butanes). The overheads of this unit (C3's) are sent to the PPU4 and a portion of this stream [redacted] is sent to the alkylation unit. The bottoms of the olefin depropaniser are sent to the alkylation unit.

5.1.14(b) PPU4

This unit receives the C3's (mixture of propane and propylene) from the olefin depropaniser overheads. The feed is passed through a C2/C3 splitter where the light ends (C2's) are sent to the fuel gas. The C3's are then sent to the C3=/C3- (propylene/propane) splitter where the propylene is separated from the propane. The overheads of the C3=/C3- splitter is propylene and this is sent to either [redacted] to the alkylation unit [redacted]

The bottom of the C3=/C3- splitter has 3 routings:

- [redacted] this is propane in the vapour phase
- Fuel gas - this is propane in the vapour phase
- Alkylation unit - this is propane in the liquid phase

4.1.15 Amine Treating [redacted]

4.1.15(a) No. 1 Amine unit:

The saturated gas and unsaturated gas from all the different producers (DHC/FCC etc.) are routed to this unit; the amine unit is used for stripping off the H_2S from the Sat / Unsaturated Gas, using monoethanolamine (MEA). The H_2S-rich stripped gas (acid gas) is routed to the Sulphur Recovery Unit (SRU).

The first priority routing for the Sat gas is as feed to the Hydrogen unit (via a caustic wash column which removes any remaining H_2S).

The remaining Sat Gas and unsaturated gas is then routed to the refinery fuel gas pool.

5.1.15(b) No. 2 Amine unit:

This unit works on the same principle as the No1 Amine unit, however the feed to the unit is only from the RCD. The unit strips off any H_2S in the gas, and the H_2S-free gas is recycled to the RCD. The H_2S-rich gas (acid gas) is also routed as feed to the Sulphur Recovery Unit.

5.1.16 Reformer [redacted]

The objective of the unit is to produce hydrogen (at a certain minimum H_2 purity level), for consumption by consumers (DHC/RCD/DU/Butamer).

[redacted]

The H_2 product is then routed to a last reactor where any remaining CO_2 is converted back to methane (CO_2 is harmful to the downstream users).

5.1.17 Sulphur Recovery (Claus Unit) [redacted]

This section consists of the Claus Sulphur Recovery Unit.

The purpose of the Sulphur Recovery Unit (SRU) is to convert H_2S rich gas received from the Amine Units and the Sour Water Stripper Offgas to elemental Sulphur. The H_2S rich gas is passed through a combustion chamber in a reductive atmosphere with oxygen. The temperature in the combustion chamber is kept at high levels to destroy the ammonia impurities entering the plant together with the feed.

A portion of the H_2S rich gas is converted to SO_2 to achieve a 2:1 H_2S:SO_2 ratio. This ratio is required to ensure maximum conversion to elemental Sulphur in the reactors of the Unit. Through a series of condensers, the 2- stage Claus reactors and a control system linked to a tail gas analyser, the plant can achieve average recovery efficiencies of 95% when process conditions are within normal parameters.

The Offgas is combusted through a tail gas incinerator where all the remaining H_2S is converted to SO_2 before being released to atmosphere through the main stack. [redacted]

The liquid Sulphur is drained into the Sulphur pit where temperature is maintained at ±140°C using steam coils and tracing in the lines. The liquid Sulphur is then transferred once per day to the dispatch tank from where it is dispatched as such at ±140°C to external customers.

5.1.18 Storage Facilities

The storage facilities consist of raw materials, intermediate and final products storage tanks.

Intermediate and final products may be stored inside fixed roof or floating roof tanks depending on the size of the tank, vapour pressure of the product and the service of the tank. Intermediate product may be used for further processing or for blending into final product.

Floating roof tanks with a diameter of greater than 20 m are equipped with primary and secondary seals to minimise fugitive emissions.

5.1.19 Road and Rail Loading Facilities

Raw materials and products are transported via road, rail or pipeline and offloaded/loaded at the road gantries and product loading rail siding.

Additives and intermediate products are either blended directly into the final product or stored in the existing storage tanks for blending into the final product pool where it may be dispatched via road, rail, or pipeline.

5.2. LISTED ACTIVITY

Listed Activities, as published in terms of Section 21 of the AQA, authorised to be conducted at the premises by the licence holder:

Listed Activity Number	Category of Listed Activity	Sub-category of the Listed Activity	Name of the Listed Activity	Description of the Listed Activity
2	2.1	Petroleum Industry	Boilers, furnaces, and heaters	Combustion installation
2	2.2	Petroleum Industry	Catalytic cracking units	Catalytic Cracking Units
2	2.3	Petroleum Industry	Sulphur Recovery Unit	Sulphur Recovery Units
2	2.4	Petroleum Industry	Storage tanks	Storage and handling of Petroleum Products

5.3. EMISSION UNIT (EU)

List all emission units associated with the listed activities in operation at the premises by the atmospheric emission licence holder.

EU Code	Emission Unit Name	Emission Unit Process Function	Batch or Continuous Process
EU0001	Crude Distillation Unit	Atmospheric distillation of crude oil	Continuous

EU0002	Vacuum Distillation Unit	Vacuum distillation is distillation at conditions where the pressure above the liquid mixture to be distilled is reduced to less than its vapour pressure (usually less than atmospheric) causing evaporation of the least volatile liquid(s) (those with the highest boiling points) at lower temperature and hence more energy efficient distillation.	Continuous
EU0003	Fluidised Catalytic Cracker Unit	The Fluid Catalytic Cracking processes allow for the production of "light" products such as liquid petroleum gas and gasoline from heavier crude oil distillation fractions such as gas oil and residues. Fluid Catalytic Cracking produces a high yield of gasoline and liquid petroleum gas.	Continuous
EU0004	Merox	Merox treatment is mercaptan oxidation. It is a proprietary catalytic chemical process developed by UOP (Universal Oil Products) and used to remove mercaptans from LPG, Propane, Butane, Kerosene and petrol components by converting the mercaptans to liquid hydrocarbon disulphides.	Continuous
EU0005	Distillate Hydrocracker	The Distillate Hydro-cracker Unit catalytically cracks vacuum distillate (lube oil type components) into petrol, jet fuel, and diesel under a hydrogen partial pressure of [redacted] bar and a temperature of [redacted]	Continuous
EU0006	Diesel Unifiner	The purpose of this unit is to remove sulphur from diesel to reduce the sulphur dioxide (SO_2) emissions that result from using those fuels in automotive vehicles, aircraft and railway locomotives and other forms of fuel combustion.	Continuous
EU0007	Naphtha Unifiner / Platformer	The Naphtha Unifiner removes sulphur and nitrogen compounds and saturate olefins in the light naphtha. The Unifiner uses the hydrogen from platformate to remove the undesirable compounds and supplies the feed to the Platformer. The platforming unit converts the low octane naphtha from Unifiner to high octane reformate by conversion of straight chain compounds into cyclic compounds.	Continuous
EU0008	Reduced Crude Desulphurisation	The Reduced Crude Desulphurisation unit operates at elevated temperature [redacted] and pressure [redacted] The unit catalytically hydro-desulphurises, demetallises and cracks vacuum residue (road tar and heavy fuel oil) into feedstock that can be treated in the fluid catalytic cracking unit where LPG, petrol, kerosene and diesel are produced.	Continuous
EU0009	Hydrogen Plant and Hydrogen Membrane	At high temperatures [redacted] and in the presence of a metal-based catalyst [redacted] steam reacts with methane to yield carbon monoxide and hydrogen.	Continuous

EU0010	PPU4	The PPU4 Unit separates propane (sold as a final product) from propylene. The propylene is sold as a feedstock to neighbouring industry [redacted]	Continuous
EU0011	Bitumen Blower	In order to produce bitumen that will soften at a higher temperature than an equivalent penetration Bitumen, severe air blowing is required. The product is therefore also known as 'air-blown' or 'oxidised' bitumen. Typically, the blower feedstock has a lower initial boiling point than other bitumen grades.	Batch
EU0012	Sour Water Stripper	The Sour Water Stripper is used to force both Hydrogen Sulphide and Ammonia out of the water phase into a gas phase. Sulphur is recovered from the gas phase "Acid Gas" in the Claus Sulphur Recovery Unit.	Continuous
EU0013	Amine Scrubbing and Sulphur Recovery Unit	Hydrogen sulphide present in gas streams is separated by means of selective chemical absorption in the Amine unit and sent to the Sulphur Recovery Unit (SRU) for conversion into elemental sulphur. The resultant "sweet gas" is used as Refinery Fuel Gas. Wastewater Stripper Off gas is also routed to the SRU. The acid gas, rich in H_2S, is passed through a combustion chamber at [redacted] to combust ammonia impurities and to convert H_2S to liquid sulphur.	Continuous
EU0014	Alkylation Unit	Alkylation is a process that combines olefins with iso-butane using a catalyst, HF acid in this case, to produce alkylate. Alkylate is highly flammable and is blended into petrol to boost its octane. The unit operates in tandem with the Butamer Unit that produces iso- butane as feed for the Alkylation Unit.	Continuous
EU0015	Crude, Intermediate, Final Product Tanks, Spheres and Bullets	Storage of raw materials, intermediate and final products used and produced in the refinery.	Continuous
EU0016	Road and Rail Loading Facilities	Facilities for loading road tankers and rail tankers with LPG, Petrol, Diesel, Jet Fuel, Fuel Oil, slurry and Bitumen.	Batch
EU0017	Stacks	Natref has two main stacks, a [redacted] Main Refinery Stack where refinery off-gasses are vented and a [redacted] stack which is used under start-up, shut-down and abnormal operating conditions	Main Stack – Continuous FCCU Stack – Batch
EU0018	Flares	Flares are used a safety device to manage abnormal operating conditions and start up and shut down the refinery safely.	Batch
EU0019	API Area	All fugitive emissions from within the PI area	Continuous
EU0020	Final product loading and offloading activities	All fugitives emissions from final product loading and offloading activities	Continuous

EU0021	South Tank Farm (STF): Intermediate Product Storage	All fugitives emissions from within this tank farm area	Continuous
EU022	Strategic Fuel Fund (SFF): Final Product Storage	All fugitives emissions from within this tank farm area	Continuous
EU0023	Vapour Recovery Unit	Vapour Recovery Unit at LSR tanks	Continuous
EU0024	Vapour Recovery Unit	Vapour Recovery Unit at dispatch	Continuous
EU0025	Sulphur recovery unit	Sulphur recovery unit	Continuous

**Emission Unit* means a single component (equipment) with identifiable inputs and outputs within a process flow. A series of unit processes make up the full manufacturing process, for example, boiler, furnace, distillation column, etc.*

5.4. HOURS OF OPERATIONS (EXCLUDING SHUTDOWNS)

Emission ID	Unit Process	Operating Hours	Days of Operation per Year
EU0001	Crude Distillation Unit	24-hours/day	365 days/year
EU0002	Vacuum Distillation Unit	24-hours/day	365 days/year
EU0003	Fluidised Catalytic Cracker Unit	24-hours/day	365 days/year
EU0004	Merox	24-hours/day	365 days/year
EU0005	Distillate Hydrocracker	24-hours/day	365 days/year
EU0006	Diesel Unifiner	24-hours/day	365 days/year
EU0007	Naphtha Unifiner / Platformer	24-hours/day	365 days/year
EU0008	Reduced Crude Desulphurisation	24-hours/day	365 days/year
EU0009	Hydrogen Plant and Hydrogen Membrane	24-hours/day	365 days/year
EU0010	PPU4	24-hours/day	365 days/year
EU0011	Bitumen Blower	24-hours/day	365 days/year
EU0012	Sour Water Stripper	24-hours/day	365 days/year
EU0013	Amine Scrubbing and Sulphur Recovery Unit	24-hours/day	365 days/year
EU0014	Alkylation Unit	24-hours/day	365 days/year
EU0015	Crude, Intermediate, Final Product Tanks, Spheres and Bullets	24-hours/day	365 days/year

Emission ID	Unit Process	Operating Hours	Days of Operation per Year
EU0016	Road and Rail Loading Facilities	24-hours/day	365 days/year
EU0017	Stacks	24-hours/day	365 days/year
EU0018	Flares	24-hours/day	365 days/year
EU0019	API Area	24-hours/day	365 days/year
EU0020	Final product loading and offloading activities	24-hours/day	365 days/year
EU0021	South Tank Farm (STF): Intermediate Product Storage	24-hours/day	365 days/year
EU0022	Strategic Fuel Fund (SFF): Final Product Storage	24-hours/day	365 days/year
EU0023	Vapour Recovery Unit	24-hours/day	365 days/year
EU0024	Vapour Recovery Unit	24-hours/day	365 days/year
EU0025	Sulphur recovery unit	24-hours/day	365 days/year

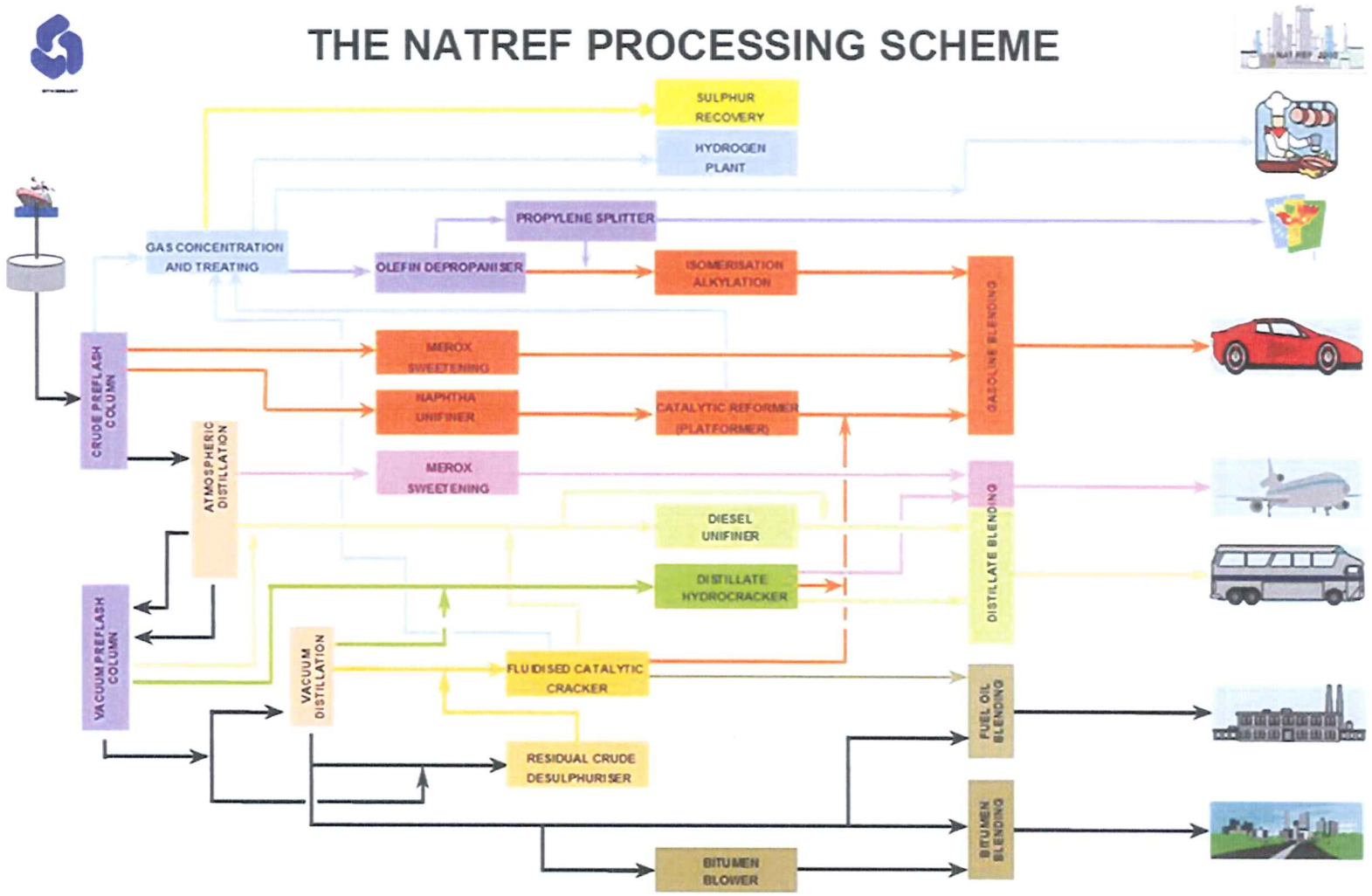

Figure 5.1: Natref summary process flow diagram

Figure 5.2: Natref Site Layout

6. RAW MATERIALS AND PRODUCTS

6.1. Raw materials used

Raw Material Type	Design Consumption Rate (Quantity)	Actual Consumption Rate (Quantity)	Units (quantity/period)
Crude Oil	6 307 200 m^3/year	620 m^3/h	m^3/year

6.2. PRODUCTION RATES

Product Name	Design Production Capacity (Quantity)	Actual Production Capacity (Quantity)	Units (quantity/period)
Petrol (All Grades)	[redacted]	[redacted]	m^3/year
Diesel (All Grades)			m^3/year
Jet Fuel (incl. Paraffin)			m^3/year
Bitumen			m^3/year

Production rates are variable and dependent on the fuels product market demand.

6.3 By-Product

By-Product Name	Design Production Capacity (Quantity)	Actual Production Capacity (Quantity)	Units (Quantity/Period)
Fuel Oil (All Grades)	[redacted]	[redacted]	m^3/year
LPG			m^3/year
Propylene			m^3/year
Sulphur			m^3/year
Carbon Dioxide			ton/year

6.3. MATERIALS USED IN ENERGY SOURCES

Materials for Energy	Sulphur Content of the Material (%)	Ash Content of Material (%)	Design Consumption Rate (Quantity	Actual Consumption Rate (Quantity)	Units (Quantity/ Period)
Sasol Residual Gas (tail gas)	-	N/A	[redacted]	[redacted]	ton/year
Natural Gas	-	N/A			ton/year
Refinery Fuel Gas	-	N/A			ton/year
Electricity	0	0			MWh/year
Steam	0	0			ton/year

[redacted]

6.4. SOURCES OF ATMOSPHERIC EMISSIONS

6.4.1. Point source parameters

Unique Stack ID	Stack Name	Latitude (decimal degrees)	Longitude (decimal degrees)	Height of Release Above Ground (m)	Height Above Nearby Building (m)	Diameter at Stack Tip / Vent Exit (m)	Actual Gas Exit Temperature (°C)	Actual Gas Volumetric Flow (m^3/hr)	Actual Gas Exit Velocity (m/s)
[redacted]	Refinery Main Stack	S -26°.48'21.72"	E27°.51' 28.26"	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	FCC Stack (when CO boiler is offline)	S -26°.48' 18.37"	E27°.51' 27.46"						
	Number 1 Flare	S -26°.48' 17.58"	E27°.51' 39.06"			Not applicable	Not applicable	Flame	
	Number 2 Flare	S -26°.48' 15.57"	E27°.51' 40.28"			Not applicable	Not applicable	Flame	
	Number 3 Flare	S -26°.48' 11.77"	E27°.51' 34.81"			Not applicable	Not applicable	Flame	
	NU Fired Heater Stack	S -26° 48' 25.48"	E27° 51' 30.24"			[redacted]	[redacted]	[redacted]	
	NU Fired Heater Stack	S -26° 48' 25.03"	E27° 51' 30.53"						
	NU Fired Heater Stack	S -26° 48' 24.38"	E27° 51' 29.64"						
	NU Fired Heater Stack	S -26° 48' 23.92"	E27° 51' 31.22"						

Unique Stack ID	Stack Name	Latitude (decimal degrees)	Longitude (decimal degrees)	Height of Release Above Ground (m)	Height Above Nearby Building (m)	Diameter at Stack Tip / Vent Exit (m)	Actual Gas Exit Temperature (°C)	Actual Gas Volumetric Flow (m^3/hr)	Actual Gas Exit Velocity (m/s)
[redacted]	DHC Fired Heater Stack	S -26° 48' 23.38"	E27° 51' 25.27"	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Reformer stack	S -26° 48' 22.55"	E27° 51' 22.28"						
	Boiler flue gas stack	S-26°48'24"	E27°51'26"						

*Point source means a single identifiable source and fixed location of atmospheric pollution, e.g. stack, chimney, etc.

6.4.2. Area and/or line source parameters

Unique Area Source ID	Source Name	Source Description	Latitude (decimal degrees) of SW corner	Longitude (decimal degrees) of SW corner	Height of Release Above Ground (m)	Length of Area (m)	Width of Area (m)
EU0019	API Area	All fugitive emissions from within the PI area	S -26° 48' 00,81"	E27° 51 47,40"	[redacted]	[redacted]	N/A
EU0020	Final product loading and offloading activities	All fugitives emissions from final product loading and offloading activities	S -26° 48' 25,10"	E27° 50' 56,55"			N/A
EU0021	South Tank Farm (STF): Intermediate Product Storage	All fugitives emissions from within this tank farm area	S -26° 48' 34,72"	E27° 51' 19,45"			N/A
EU0022	Strategic Fuel Fund (SFF): Final Product Storage	All fugitives emissions from within this tank farm area	S -26° 48' 12,76"	E27° 51' 08,04"			N/A

7. APPLIANCES AND MEASURES TO PREVENT AIR POLLUTION

7.1. Appliances and control measures

Appliances				Abatement Equipment Control Technology							
Associated Unique Stack/ EU ID	Appliance / Process Equipment Number	Appliance Type / Description	Appliance Serial Number	Abatement Equipment Manufacture Date	Abatement Equipment Name and Model	Abatement Equipment Technology Type	Commission Date	Date of Significant Modification / Upgrade	Design Capacity	Minimum Control Efficiency (%)	Minimum Utilization (%)
[redacted]	[redacted]	Crude Fired Heater	Not applicable	Not available	LE-CSGC-10W Low NO_x Burners	Callidus Scepter	01/12/2012	2012	NO_x emission basis (3% O_2) <70 mg/Nm^3 22 kW (79.2 MJ/hr)	N/A	100%
		Crude Fired Heater	Not applicable	Not available	LE-CSGC-10W Low NO_x Burners	Callidus Scepter	01/12/2012	2012	NO_x emission basis (3% O_2) <70 mg/Nm^3 22 kW (79.2 MJ/hr)	N/A	100%
		Sulphur Recovery Unit	Not applicable	Not available	Claus Unit	[redacted]	Not available	Not available	140 ton/day	≥95%	≥99%
N/A	E25001	CO_2 Stripper	Not applicable	Not available	CO_2 Plant	[redacted]	Not available	Not available	Not available	N/A	100%
N/A		Vapour Recovery Unit at Dispatch	Not available	Not available	Not available	Vapour Recovery System (activated carbon)	Not available	N/A	Not available	≥95%	≥95%
N/A	Not available	Vapour Recovery Unit at LSR Tanks	Not available	Not available	Not available	Vapour Recovery System	Not available	N/A	Not available	≥95%	≥95%

Appliances				Abatement Equipment Control Technology							
Associated Unique Stack/ EU ID	Appliance / Process Equipment Number	Appliance Type / Description	Appliance Serial Number	Abatement Equipment Manufacture Date	Abatement Equipment Name and Model	Abatement Equipment Technology Type	Commission Date	Date of Significant Modification / Upgrade	Design Capacity	Minimum Control Efficiency (%)	Minimum Utilization (%)
						(activated carbon)					
[redacted]	Not available	Electrostatic Precipitator	Not available	2022	Electrostatic Precipitator		February 2022	N/A			

7.2. POINT SOURCE – MINIMUM EMISSIONS STANDARDS (UNDER NORMAL WORKING CONDITIONS)

Point Source/EU Code	Category	Appliance	Pollutant Name	Maximum Release Rate			Duration of Emissions
				(mg/Nm³)	Compliance Time Frame	Average Period	
[redacted]	**Subcategory 2.1:** Combustion Installations	Crude Fired Heater	PM	70	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous
			SO_2	1000	Immediately	Daily	Continuous
[redacted]	**Subcategory 2.1:** Combustion Installations	Refinery Boilers	PM	70	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous
			SO_2	1000	Immediately	Daily	Continuous
[redacted]	**Subcategory 2.1:** Combustion Installations	Vacuum preflash Offgas Furnace	PM	70	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous

Point Source/EU Code	Category	Appliance	Pollutant Name	Maximum Release Rate			Duration of Emissions
				(mg/Nm³)	Compliance Time Frame	Average Period	
			SO_2	1000	Immediately	Daily	Continuous
[redacted]	**Subcategory 2.1:** Combustion Installations	Platformer and DU furnaces	PM	70	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous
			SO_2	1000	Immediately	Daily	Continuous
[redacted]	**Subcategory 2.1:** Combustion Installations	RCD and DHC Heaters	PM	70	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous
			SO_2	1000	Immediately	Daily	Continuous
	Subcategory 2.1: Combustion Installations	Acid gas furnace	PM	70	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous
			SO_2	1000	Immediately	Daily	Continuous
	Subcategory 2.1: Combustion Installations	Acid gas furnace	PM	70	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous
			SO_2	1000	Immediately	Daily	Continuous
	Subcategory 2.1: Combustion Installations	NU Charge Heater	PM	70	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous
			SO_2	1000	Immediately	Daily	Continuous
	Subcategory 2.1: Combustion Installations	NU Reboiler Heater	PM	70	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous
			SO_2	1000	Immediately	Daily	Continuous
	Subcategory 2.1:		PM	70	Immediately	Daily	Continuous

Point Source/EU Code	Category	Appliance	Pollutant Name	Maximum Release Rate			Duration of Emissions
				(mg/Nm³)	Compliance Time Frame	Average Period	
	Combustion Installations	Platformer Reactor Charge Heater	NOx	400	Immediately	Daily	Continuous
			SO_2	1000	Immediately	Daily	Continuous
[redacted]	**Subcategory 2.1:** Combustion Installations	Platformer Stabilizer Reboiler	PM	70	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous
			SO_2	1000	Immediately	Daily	Continuous
	Subcategory 2.1: Combustion Installations	Steam Methane Reformer Heater	PM	70	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous
			SO_2	1000	Immediately	Daily	Continuous
	Subcategory 2.1: Combustion Installations	Kerosene Splitter Reboiler	PM	70	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous
			SO_2	1000	Immediately	Daily	Continuous
	Subcategory 2.2: Combustion Installations	FCCU/CO Boiler	PM	100	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous
			SO_2	1500	Immediately	Daily	Continuous
	Subcategory 2.2: Catalytic Cracking Units	Fluid Catalytic Cracking (FCC) Unit	PM	100	Immediately	Daily	Continuous
			NOx	400	Immediately	Daily	Continuous
			SO_2	1500	Immediately	Daily	Continuous
	Subcategory 2.3: Sulphur Recovery Units	Sulphur Recovery Unit	SO_2	a	Immediately	95% recovery efficiency, and 99% availability	Continuous

Point Source/EU Code	Category	Appliance	Pollutant Name	Maximum Release Rate			Duration of Emissions
				(mg/Nm³)	Compliance Time Frame	Average Period	
EU0023	**Subcategory 2.4:** Vapour Recovery Unit (VRU)	Vapour Recovery Unit at Dispatch	VOCs	40 000	Immediately	Daily	Continuous
EU0024	**Subcategory 2.4:** Vapour Recovery Unit (VRU)	Vapour Recovery Unit at LSR Tanks	VOCs	40 000	Immediately	Daily	Continuous

7.2.1 SPECIAL ARRANGEMENTS

Sub-category	Special Arrangements
Subcategory 2.1: Combustion Installations	**(a) The following special arrangements shall apply –** i) No continuous flaring of hydrogen sulphide-rich gases shall be allowed.
Subcategory 2.3: Sulphur Recovery Units	(a) **The following special arrangement shall apply –** Sulphur recovery units should achieve 95% recovery efficiency and availability of 99%, aligned with the Minimum Emission Standards averaging period and reported monthly.
Subcategory 2.4: Storage and Handling of Petroleum Products	(a) **The following transitional arrangement shall apply for the storage and handling of raw materials, intermediate and final products with a vapour pressure greater than 14kPa at operating temperature: –** Leak detection and repair (LDAR) program which was approved by licensing authority and instituted, on01 January 2014, shall continue for the duration of this license. (b) **The following special arrangements shall apply for control of TVOCs from storage of raw materials, intermediate and final products with a vapour pressure of up to 14kPa at**

operating temperature, except during loading and offloading. (Alternative control measures that can achieve the same or better results may be used) –

(i) Storage vessels for liquids shall be of the following type:

Application	All permanent immobile liquid storage facilities at a single site with a combined storage capacity of greater than 1000 cubic meters.
True vapour pressure of contents at product storage temperature	**Type of tank or vessel**
Type 1: Up to 14 kPa	Fixed-roof tank vented to atmosphere, or as per Type 2 and 3
Type 2: Above 14 kPa and up to 91 kPa with a throughput of less than 50'000 m^3 per annum	Fixed-roof tank with Pressure Vacuum Vents fitted as a minimum, to prevent "breathing" losses, or as per Type 3
Type 3: Above 14 kPa and up to 91 kPa with a throughput greater than 50'000 m^3 per annum	a) External floating-roof tank with primary rim seal and secondary rim seal for tank with a diameter greater than 20m, or b) fixed-roof tank with internal floating deck / roof fitted with primary seal, or c) fixed-roof tank with vapour recovery system.
Type 4: Above 91 kPa	Pressure vessel

(i) The roof legs, slotted pipes and/or dipping well on floating roof tanks (except for domed floating roof tanks or internal floating roof tanks) shall have sleeves fitted to minimise emissions.

(ii) Relief valves on pressurised storage should undergo periodic checks for internal leaks. This can be carried out using portable acoustic monitors or if venting to atmosphere with an accessible open end, tested with a hydrocarbon analyser as part of an LDAR programme.

(c) The following special arrangements shall apply for control of TVOCs from the loading and unloading (excluding ships) of raw materials, intermediate and final products with a vapour pressure of greater than 14kPa at handling temperature. Alternative control measures that can achieve the same or better results may be used:

(i) All installations with a throughput of greater than 50'000 m3 per annum of products with a vapour pressure greater than 14 kPa, must be fitted with vapour recovery / destruction units. Emission limits are set out in the table below -

Description:	Vapour Recovery Units		
Application:	All loading/ offloading facilities with a throughput greater than 50 000 m^3		
Substance or mixture of substances		**Plant status**	**mg/Nm^3 under normal conditions of 273 Kelvin and 101.3 kPa.**
Common name	**Chemical symbol**		
Total volatile organic compounds from vapour recovery/ destruction units using thermal treatment.	N/A	New	150
		Existing	150
Total volatile organic compounds from vapour recovery/ destruction units using non-thermal treatment.	N/A	New	40 000
		Existing	40 000

(ii) For road tanker and rail car loading / offloading facilities where the throughput is less than 50'000 m^3 per annum, and where ambient air quality is, or is likely to be impacted, all liquid products shall be loaded using bottom loading, or equivalent, with the venting pipe connected to a vapour balancing system. Where vapour balancing and / or bottom loading is not possible, a recovery system utilizing adsorption, absorption, condensation or incineration of the remaining VOC's, with a collection efficiency of at least 95%, shall be fitted.

7.3 CONDITIONS APPLICABLE:

7.3.1 Average of all measurements taken during normal operating conditions per reporting period to be used for compliance reporting.

7.3.2 The licence holder must report any non-compliance with the condition stipulated in the license.

7.3.3 Since the licence holder's activities are carried out in a national air pollution priority area (Vaal Triangle Airshed Priority Area), further stricter condition may be introduced should it be found prudent to do so.

7.3.4 All records of compliance and non-compliance must be maintained and be kept for at least five (5) years.

7.3.5 Any abnormalities experienced shall form part of the normal part of the monthly reporting and be forwarded to the licensing authority.

7.3.6 All minimum emission standards are expressed on a daily average basis, under normal conditions of 273 K, 101.3 KPa, 10% oxygen and dry gas.

7.3.7 Sulphur recovery units should achieve 95% recovery efficiency and availability of 99%, aligned with the MES averaging period and reported monthly.

7.3.8 In the case of the limit value exceedance of a parameter not monitored through online monitoring, but via a third party, the following shall apply:

- The Licensing Officer shall be notified within twenty four (24) hours from the time that Natref becomes aware of the exceedance.
- Within fourteen days (14) after the notification of the Licensing Officer, a plan on how Natref will manage the upset condition and the plant be brought back into compliance, must be presented to the Licensing Officer together with the results of dispersion model where relevant, for approval.
- On acceptance of the plan with its associated impact, the Licensing Officer will issue a written approval for the implementation of the plan and the necessary reporting and tracking to bring the plant back into compliance.
- Failing to adhere to the above conditions under 7.3.8 or the plan, will constitute non-compliance.

Point source – operating requirements

7.4 EMISSION UNIT – MAXIMUM EMISSION RATES (UNDER START-UP, MAINTENANCE AND SHUT-DOWN CONDITIONS)

7.4.1 Should normal start-up, maintenance and shutdown conditions exceed a period of 48 hours per plant, Section 30 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), shall apply and the incident shall be reported, if triggered by the exceedance of the emission limit.

7.4.2 The emission limits in section 7.2 do not apply during start-up, maintenance and shut-down conditions.

7.4.3 The licence holder must take all reasonable measures to control atmospheric emissions during start- up, maintenance and shut-down operations.

7.4.4 Reporting of emissions will commence 48 hours after a unit has been synchronised on-load.

7.4.5 In order to put into effect the provisions of section 43 of the Act, the licence holder shall, undertake an investigation to calculate, measure or monitor and report on point source emissions released during start-up, maintenance and shut-down conditions. Such measurement and reporting shall be carried out in terms of the measurement, monitoring and reporting requirements set out in the National Environmental Management: Air Quality Act (act 39 of 2004): Standards and Regulations where it is reasonably practicable and safe considering the prevailing circumstances.

7.4.6 The licence holder shall be liable to prevent and mitigate against the risk to harm human health and the environment and shall put in place measures necessary to prevent and / or mitigate against such risks.

7.4.7 [redacted]

7.4.8 [redacted]

7.4.9 [redacted]

7.4.10 [redacted]

7.4.11 [redacted]

7.4.12 [redacted]

7.4.13 [redacted]

7.4. POINT SOURCE – EMISSIONS MONITORING AND REPORTING REQUIREMENTS

Point Source/ EU Code	Emissions Sampling / Monitoring Method	Sampling Frequency	Sampling Duration	Parameters to be measured	Parameters to be reported	Reporting Frequency
[redacted]	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually

Point Source/ EU Code	Emissions Sampling / Monitoring Method	Sampling Frequency	Sampling Duration	Parameters to be measured	Parameters to be reported	Reporting Frequency
[redacted]	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually

Point Source/ EU Code	Emissions Sampling / Monitoring Method	Sampling Frequency	Sampling Duration	Parameters to be measured	Parameters to be reported	Reporting Frequency
[redacted]	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO2	PM, NOx & SO2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually
	As per ANNEXTURE A of NEM: AQA	Bi-Annually	As per prescribed method	PM, NOx & SO_2	PM, NOx & SO_2	Bi-Annually

7.5. AREA AND/OR LINE SOURCE – MANAGEMENT AND MITIGATION MEASURES

Area and/or Line Source Code	Area and/or Line Source Description	Description of Specific Measures	Timeframe for Achieving Required Control Efficiency	Method of Monitoring Measures Effectiveness	Contingency Measures
[redacted]	API Area	All fugitive emissions from within the PI area	Immediately	BTEX	
	Final product loading and offloading activities	All fugitives emissions from final product loading and offloading activities	Immediately	BTEX & LDAR	

[redacted]	South Tank Farm (STF): Intermediate Product Storage	All fugitives emissions from within this tank farm area	Immediately	BTEX	
	Strategic Fuel Fund (SFF): Final Product Storage	All fugitives emissions from within this tank farm area	Immediately	BTEX & LDAR	

7.6. ROUTINE REPORTING AND RECORD-KEEPING

7.6.1 Complaints register

The licence holder must maintain a complaints' register at its premises, and such register must be made available for inspections. The complaints register must include the following information on the complainant, namely, the name, physical address, telephone number, date and the time when the complaint was registered. The register should also provide space for noise, dust and offensive odours complaints.

Furthermore, the licence holder is to investigate and, monthly, report to the licencing authority in a summarised format on the total number of complaints logged. The complaints must be reported in the following format with each component indicated as may be necessary:

(a) Source code / name;
(b) Root cause analysis;
(c) Calculation of impacts / emissions associated with incidents and dispersion modelling of pollutants, where applicable;
(d) Measures implemented or to be implemented to prevent recurrence; and
(e) Date by which measure will be implemented.

The licensing authority must also be provided with a copy of the complaints register. The record of a complaint must be kept for at least 5 (five) years after the complaint was made.

7.6.2 Investigation

The following investigations are required:

EU ID	Investigation	Purpose	Completion Date
[redacted]	Causes of high SO_2 levels	Establish interventions to reduce SO_2 levels and comply with MES limits (New Plants)	12 Months form date of issue of renewal AEL.

8 REPORTING

8.1 Annual reporting

The licence holder must complete and submit to the licensing authority an annual report. The report must include information for the year under review (i.e. annual year end of the company). The report must be submitted to the licensing authority not later than 60 (sixty) days after the end of each reporting period. The annual report must include, amongst others, the following items:

(a) Pollutant emissions trend;

(b) Compliance audit report(s);

(c) Major upgrades projects (i.e. abatement equipment or process equipment);

(d) Annual emissions for the inventory on the National Atmospheric Emissions and Inventory System; and

(d) Greenhouse gas emissions.

The holder of the licence must keep a copy of the annual report for a period of at least 5 (five) years.

8.2 Reporting during normal operating conditions

Where an exceedance occurs under normal operating conditions with emission limits contained in the AEL, those exceedances shall be reported to the licensing authority using a template informed by the content of the NEMA Section 30 reporting template.

For the purposes of compliance reporting, all shut down, start up, upset and maintenance conditions are to be excluded for the relevant compliance averaging period.

9. DISPOSAL OF WASTE AND EFFLUENT ARISING FROM ABATEMENT EQUIPMENT CONTROL TECHNOLOGY

The disposal of any waste and effluent arising from the abatement equipment control technology must comply with the relevant legislation and requirements of the relevant authorities.

10. PENALTIES FOR NON-COMPLIANCE WITH LICENCE AND STATUTORY CONDITIONS OR REQUIREMENTS

Failure to comply with any of the licence and relevant statutory conditions and/or requirements is an offence, and licence holder, if convicted, will be subjected to those penalties as set out in section 52 of the AQA.

11. APPEAL OF ATMOSPHERIC EMISSIONS LICENCE

11.1 The holder of the authorization must notify every registered interested and affected party, in writing and within five (5) working days of the date of issue, of the holder's receipt of this atmospheric emissions licence.

11.2 The written notification referred to in Condition 11.1 above must –

- 11.2.1 Specify the date on which the atmospheric emissions licence was issued;
- 11.2.2 Inform interested and affected parties of the appeal procedure provided for in Chapter 7 the GN No. R993 of 18 June 2014; and
- 11.2.3 Advise interested and affected parties that a copy of the atmospheric emissions licence and reasons for the decision will be furnished on request.

11.3 An appeal against the decisions contained in this atmospheric emissions licence must be lodged, in writing, with the Municipal Manager: Fezile Dabi District Municipality, P.O. Box 10, Sasolburg, 1947, Tel No: 016 970 8600, Fax No: 016 970 8733.

12. REVIEW

12.1 The authority shall have the right to review the licence continuously within the period as stipulated in clause 1 above or as and when such review is deemed necessary by the Air Quality Officer;
12.2 Such review shall be done as a result of amendments in legislation or by virtue of findings from regular inspections done by the Air Quality Officer;
12.3 The authority shall serve the licence holder with a 30 (thirty) day notice when such a necessity arises;
12.4 The authority shall under no circumstances be barred by licence holder from reviewing the licence upon receiving notice of review.