Gert Sibande District Municipality

Please address all correspondence to:

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OFFICE OF THE MUNICIPAL MANAGER

Enquiries: Ms. MLT Mogakabe (017 801 7000)
Our Ref: Govan Mbeki/Sasol South Africa Limited- Secunda Operations Synfuels/0016/2025/F04
Date: 25 February 2025

Sasol South Africa Limited- Secunda Operations Synfuels
PDP Kruger
Secunda
2302

Attention: Mr. Hannes Buys

Dear Sir

ATMOSPHERIC EMISSION LICENCE IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 2004 (ACT NO. 39 OF 2004) AS AMENDED.

With reference to your application dated **16 February 2024**, enclosed, herewith, the Atmospheric Emission Licence No **Govan Mbeki/Sasol South Africa Limited- Secunda Operations Synfuels/0016/2025/F04** dated **25 February 2025** in respect of the **Sasol South Africa Limited- Secunda Operations Synfuels.**

Your attention is drawn to the following conditions for licence issue –

a. Chapter 5, Section 42 of the Act, Issuing of Atmospheric Emission Licence
And
b. Chapter 5, Section 43 of the Act, Content of Provisional Atmospheric Emission Licence, and Atmospheric Emission Licence.

1. **SITUATION AND EXTENT OF PLANT**

Situation
PDP Kruger, Secunda, Govan Mbeki Local Municipality, Gert Sibande District, Mpumalanga.

Extent
24.05km^2

2. NATURE OF PROCESS AND LISTED ACTIVITIES

Category 1 Sub-category 1.1: Solid Fuel Combustion Installations; Sub-category 1.4: Gas Combustion Installations.

Category 2 Sub-category 2.1: Combustion Installations, Sub-category 2.2: Catalytic Cracker Units.

Category 3 Sub-category 3.2: Coke Production, Sub-category 3.3: Tar Processes, Sub-category 3.6: Synthetic Gas Production and Clean-up.

Category 4: Metallurgical Industry Sub-category 4.1: Drying and Calcining, Sub-category 4.7: Electric Arc Furnaces.

Category 5 Sub-category 5.1 Storage and Handling of Ore and Coal.

Category 7 Sub-category 7.1: Production and/or use in manufacturing of ammonia, fluorine, fluorine compounds, chlorine and hydrogen cyanide Sub-category 7.2: Production of Acids.

Category 8 Sub-category 8.1: Thermal treatment of General and Hazardous Waste.

Yours in good governance,

MR. CA HABILE
MUNICIPAL MANAGER

GERT SIBANDE DISTRICT MUNICIPALITY

NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 2004 (ACT NO. 39 OF 2004) AS AMENDED

Atmospheric Emission License

Sasol South Africa Limited- Secunda Operations Synfuels

Is authorized to continue the processes listed below, with equipment and plant as detailed in the licence conditions of licence no. **Govan Mbeki/Sasol South Africa Limited- Secunda Operations Synfuels/0016/2025/F04** on the premise known as **PDP Kruger Site, Secunda, Govan Mbeki Local Municipality, Gert Sibande District Municipality, Mpumalanga.**

Category 1 Sub-category 1.1: Solid Fuel Combustion Installations; Sub-category 1.4: Gas Combustion Installations.
Category 2 Sub-category 2.1: Combustion Installations, Sub-category 2.2: Catalytic Cracker Units.
Category 3 Sub-category 3.2: Coke Production, Sub-category 3.3: Tar Processes, Sub-category 3.6: Synthetic Gas Production and Clean-up.
Category 4: Metallurgical Industry Sub-category 4.1: Drying and Calcining, Sub-category 4.7: Electric Arc Furnaces.
Category 5 Sub-category 5.1 Storage and Handling of Ore and Coal.
Category 7 Sub-category 7.1: Production and/or use in manufacturing of ammonia, fluorine, fluorine compounds, chlorine and hydrogen cyanide Sub-category 7.2: Production of Acids.
Category 8 Sub-category 8.1: Thermal treatment of General and Hazardous Waste.

LICENSING AUTHORITY

Govan Mbeki/Sasol South Africa Limited- Secunda Operations Synfuels/0016/2025/F04
Date: 25 February 2025

Gert Sibande District Municipality

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ATMOSPHERIC EMISSION LICENCE AS CONTEMPLATED IN SECTION 43 OF THE NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 2004, (ACT NO. 39 OF 2004) (NEMAQA) AS AMENDED

I, **Mary Lorette Tebogo Mogakabe**, in my capacity as **License Officer** (hereinafter referred to as "the Licensing Authority"), in terms of section 36(1) of the National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004, hereinafter referred to as the "Act"), and as provided for in section 40(1)(a) of the Act, hereby grant an Atmospheric Emission Licence to **Sasol South Africa Limited- Secunda Operations Synfuels** ('the Applicant)."

The Atmospheric Emission Licence is issued to **Sasol South Africa Limited- Secunda Operations Synfuels** in terms of section 42 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), in respect of Listed Activities: -
Category 1 Sub-category 1.1: Solid Fuel Combustion Installations; Sub-category 1.4: Gas Combustion Installations.
Category 2 Sub-category 2.1: Combustion Installations, Sub-category 2.2: Catalytic Cracker Units
Category 3 Sub-category 3.2: Coke Production, Sub-category 3.3: Tar Processes, Sub-category 3.6: Synthetic Gas Production and Clean-up.
Category 4: Metallurgical Industry Sub-category 4.1: Drying and Calcining, Sub-category 4.7: Electric Arc Furnaces.
Category 5 Sub-category 5.1 Storage and Handling of Ore and Coal.
Category 7 Sub-category 7.1: Production and/or use in manufacturing of ammonia, fluorine, fluorine compounds, chlorine and hydrogen cyanide Sub-category 7.2: Production of Acids.
Category 8 Sub-category 8.1: Thermal treatment of General and Hazardous Waste.

The Atmospheric Emission Licence has been issued based on information provided in the company's application dated **16 February 2024** and information that became available during processing of the application.

The Atmospheric Emission Licence is valid upon signature for a period not exceeding five (05) years from the date of issue of this licence. The reason for issuing the licence is renewal. The Atmospheric Emission Licence is issued subject to the conditions and requirements set out below which form part of The Atmospheric Emission Licence, and which are binding on the holder of the Atmospheric Emission Licence ("the holder").

1 ATMOSPHERIC EMISSION LICENCE ADMINISTRATION

Name of the Licensing Authority	Gert Sibande District Municipality
Atmospheric Emission Licence Number	Govan Mbeki/Sasol South Africa Limited- Secunda Operations Synfuels/0016/2025/F04
Atmospheric Emission Licence Issue Date	25 February 2025
Atmospheric Emission Licence Type	Renewal
Renewal Date	30 November 2029
Expiry date	25 February 2030

2 ATMOSPHERIC EMISSION LICENCE HOLDER DETAILS

Enterprise Name	Sasol South Africa Ltd
Trading as	Secunda Operations Synfuels
Enterprise Registration Number (Registration Numbers if Joint Venture)	1968/013914/06
Registered Address	Sasol Place 50 Katherine Street Sandton Gauteng
Postal Address	Private Bag 1013 Secunda 2302
Telephone Number (General)	017 610 5105
Industry Sector	Petrochemical
Name of Responsible Person or Emission Control Officer	Mr. Hannes Buys
Telephone Number	017 619 3515
Cell Phone Number	082 339 3906
Email Address	Hannes.buys@sasol.com
After Hours Contact Details	082 902 1989
Land Use Zoning as per Town Planning Scheme	Industrial Special

3. LOCATION AND EXTENT OF PLANT

3.1. Facility Address

Physical Address of the Premises	PDP Kruger Secunda 2302
Description of Site (Erf)	Highveld Ridge, Mpumalanga
Coordinates of Approximate Centre of Operations	Latitude: [redacted] Longitude: [redacted]
Extent (km²)	24.05
Elevation Above Mean Sea Level (m)	1 597
Province	Mpumalanga
Metropolitan/District Municipality	Gert Sibande District Municipality
Local Municipality	Govan Mbeki Local Municipality
Designated Priority Area	Highveld Priority Area

3.2. Description of surrounding land use (within 5 km radius)

- Secunda – residential and commercial
- Embalenhle – residential and commercial
- Mining activities
- Farming activities

Figure 1: Secunda Operations: Synfuels satellite image

4. GENERAL CONDITIONS

4.1. Process and ownership changes.

(a) The holder of the Atmospheric Emission 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 always properly maintained, and operated.

(b) No building, plant or site of works related to the listed activity or activities used by the licence holder shall be extended, altered, or added to the listed activity without an environmental authorisation from the competent authority. The investigation, assessment, and communication of potential impact of such an activity must follow the assessment procedure as prescribed in the Environmental Impact Assessment Regulations published in terms of Section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended.

(c) Any changes in processes or production increases, by the licence holder, will require prior written approval from the licensing authority.

(d) Any changes or increase to the type and quantities of input materials and products, or to production equipment and treatment facilities will require prior written approval from the licensing authority.

(e) 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 thirty (30) working days after the change of ownership.

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

(g) The licence holder must notify the Licensing Authority in writing and submit the closure and rehabilitation plan three (3) months prior to the decommissioning of the facility.

4.2. General duty of care

(a) 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 as amended including Part II Section 3 of Gert Sibande District Municipal Air Quality by-laws.

(b) 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 as amended.

(c) Failure to comply with the above condition 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 as amended including Part III Section 3 of Gert Sibande District Municipal Air Quality by-laws.

4.3. Sampling and/or analysis requirements

(a) Measurement, calculation and /or sampling and analysis shall be carried out in accordance with any nationally or internationally acceptable standard in line with Annexure A of NEMAQA as amended.

(b) Methods other than those contained in Annexure A of NEMAQA as amended may be used with the written consent of the National Air Quality Officer.

(c) In seeking the written consent referred to in paragraph (b), an applicant must provide the National Air Quality Officer with any information that supports the equivalence of the method other than those listed in Annexure A of NEMAQA as amended.

(d) The licence holder is responsible for quality assurance of methods and performance. Where the holder of the licence uses internal or external laboratories for sampling or analysis, only accredited laboratories by the national accreditation body shall be used. The certified copy of accreditation of the internal or external laboratory must be submitted to the Licensing Authority on annual basis.

(e) The licence holder must provide the Licensing Authority on request with raw data obtained during sampling and or analysis including proof of agreed methodology used to reach the results submitted for compliance.

4.4. General requirements for licence holder

(a) The licence holder must conduct an induction on air quality management issues including compliance with the conditions of this licence to 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.

(b) 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.

(c) A valid licence must be kept at the premises where the listed activity is undertaken. The licence must be made available to the Environmental Management Inspector / Air Quality Officer or an authorised officer representing the licensing authority who requests to see it.

(d) The Atmospheric Emission Licence Certificate must be displayed at the premises where the listed activity is undertaken.

(e) The licence holder must inform, in writing, the licensing authority of any change to its details but not limited to the name of the Emission Control Officer, postal address and/or telephonic details within five (05) working days after such change has been effected.

(f) The Emission Control Officer or facility representative must attend the Highveld Priority Area Implementation Task Team or Air Quality Stakeholder Forum Meetings bi-annually.

(g) The licence holder must report and submit annual emission report for the preceding year in terms of GNR 283 in Government Gazette 38633 of 02 April 2015 and GNR 4493 in Government Gazette 50284 of 08 March 2024 (National Atmospheric Emission Inventory System Reporting Regulations).

(h) The licence holder must hold an environmental/air quality consultation meeting with interested and affected parties as well the community surrounding Sasol Secunda bi-annually to give feedback on the processes, projects conducted by the facility as well as compliance status in relation to air quality management. The licence holder must submit written proof of such consultation to the licensing authority bi-annually.

4.5. Statutory obligations

The licence holder must comply with the obligations as set out in Chapter 5 of NEMAQA (Act No. 39 of 2004) as amended, National Environmental Management Act, 1998 (Act No. 108 of 1998) as amended, including Gert Sibande District Municipal Air Quality Management by-laws.

5 NATURE OF PROCESS

5.1. Process Description

5.1.1. Utilities

5.1.1.1. Steam plant

Steam is used in various processes throughout the factory and for generating electricity. The steam plants generate steam from 17 boilers using fine coal and boiler feed water. The steam plants (units 43/243) supply process steam for the gasification process, and drive steam for turbines at the Synthol and oxygen east plants. Make-up steam is let down to satisfy deficits on the medium pressure and low-pressure factory steam headers. The balance of the steam produced is used to generate electricity. Electricity is generated by means of 10 steam driven turbine generators.

Steam plant west (Unit 43) and steam plant east (Unit 243) both have eight Babcock boilers, while steam plant east (Unit 243) has a ninth boiler built by ICAL. Electricity is generated in turbine generator sets rated at 60 megawatts electric (MWe). There are six and four turbine generators at Steam plant west (Unit 43) and Steam plant east (Unit 243) respectively, resulting in a combined generation capacity of 600MW. The operating philosophy of the steam plants is such that the steam header pressure control is done by manipulating the boilers and turbine generator load.

5.1.1.2. Gas Turbines

Two gas turbines provide additional electricity generating capacity. Natural gas from Mozambique and methane rich gas (MRG) from the cold separation units (at gas circuit) are used as the feed streams (fuel) to the gas turbines. The electricity generated is supplied into the Eskom grid. The gas turbine power plant consists of two gas turbine generators and associated plants. The two gas turbine generator trains operate independently in parallel. The gas turbines' design capacity is 118 megawatts (MW). The maximum operating generation capacity from each gas turbine is approximately 104 MW during summer months and 110 -118 MW during winter months.

The exhaust gas from the gas turbines is used to generate high pressure steam in two heat recovery steam generators (HRSGs). Each gas turbine has its own HRSG with supporting boiler feed water pre-conditioning equipment and own blow down equipment. Each HRSG produces 163 tons per hour (t/h) maximum continuous rating 40 bar (g) steam. The gas turbines can be operated as open cycle gas turbines with the HRSGs out of commission (abnormal operation). When operating in an open cycle mode the exhaust gas is released into the atmosphere via a bypass stack.

5.1.2. Gas Production

5.1.2.1. Coal processing

Coal is conveyed from Sasol coal supply east and west to the coal processing units (Unit 01/201). The coal is conveyed into 14 bunkers on top of coal processing on each side from where the coal is screened in a primary and secondary vibrating screen. The coarse fraction (oversize material) is conveyed to coal distribution (Unit 02/202). These conveyer belts transfer material on incline conveyers (CV18, 19, 20, and 21) where the coal is dumped into the north and south bins of the respective east and west coal distribution plants. From the north and south bin, the coal is conveyed via the wing conveyers. Last mentioned conveyer belts service two tripper cars per conveyer where they are then used to fill the different bunkers of the gasifiers.

The undersized material from the secondary vibrating screen is transferred by means of gravity to the sieve bend screen where primary dewatering takes place. The oversize material from the sieve bend screens is transferred to a centrifuge where further dewatering takes place. The undersize of the sieve bend screens are transferred in a slurry launder to the thickener system where flocculant is added to aid in the settling of the coal particles. The underflow of the thickeners is pumped to the filter section where the slurry is dewatered by means of vacuum filtration. The filter cake is removed from the filter cloth with the aid of a compressed air cycle. The filter cake and centrifuge product combine on conveyors CV9 and CV10 to be used as feed to the steam plant (Unit 43/243). The water is recovered from the thickener to be used as spray water.

5.1.2.2. Gasification and Raw Gas Cooling

Eighty-four Sasol® fixed bed dry bottom (FBDBTM) gasifiers (i.e., 42 gasifiers at each unit, 010 and 210), are used to gasify coal at a temperature of approximately [redacted]) using high pressure superheated steam and oxygen. The Sasol® FBDBTM gasifier is a commercially proven process for the conversion of coal feedstock into synthesis gas. In this process, the following streams are formed:

- Crude raw gas is transferred to raw gas cooling unit and then to the Rectisol unit for further purification.
- Ash as a solid waste stream that is processed at the inside ash unit prior to being sent to the outside ash unit for final disposal.
- Gas liquor (a water stream) is transferred to the gas liquor separation units to separate tar, oils and solids from the aqueous phase.

Wet gasification coal is sent to the coal storage bunkers at the top of each gasifier. Coal is loaded with each gasifier using batch operated coal locks. To safely open the coal lock to add a new batch of coal, the coal lock is firstly de-pressurized to a coal lock raw gas compressor (Unit X09). The coal lock is further de-pressurized to local flare (flares at units 010/210). The residual coal lock raw gas is safely vented to the atmosphere via a venturi ejector system which uses air as motive fluid. Inside the gasifiers, carbonaceous fraction of coal reacts with a steam and oxygen mixture to produce crude raw gas containing hydrogen, carbon dioxide (CO_2), carbon monoxide (CO), methane, steam, as well as small concentration of hydrocarbons, tars, oils, phenols, ammonia and others.

Hot gas leaving the gasifiers at approximately 500°C is first quenched to remove solids and heavy tar and then cooled in the heat exchangers at raw gas cooling (Unit 011& 211) before it is sent to Rectisol for further purification. During the gasification process, mineral matter contained in coal is oxidized and ash is produced. The ash is intermittently removed from the bottom of a gasifier via an automatically operated ash lock hopper, quenched with water and sent to the inside ash unit for processing and final disposal at the outside ash unit. The gas liquor containing dissolved oil, phenols, tar acids, organic acids and ammonia, is worked-up in the gas liquor separation, phenosolvan, ammonia recovery and biological water recovery effluent treatment plants, before it is used as make-up water to the cooling water towers units.

During gasifier start-up, generated gases are condensed in the waste heat boiler and vented to atmosphere via the start-up vent system. Once the generated gas is oxygen free and operation is stable, the gas routing is switched from the cold vent system to the flare system. After a pressure ramp-up to normal gasifier operating pressure, and confirmation that the crude raw gas meets the desired specification, the raw gas is switched from the flare system to the raw gas header (which is routed to Rectisol via gas cooling).

5.1.2.3. Rectisol

The main function of Rectisol is to remove acid gases, such as CO_2 and hydrogen sulphide (H_2S), together with other impurities from the raw gas produced by gasification. The resulting cleaned gas, called pure gas, is the feedstock to the Synthol plant. The Rectisol process is a physical absorption process that washes the raw gas with cold methanol to remove CO_2, H_2S, benzene, toluene, ethyl benzene and xylene (BTEX) and other organic and inorganic compounds. The raw gas and methanol flow counter-current through an absorption tower which comprises three sections. The resultant pure gas is routed directly to Synthol, and the loaded methanol is routed to the regeneration systems. The methanol from the first tower section has water added to it and the BTEX-rich naphtha phase is removed by gravity separation in an extractor drum and sent to the tank farm. The remaining water-methanol phase is distilled to separate the methanol (which is recycled back into the system) and the water (sent to waterworks for further processing). The methanol from the second tower section is flashed to remove CO_2, H_2S and other gases and some of it is then heated to strip off any remaining gases. The methanol from the third tower section is processed with the methanol from the second tower section. The CO_2 and H_2S - containing off gas streams are routed to the sulphur and wet sulphuric acid plants for removal of H_2S. The entire process is supported by a propylene refrigeration system.

5.1.2.4. Sulphur Recovery

The plants receive the feed-gas from Rectisol for the absorption and conversion of H_2S into saleable elementary sulphur, prior to routing the H_2S lean gas to the stack. The off-gas from sulphur plant is combined with the hot flue gas from steam plant, to assist with the buoyance, before being routed to the main stack. The H_2S in the feed-gas from Rectisol is absorbed into sulfolin liquor by means of venturi absorbers. The sulphur recovery and steam plant processes are one integrated activity because they were designed as an integrated system concluding in the main stacks (east and west).

Since the two processes are integrated and designed as one, the total emissions emanating from the integrated process are released at the main stacks (east and west).

From the absorbers the Sulfolin liquor with absorbed H_2S goes into the reaction tanks where elemental sulphur is produced. In the reaction tanks vanadium (V) is an active oxidizing agent that oxidizes HS- to elemental sulphur. During this process vanadium is reduced to inactive vanadium (IV), which needs to be re-activated. The liquor from the reaction tanks is sent to two oxidizers arranged in series.

In the oxidizers (X18DM-X012/3/4), the elementary sulphur is separated from the liquor [redacted] where compressed air is bubbled through the oxidizer tanks and discharged to atmosphere via the vents located on top of the oxidizers.

In the separator, the sulphur from the oxidizers melts into liquid sulphur and is separated from water before being sent down to the sulphur pit. From the pit, the liquid sulphur is transported by road trucks to the granulation plant for filtering and formation of sulphur granules. Recovered liquids and water from the oxidizers and separators are collected in the collecting drum, which is equipped with an air bubbling system [redacted]. The liquid from the collecting drum is re-used as sulfolin liquor for H_2S absorption. The collecting drum and lines leading from it are equipped with vents to discharge the bubbled air.

During the conversion of HS- to elemental sulphur and the re-oxidation of vanadium, salts such as NaSCN, $NaHCO_3$ and Na_2SO_4 are formed. A bleed stream from the discharge side of the circulation pump is routed to the sulphate plant to produce sodium sulphate as a by-product, thereby reducing the salt concentration of the circulation liquid.

5.1.2.5. Wet Sulphuric Acid Plant

The feed gas to wet sulphuric acid (WSA) plant is sourced from Rectisol phases 3 and 4, which are routed to a knockout drum (per phase). The outlets of the knockout drums combined before Phenosolvan off gas joins the feed header into the WSA combustor where the feed gas is burned with fuel gas and hot air to form SO_2 containing process gas.

After the combustion the process gas is cooled in a waste heat boiler. The formed process gas, after being cooled down, leaves the waste heat boiler and dilution air is introduced to ensure sufficient oxygen content before entering the SCR oxides of nitrogen NOx converter. In the oxides of nitrogen (NOx) converter the nitrogen oxides are removed from the process gas. The reduction of the nitrogen oxides is carried out by the injection of ammonia into the process gas and subsequently passing the gas mixture over a catalyst where the nitrogen oxides react with the ammonia and are converted to nitrogen and water vapour. From the NOx converter the process gas is further processed in the sulphur dioxide (SO_2) converter. The SO_2 in the process gas is oxidized catalytically. The SO_2 gas reacts with O_2 to form SO_3 gas. The formed SO_3 gas reacts with the water vapour present in the process gas through exothermic hydration reaction, resulting in the formation of sulphuric acid gas (H_2SO_4).

The process gas then enters the WSA condenser where it is further cooled by means of air in a glass tube heat exchanger, and the remaining part of the hydration reaction and the condensation of sulphuric acid take place. The produced sulphuric acid has a concentration of 96.5 wt.%, with a maximum acid mist content of 20 ppm (by volume) when leaving the top of the WSA condenser. The hot sulphuric acid product will leave the bottom of the WSA condenser. Normally, if no special precautions are taken, condensations of sulphuric acid vapour will result in a mist of very small acid droplets. These very small droplets cannot be separated from the process gas in the WSA condenser. Thus, to overcome this problem four mist control units are installed. The mist control units generate a gas stream containing very small silicon particles. These silicon particles act as nuclei for the formation of larger acid droplets. By adding the particles to the process gas upstream of the condenser, the droplets formed will be large enough to be separated from the process gas in the demisters installed at the top of the WSA condenser. A mixing arrangement is installed in the duct upstream of the condenser to ensure that the silicon particles are homogeneously mixed into the process gas.

The cleaned gas leaves the top of the WSA condenser. Even though all four mist control units are well in operation, the clean gas will contain a small amount of remaining acid mist which is reduced by the wet electrostatic precipitator (WESP). The WESP consists of an empty column scrubber part, where the cleaned gas is sprayed with weak acid and the precipitator where the mist particles form a liquid film on the vertical collecting electrodes due to the strong electric field. The liquid film then runs down the electrodes to the scrubber sump and the cleaned gas proceeds to the stack where it led to the atmosphere.

5.1.3. Gas Circuit

The pure gas from Rectisol is fed to the Synthol reactors where the Fischer–Tropsch synthesis process is used to react hydrogen and carbon monoxide in the presence of a catalyst to form various hydrocarbon products. These hydrocarbons are further processed in the refining units into various products. The tail gas from the Synthol unit is fed to the Benfield unit where CO_2 is removed.

5.1.3.1. Catalyst Manufacturing and Catalyst Reduction

The catalyst manufacturing units [redacted] prepare the iron-based catalyst for use in the Sasol Advanced Synthol (SAS) reactors at Syntho[redacted]

[redacted]

5.1.4. Refining

5.1.4.1. Tar distillation units (Units 14/214)

The purpose of this unit is to fractionate crude tar, originating from gasification, into different fractions, which is then used as feed for downstream units. These fractions (from low to high boiling point) include light naphtha, heavy naphtha, medium creosote, heavy creosote, residue oil and pitch.

5.1.4.2. Neutral oil stripper (Unit 27A)

The purpose of Unit 27A is to remove the neutral oils contained in the high neutral oil depitched tar acids (HNO- DTA) feed, producing low neutral oil depitched tar acids (LNO-DTA). Unit 27A is the final processing step in the tar acid value chain (TAVC) on the Secunda site. The LNO-DTA consists mainly of phenols, cresols and xylenols (PCXs) that are extracted from the gas liquor stream at Phenosolvan into crude tar acids (CTA), from where most pitch is removed in the primary depitchers where the distillate product HNO-DTA is sent to unit 27A.

5.1.4.3. Secondary depitcher (Unit 74)

The CTA feed stream sent to the primary depitcher at Phenosolvan is split into the side draw, HNODTA stream going to Unit 27A and the phenolic pitch bottoms stream that is fed to Unit 74. The purpose of the secondary depitcher is to recover the remaining PCXs from the phenolic pitch stream in secondary depitcher (SD)-DTA that is transferred to Sasol Phenolics (TNPE) for production of Value Cresylic Acids, which is a feedstock for The Sasol Phenolics plants based in Houston, Texas.

5.1.4.4. Coal tar Naphtha hydrogenation (Unit 15/215)

The purpose of this unit is to hydro treat a combined feed of Rectisol naphtha from Units 2/12, light naphtha, and heavy naphtha from Unit 14/214 to remove phenolic and nitrogen compounds. Olefin saturation and sulphur removal also takes place to produce a product acceptable for utilization in the petrol pool. The liquid product is fed to a H_2S stripper where the sour water is removed from the product stream. The final product goes to storage to be used as a blending component in petrol.

5.1.4.5. Creosote hydrogenation unit (Unit 228)

The purpose of this unit is to hydro treat heavy tar derived cuts to produce creosote naphtha and diesel. The plant receives medium creosote, heavy creosote and residue oil from units 14/214. The unit also receives medium temperature pitch (MTP), FFC, cooker gas oil and waxy oil transfer material from carbo tar (unit 39) and this is fed to the unit as a percentage of the Unit 14/214's feed streams.

After the hydro treating reactors a high concentration hydrogen gas stream, hydrogen sulphide (produced) rich gas stream and sour water (produced and added) is separated from the hydrocarbon stream at various points. The hydrocarbon stream is separated into a creosote naphtha and creosote diesel stream. Due to the high naphthene and aromatic content the creosote naphtha is routed to the platformer, while the creosote diesel is a final diesel blending component.

5.1.4.6. Naphtha hydrotreater, platformer and Continuous Catalyst Regenerator CCR (Unit 30/230 and Unit 31/231)

The naphtha hydrotreater is a catalytic refining process used to saturate olefins and remove oxygenates. The feed for the naphtha hydrotreater is naphtha cut originating from Synthol light oil, distillate naphtha from the distillate hydrotreater (Unit 35/235) and creosote naphtha from Unit 228. After the hydrotreating reactors, a high concentration hydrogen gas stream hydrogen sulphide (produced) rich gas stream and sour water (produced and added) is separated from the hydrocarbon stream at various points. The hydrocarbon stream is separated into an IP and platformer feed stream.

Platforming is a catalytic refining process employing a selected catalyst to convert low quality naphtha in the presence of hydrogen into aromatic rich, high-octane product while also yielding a hydrogen rich gas stream and a liquid petroleum gas (LPG) stream. The LPG stream is routed to Unit 32/232 or to a petrol component tank depending on season. The hydrocarbon stream is routed as platformate to the petrol component tanks.

During a normal operating cycle, platforming catalyst deactivates due to excessive carbon build-up. The catalyst is continuously removed from the platforming reactors and sent to the continuous catalyst regeneration (CCR) unit, where the carbon is burnt off the catalyst restoring the activity of the catalyst. A certain number of fines are produced in the unit which are subsequently disposed of.

5.1.4.7. Catalytic distillation hydrotreater (Unit 78)

The Unit 78 catalytic distillation (CD) hydro unit is designed to individually hydro-isomerize C5 and C6+ hydrocarbons over a catalyst [redacted] and produce a diene-free C5 feedstock to the skeletal isomerization unit (Unit 90) and eventually the tertiary amyl methyl ether (TAME) unit. The reactions take place over a catalyst [redacted] The C5 CD hydro product from the column's bottoms (essentially diene free) is routed to the skeletal isomerization unit, and eventually to the CD TAME unit for TAME production. The C5 product can also be routed either to storage, directly to Unit 79 or a combination of the afore-mentioned scenarios.

5.1.4.8. CD TAME (Unit 79)

The CD TAME (Unit 79) converts a C5 product from the C5 CD hydro column via the skeletal isomerization plant (Unit 90), to produce TAME. This C5 stream from Unit 90 is fed to Unit 79 [redacted]. TAME product is recovered from the bottom of the reaction column. The distillate contains the C5 raffinate and some methanol. Methanol is extracted from the distillate stream in the methanol extraction column. The C5 raffinate [redacted] is sent to the fuel pool. Methanol is recovered from the methanol/water mixture in the methanol recovery column and recycled to the reaction section of the process.

5.1.4.9. C5 Isomerization (Unit 90)

The C5 skeletal isomerization unit (Unit 90) produces branched iso-amylenes from the C5 olefinic feed from the C5 CD hydro unit (Unit 78). The branched iso-amylenes are required as feed to the CD TAME unit (Unit 79). The C5 olefinic feed is contacted with catalyst. Heavy ends of C6 and higher are removed from the reactor effluent in a debutanizer column and sent to the existing C6 storage facilities in the tank farm. Light ends of C4 and lower are removed in a debutanizer column and sent to the catalytic polymerization unit (Unit 32). The bottoms product from the debutanizer column is the C5 iso-amylene product that is sent to Unit 79. [redacted]

5.1.4.10. Vacuum distillation (Unit 034/234)

The vacuum distillation unit (Unit 034/234) separates the decanted oil (DO) stream from Synthol (Unit 020/220) as well as the heavy diesel components produced in Units 29/229. The products from this unit are light vacuum gas oil and heavy vacuum gas oil routed to diesel hydro treaters (Unit 35/235) and a minimum amount of heavy fuel oil routed to carbo tar (Unit 39).

5.1.4.11. Distillate hydrotreater (Unit 35/235)

The purpose of this unit is hydrotreating. The plant receives heavy components from stabilized light oil (SLO)/Safol unit and the lighter components from the vacuum distillation units (Units 34/234). After the hydrotreating reactors, a high concentration hydrogen gas stream and hydrogen sulphide (produced) rich gas stream is separated from the hydrocarbon stream at various points. The hydrocarbon stream is separated into naphtha, light diesel and a heavy stream.

The naphtha stream is sent to the naphtha hydrotreater (Units 30/230), the heavy stream is to distillate selective cracker (at Unit 35) and the light diesel is sent to the diesel component tanks. The hydrogen compression system supplies high purity (99% pure) hydrogen at 56 bars to a number of refinery and chemical units. Unit 235 also receives hydrogen used in majority of the refinery units.

5.1.4.12. Distillate selective cracker (Unit 35)

The distillate selective cracker (DSC) unit consists of two main sections - the cracking/dewaxing reactor section and the fractionation section. The main function of the reactor is to crack the heavy feed material into diesel range boiling material. The DSC fractionation section's main purpose is to separate reactor effluent material into very light gasoline boiling range material, a heavy diesel cut and a fuel oil cut.

5.1.4.13. Light oil fractionation (Unit 029/229)

The purpose of this unit is to perform the primary fractionation for the refinery facilities. The feed to the unit is stabilized light oil (SLO) from Synthol (Unit 20/220). The unit produces a light C5/C6 stream for CD hydro unit (Unit 78), a naphtha product that feeds octene (Unit 301) and the naphtha hydro-treatment units (Units 30/230), a distillate stream that feeds Safol (Unit 303) and diesel hydrotreater units (Unit 35/235) and a heavy product that feeds the vacuum distillation units (Unit 34/234).

5.1.4.14. Polymer hydrotreater (Unit 33)

As part of the new overall Refinery flow scheme that will enable Clean Fuels 2 compliant fuel production, the feed to U033 will be reduced and will be much lighter than the current one. The usual feed to the CatPoly Hydrotreater (PHT) is a mixture of petrol and diesel from 032VL-105, which is a mixture of 032VL-105 side draw and UHCPP. In the new flow scheme, the feed to U033 will come from the overhead of 032VL-105 and hence will only contain light petrol components. As there will be no diesel components in the feed to U033, the Splitter Column (033VL- 101-R1) will serve no function with 033VL-101-R1 decoupled from the rest of U033. This column is utilized for U(2)15 Coal Tar Naphtha (CTN), U228 Creosote Naphtha (CN), as well as U(2)30 Naphtha Hydrotreater (NHT) C6's VL-103 overheads (referred to as Mixed Naphtha) fractionation. The overheads stream, rich in benzene and benzene precursors, will be routed back to U032 for alkylation and processing whilst the bottoms benzene-lean naphtha stream will be routed to U30 and U230 to be upgraded in the platformer. The rest of the polymer hydrotreater is still designed to convert olefins into paraffins, but only a petrol component will be produced. Furthermore, the objective is to convert benzene to cyclohexane to ensure the fuel pool is compliant on the benzene specifications.

The Light Unhydrogenated Cat Poly Petrol (LUHCPP) from the 32VL-105 is the feed to the PHT section of the unit. After the hydro-treating reactors have a high concentration hydrogen gas stream, hydrogen sulphide (produced) rich gas stream and sour water (produced and added) are separated from the hydrocarbon stream at various points. The hydrocarbon stream is separated into petrol and diesel component streams.

5.1.4.15. Polymer hydrotreater (Unit 233)

The purpose of this unit is to convert olefins, from either a heavy naphtha fraction or a distillate fraction, to the corresponding paraffins. The feed to the unit comes from Units 2/32. After the hydrotreating reactors a high concentration hydrogen gas stream, hydrogen sulphide (produced) rich gas stream and sour water (produced and added) are separated from the hydrocarbon stream at various points. The hydrocarbon stream is separated into a petrol, petrol side draw and diesel component streams.

5.1.4.16. Catalytic polymerization and LPG recovery (Unit 32/232)

The purpose of this unit is to produce motor fuels, namely petrol, diesel and jet fuel from a stream of C3/C4. This is achieved by fusion of small olefin molecules into large olefins through polymerization with the aid of a phosphoric acid catalyst. The olefins react in the process, but the butane and propane do not hence they go to LPG recovery. Saturated C3's and C4's are sold as LPG.

The 032VL-105 column revamp project added an additional side draw above the column feed for the extraction of cumene and UHCPP. The remainder of the light UHCPP (LUHCPP) and unreacted benzene will report to the column overheads. The UHCPD and Heavy Polymer will have a similar composition to previous operation, but the product routings changed to support the CF2 flow scheme.

5.1.4.17. Synfuels Catalytic Cracker (U293) SCC

The Synfuels catalytic cracker (SCC) is a fluidized catalytic cracking (FCC) process, similar in configuration to a refinery FCC unit. Low molecular weight olefins and paraffin's are converted to high value products such as ethylene, propylene and high-octane gasoline. [redacted]

5.1.5. Tar and Phenosolvan

5.1.5.1. Gas Liquor Separation

The purpose of the gas liquor separation unit is to separate various gases, liquid and solid components from the gas liquor streams. Dissolved gases are removed from the gas liquor by expansion to almost atmospheric pressure. The different liquids and solids are separated in separators by means of physical methods based on settling time and different densities.

To achieve a good separation of gases, liquids and solids the following requirements have to be considered:

- The differences between the specific gravity of the water and the lighter (oil) and heavier (tar) fractions must be sufficiently great.
- Emulsions have to be avoided.

There are four types of separators, namely: primary, secondary, tertiary and oily separators. Separation takes place by gravity at controlled temperatures and atmospheric pressure. All separation tanks are fitted with over pressure protection. The feed to the gas liquor separation unit originates from the cooling and washing of the raw gas from coal gasification. The raw gas contains large amounts of water vapours (steam, carbonization water and coal moistures (surface water, hygroscopic moisture, decomposition water, mineral moisture)) and by-products from carbonization such as tar, oil, naphtha, phenols, chlorine, fluorine and fatty acids. It also contains dissolved gases (mostly NH_3, CO_2, and H_2) and small amounts of combustible gases and coal dust as well as inorganic salts.

Feed steams originate in:

- Gasification (unit 10/210);
- Gas cooling (unit 11/211);
- Rectisol (unit 12/212);
- Phenosolvan (unit 16/216);
- Coal tar filtration (CTF);
- Refinery unit 14 and 74; and
- Carbo tar

5.1.5.2. Phenosolvan

The Phenosolvan (unit 16/216) and ammonia recovery (unit 17/217) plants are part of the gas liquor value chain. These are mainly water purification plants, whose purpose is to remove Impurities such as suspended solids and oil as well as to recover pitch, phenols, organic waste, carbon dioxide (CO_2), hydrogen sulphide (H_2S) and ammonia (NH_3) from the gas liquor before pumping the stripped gas liquor to the water recovery units (unit 52/ 252) for re- use in the Secunda Synfuels factory as cooling water. Only phenols and ammonia are marketable products.

The purpose of the Phenosolvan unit is to extract depitcher tar acids (OTA) and phenolic pitch from gas liquor. Gas liquor is pumped from storage tanks to sand filters (X16FT - X01 A-H) to remove any tar, oil and solid particulates. These filters are regularly back flushed[redacted]. During said backwashing of the filters, the overheads valve (X16FV-X003) will open to protect the filter from overpressure or vacuum.[redacted] From here the gas liquor goes to the extraction train where phenols are removed using di-isopropyl ether (DIPE) as a solvent. The phenol rich[redacted] stream is further processed to recover the solvent and purify the phenol product. The final purification step is to remove the phenolic pitch from the crude phenol. This is done via distillation of the crude phenol stream in a vacuum distillation unit column named the depitcher (X16VL-107). A slight vacuum is maintained by an ejector system. These ejectors vent to atmosphere (one each factory).

5.1.5.3. Coker (Unit 39)

The delayed coker plant receives the so-called bottom of the barrel products from upstream units to produce coke. The plant mainly operates in two different modes to produce two different types of coke. These modes are medium temperature pitch (MTP) mode and waxy oil (WO) mode. Reactions and catalyst: The coker plant produces green coke using a delayed coking process, which involves thermal cracking of the feedstock (pitch or waxy oil) at elevated temperatures and long residence time at specific conditions. The basic reaction that takes place is:

HC + impurities = C + impurities + vapour (H_2O & volatile material).

5.1.5.4. Calciner (Unit 75) and coker storage and handling (unit 76)

The Coke Calcining Unit, (unit 75) receives MTP green coke from the delayed coker unit (unit 39) and thermally upgrades the green coke to produce calcined coke. The calciner produces three main grades of coke, Cathode Paste (CP), Carbon Grade (CG) and Medium-low Sulfur (ML) Coke. The coke is conveyed to coke storage and handling (unit 76) before being sent to the market. Unit 76 is a storage facility for final products from the calciner unit (unit 075) and distribution via rail and road trucks of different sizes, quantities, and products.

5.1.5.5. Coal Tar Filtration (Unit 96/296)

CTF units (units 96/296) receive tar from gas liquor separation units (units 13/213). Solids and water are removed from the tar. The solids get trucked to the mixing plant where they are mixed with fine coal and fed to the boilers. The final tar product with an ash specification of less than 0.020 and the water specification of less than 1.50% is pumped to tank farm as feed for the tar distillation units (units 14/214). Vapours from the CTF unit are collected in a header and sent to the gas liquor separation units' thermal oxidizer for destruction.

5.1.5.6. Feed Preparation (Unit 86)

The purpose of the feed preparation unit (unit 86) is to clean-up heavy residue streams removing primarily solids and water; the feed streams can vary depending on availability. The unit consists of two trains; Train 1 processes waxy oil (WO) related product and train 2 processes the crude tar from various sources and serves as a CTF contingency.

Train 1 can also be utilized to process tar when there is very high tank levels from tank farm (256TK1401/2). Through the series of processes, water and solids are removed from the contaminated feed streams and made available to customers such as heating fuels and tar distillation units (units 14/214).

5.1.6. Water and Ash

5.1.6.1. Bio-sludge (Multi hearth) incinerators

Thickened waste activated sludge (WAS) generated by the biological wastewater treatment plants (Unit 52/252) are burned in four (4) multiple-hearth incinerators. Each unit has two (2) incinerators. Combustion in the incinerator burners is achieved by means of fuel gas and combustion air. Cooling air is introduced to the incinerator to control the temperature of the ash cooling zone. This is to ensure that the red ash exits the incinerator at a safe temperature. Off-gas from the incinerators is scrubbed and then exits to atmosphere via the stack, red ash is collected in a bin at the bottom of the incinerator and a fine ash slurry is routed to the process water dams.

5.1.6.2. High Organic Waste (HOW) Incinerators

The HOW incinerators burn a high organic waste stream from Phenosolvan and ammonia recovery (Unit 17/217) and a stream from chemical work up (Unit 37/237). The burner is a combination burner for optional or simultaneous combustion of fuel gas and HOW. The product is atomized with steam in the burner. Fuel gas is constantly burnt since it serves as the pilot flame to ignite the HOW. Oxygen is required for combustion therefore a controlled quantity of combustion air is provided to the burner. Cooling air is used to control the afterburner's temperature. Warm air containing combustion gases is let out to the atmosphere through the stack.

5.1.6.3. Waste Recycling Facility (WRF)

The WRF is designed to treat waste products from various units in the Synfuels Secunda site. The wastewater entering the plant is primarily contaminated with oils, hydrocarbons, dissolved solids and suspended solids. The products from this facility include treated water, recovered oil and sludge. After treatment the water can be recycled. The facility has a bulk liquid unloading facility, a wastewater tank farm and a wastewater treatment plant. The wastewater tank farm handles and stores liquid waste material, while the wastewater treatment plant treats the waste streams with separation, chemical and biological processes.

5.2. Listed Activities

Listed Activity Number	Category of Listed Activity	Sub-category of the listed activity	Description of the Listed Activity	Application	Secunda Operations Synfuels Processes
1.1	Combustion installations	Solid Fuel Combustion installations	Solid fuels (excluding biomass) combustion installations used primarily for steam raising or electricity generation	All installations with the design capacity equal to or greater than 50 MW heat input per unit, based on the lower calorific value of the fuel used.	Steam Boilers
1.4	Combustion installations	Gas Combustion Installations	Gas combustion installations (including gas turbines burning natural gas) used primarily for steam raising or electricity production	All installations with the design capacity equal to or greater than 50 MW heat input per unit, based on the lower calorific value of the fuel used.	Gas Turbines
2.1	Petroleum Industry	Combustion installation	Combustion installations not used primarily for steam raising or electricity generation (furnaces and heaters)	All refinery furnaces and heaters	Refinery Heaters
2.2	Petroleum Industry	Catalytic Cracking Units	Refinery Catalytic Cracking Units	All installations	Secunda Catalytic Cracker
3.2	Carbonization and Coal Gasification	Coke production	Coke production and by-product recovery	All installations	Calciner and coke storage and handling
3.3	Carbonization and Coal gasification	Tar processes	Processes in which tar, creosote or any other product of distillation of tar is distilled or is heated in any manufacturing process	All installations	Coker, feed preparation, refinery tar distillation units
3.6	Carbonization and Coal gasification	Synthetic gas production and clean-up	The production and clean-up of gaseous stream derived from coal gasification separation and clean-up of a raw gas stream through a process that involves sulphur removal and Rectisol as well as the stripping of a liquid tar stream derived for the gasification process	All installations	Gasification Gas liquor separation Phenosolvan Sulphur recovery
4.1	Metallurgical Industry	Drying and Calcining	Drying and Calcining of mineral solids including ore	Facility with capacity of more than 100 tons/month product	Catalyst preparation – rotary kilns

4.7	Metallurgical Industry	Electric Arc Furnaces (Primary and Secondary)	Electric arc furnaces in the steel making industry	All installations	Catalyst preparation – electric arc furnaces
5.1	Mineral Processing, Storage and Handling	Storage and handling of ore and coal	Storage and handling of ore and coal not situated on the premises of mine or works as defined in the Mines Health and Safety Act 29/1996	Locations designed to hold more than 100 000 tons	Coal processing
7.1	Inorganic Chemical Industry	Production and/or use in manufacturing of ammonia, fluorine, fluorine compounds, chlorine, and hydrogen cyanide	Production and/or use in manufacturing of ammonia, fluorine, fluorine compounds, chlorine and hydrogen cyanide and chlorine gas (excluding metallurgical processed related activities regulated under category 4)	All installations producing and/or using more than 100 tons per annual of any of the listed compounds	Ammonia recovery
7.2	Inorganic Chemical Industry	Production of acids	The production, bulk handling and/or use of hydrofluoric, hydrochloric, nitric and sulphuric acid (including oleum) in concentrations exceeding 10%. Processes in which oxides of sulphur are emitted through the production of acid sulphide of alkalis or alkaline earths or through the production of liquid sulphur or sulphurous acid. Secondary production of hydrochloric acid through regeneration.	All installations producing, handling and/or using more than 100 tons per annum of any of the listed compounds (excluding metallurgical processed related activities regulated under category 4)	Wet Sulphuric Acid
8.1	Thermal Treatment of Hazardous and General Waste	Thermal Treatment of Hazardous and General Waste	Facilities where general and hazardous waste are treated by the application of heat.	All installations treating 10 kg per day of waste	Bio-sludge incinerators, HOW incinerators

5.3. Unit process or processes

Unit process	Function of unit process	Batch or continuous process
Utilities		
Coal milling process	There are 4 mills per boiler. The mill grinds course coal to fine coal, known as pulverized fuel (PF). Primary air dries the coal and then transports the PF into the boiler furnace for combustion.	Continuous
De-aeration process	The boiler feed water de-aerators use low pressure steam to heat up and remove dissolved oxygen from the feed water. Oxygen causes corrosion inside the boiler tubes if it is present.	Continuous

Combustion process	The PF is combusted in the boilers and the hot flue gases are used to heat up the water in the water wall tubes, Heated water is separated into the steam-water drum and superheated for factory usage.	Continuous
Flashing process	Blow down from the steam/water and mud drum as well as drains are flashed in the blow down vessel to 4 bar steam.	Continuous
Ash capture and handling process	Fly ash is separated from the flue gas using electrostatic precipitators. Coarse ash falls from the furnace into the drag chains. Ash is mixed with sluice water and sent to the ash system.	Continuous
Electricity generation process	Excess superheated steam not used in the process is used to generate electricity in turbogenerators. There are 10 turbo generators with a capacity of 60 MW.	Continuous
Fuel oil for start-up process	Fuel oil is used during start up and shutdown of boilers. Fuel oil is also used for commissioning and decommissioning of the coal Mills.	Intermittent
Gas Turbines	Gas turbines generate power by combusting natural gas	Continuous
Heat recovery steam generator	Steam is generated using the hot off gas from the gas turbines.	Continuous
Gas Production		
Coal Processing		
Separation	Wet screening of fine and coarse coal	Continuous
Gasification		
Gasification	Gasification process produces crude raw gas	Continuous
Coal lock raw gas compression	Coal lock raw gas compression recovers raw gas during second stage depressurisation of coal lock	Continuous
Raw gas cooling	Raw gas cooling	Continuous
Rectisol		
Absorption	Washes the raw gas with methanol to remove carbon dioxide (CO2), hydrogen sulphide (H2S), benzene, toluene, ethyl benzene and xylene (BTEX) and other organic and inorganic compounds	Continuous
Regeneration	Purification of methanol	Continuous
Sulphur recovery		
Sulphur recovery	The sulphur recovery unit reduces the amount of sulphur released into the atmosphere as hydrogen sulphide (H2S) gas by producing elemental sulphur as a saleable product.	Continuous
Wet sulphuric acid (WSA)		
Wet sulphuric acid	The wet sulphuric acid (WSA) unit reduces the amount of sulphur released into the atmosphere as hydrogen sulphide (H2S) gas by producing sulphuric acid as a saleable product.	Continuous
Gas Circuit		
Catalyst preparation		

Catalyst manufacturing	T[redacted]	Semi-batch
Catalyst reduction	The catalyst reduction system activates the catalyst before it is fed to the reactors at the Synthol units. [redacted]	Batch
Refinery		
Generic refinery unit processes		
Tank	The feed tank serves as feed reserve tank. This is a hold-up for the polymerisation of the mixed feed components and for the separation of entering water.	Continuous
Vaporizer	The vaporizer separates the light ends from the heavy ends. Saturated high pressure (HP) steam is used to vaporise the feed.	Continuous
Distillation column	The distillation column purifies hydrocarbon streams and separates hydrocarbon streams into various components.	Continuous
Catalyst distillation (CD) hydrogenation columns	CD hydrogenation unit, function as depentaniser of C5/C6 fed stream and eventually hydro-isomerise C5 stream to feed to unit 90. In rare cases feed directly to unit 79 to make Tert Amyl Methyl Ether (TAME)	Continuous
Separation and collection drums	Separation and collection drums separate streams into lighter and heavier components.	Continuous
Hydro treating reactors	The hydro treating reactors saturate olefins and oxygenates, remove nitrogen and sulphide components and remove other impurities in the presence of hydrogen.	Continuous
Platforming reactors	The platforming reactors convert low quality naphtha in the presence of hydrogen, into aromatic rich, high-octane product.	Continuous
Unit 90 - skeletal isomerisation reactor	The skeletal isomerisation unit converts the C5 feed from the CD-hydrotreating unit to iso-amylenes as feed to the CD tertiary amyl methyl ether (TAME) unit.	Continuous
Catalytic polymerisation	The reactors fuse small olefin molecules into large olefins through polymerisation with the aid of a catalyst.	Continuous
Heat exchangers	There are numerous heat exchangers to heat up, cool down, vaporise, and condense the hydrocarbon streams. There is a combination of product-product exchangers (two process exchangers exchanging energy) as well as product-utility exchangers.	Continuous
Air coolers	The air coolers cool down and condense hydrocarbon streams.	Continuous
Ejectors	The ejectors generate negative gauge pressure (vacuum). Many plants in the refinery utilise vacuum conditions to help with the separation of hydrocarbon streams.	Continuous
Compressors	The compressors increase and/or maintain the high operating pressures of the refining processes. There is reciprocal, centrifugal and turbine compressors.	Continuous

Pumps	The pumps in the refinery are centrifugal, multi-stage and positive displacement pumps.	Continuous
Electrical heaters	The electrical heater is normally not in operation. The heater primarily regenerates catalyst and heats up the main reactor for start-up.	Start-up and as required
Heaters	The heaters heat up hydrocarbon and gas streams.	Continuous
Synfuels catalytic cracker	Low molecular weight olefins and paraffin are converted to ethylene and propylene in a reaction with a catalyst. High octane gasoline is also produced.	Continuous
Catalyst fines system and waste heat boiler	The catalyst fines system recovers catalyst fines from the flue gas. The waste heat boiler cools the flue gas using boiler feed water to produce high pressure steam.	Continuous
Gas clean-up equipment	The unit (NiS reactors, DEA and caustic sections and gas dryers) removes oxygen, acid gasses and moisture from the process gas.	Continuous
Liquid dryers	The liquid dryers remove water from the C3 stream.	Continuous
Propylene refrigerant system	The propylene refrigeration system is a closed-loop system providing three levels of refrigeration.	Continuous
Tar distillation units		
Water stripper (14VL101/201; 214VL101/201)	The water stripper strips water from crude. The overhead vapours of the stripper are condensed, and the water free crude tar is sent to 14/214VL102.	Continuous
Distillation column (14VL102/202; 214VL102/202)	The distillation column operates at atmospheric pressure and the superheated stripping steam is fed to the bottom section to control the temperature. The distillation tower is heated up by the tar furnace 14HT101. The overhead vapours, mainly water and light naphtha are condensed. In the distillation tower 14VL-102 heavy naphtha, medium creosote and heavy creosote are recovered as side streams of the tower.	Continuous
Reflux drum (14DM102/202; 214DM102/202)	The condensed vapours of both VL101 and VL102 are fed to this drum where the water is separated from the light naphtha. The water overflows into the sewer, the hydrocarbons are partly sent as reflux to 14VL101 and 14VL102, and partly routed as light naphtha product to the tank.	Continuous
Flash drum (14DM104/204; 214DM104/204)	The net bottom product of the distillation tower is withdrawn from the tar furnace (14HT101) circulation stream and sent to the flash drum 14DM104. In this drum, operating under vacuum, separation between pitch and residue oil is achieved by one stage flash evaporation.	Continuous
Heavy creosote process vessel (14DM106/206; 214DM106/206)	This vessel stores heavy creosote which is a side draw from VL102 before it is pumped to tank farm.	Continuous
Medium creosote process vessel (14DM107/207; 214DM107/207)	This vessel stores medium creosote which is a side draw from VL102 before it is pumped to tank farm.	Continuous
Heavy naphtha process vessel (14DM108/208; 214DM108/208)	This vessel stores heavy naphtha which is a side draw from VL102 before it is pumped to tank farm.	Continuous

Pitch drum (14DM109/209; 214DM109/209)	The bottoms product of 14DM104 is pitch, which passes via a barometric pipe to pitch cooler 14ES114 and to a pitch drum, 14DM109, from where it is pumped to carbo tar or tank farm.	Continuous
Residue oil drum (14DM110/210; 214DM110/210)	The top product of the flash drum 14DM104 is residue oil, which is condensed in a steam-producing heat exchanger, then piped to the residue oil drum 14DM110 from where it is pumped to the battery limit.	Continuous
Heaters (14HT101/201; 214HT101/201)	These furnaces heat a high circulating bottoms product from 14VL102 to control the temperature of the column.	Continuous
Neutral oil stripper (Unit 27A)		
Neutral oil stripper (27VL101)	The neutral oil stripper removes neutral oils from high neutral oil depitched tar acids (HNO-DTA), producing low neutral oil depitched tar acids (LNO-DTA). The overhead vapour stream, containing mainly water and neutral oils, leaves the top of the column to pass through the overhead condenser system.	Continuous
Flash drum (27DM103)	This drum flashes the neutral oil from the water so that the neutral oil rich stream goes to 27DM1 and the water rich stream is recycled back to the column. Temperature and pressure of this drum determines the amount of neutral oil that is flashed.	Continuous
Separators drum (27DM1)	The stream from 27DM103 that is rich in neutral oil is cooled and sent to 27DM1 for separation. This large vessel has a long retention time thus allowing the neutral oil to separate from the water and flow over the weir inside the vessel to the second compartment where it is then pumped to tank farm.	Continuous
Unit 74		
Vacuum distillation (74VL101)	This is the secondary depitcher column that flashes phenolic pitch and fractionates the stream to recover phenolic material in the side draw, without entraining catechol or any heavy ends.	Continuous
Coal tar naphtha hydrogenation		
Feed tank (15TK-101)	The feed tank serves as a feed reserve tank. This is a hold-up for the polymerisation of the mixed feed components and for the separation of entering water.	Continuous
Vaporizer (15EX-101)	The vaporizer separates the light ends (naphtha) from the heavy ends (residue oil). Saturated HP steam is used to vaporise the feed.	Continuous
Residue stripper (15VL-101)	The residue stripper strips the remaining low boiling components by means of super-heated recycle gas.	Continuous
Residue oil collection drum (15DM-102)	Residue oil from the residue stripper is collected in the residue oil collection drum and is continuously pumped to tank farm.	Continuous
Pre-reactor (15RE-101)	The bottom separator of the pre-reactor retains any entrained liquid droplets before the hydrocarbon vapour mixture enters the pre-reactor. The pre-reactor, filled with catalyst, hydrogenates components which easily tend to polymerize.	Continuous

Main reactor (15RE-102)	Recycle gas and a hydrocarbon vapour mixture pass through the main reactor. A quench stream of cold recycled gas between the two main reactor beds prevents H2S from reacting back to mercaptans or thiophenes and prevents severe hydrogenation.	Continuous
HP separator (15DM-106)	Separates the raffinate from the gas.	Continuous
Medium pressure naphtha water separator (15DM-107)	The medium pressure naphtha water separator is a three-phase separator, firstly to separate the gas-liquid mixture and secondly to separate the organic aqueous liquid mixture. The gas/raffinate and condensate are separated under gravity, due to their density difference. The water and product are separated by a gooseneck. The entrained injection and reaction water separated therein is discharged from the bottom of the separator's water compartment directly to unit 16/216 as wastewater, or to the oily water sewer during upset conditions.	Continuous
H2S stripper (15VL-102)	The hydrogenated naphtha product is stripped of water, H2S, ammonia (NH3) and other dissolved gases. The stripping is done by means of naphtha vapour generated on the thermosiphon reboiler (15/215ES-113) tube side.	Continuous
Naphtha hydrotreater, platformer and continuous catalyst regeneration (CCR)		
Naphtha reactors system	Saturation of olefins.	Continuous
Naphtha hydro treater (NHT) charger heater	Heating of NHT reactor feed.	Continuous
Separation drums	Hydrogen, uncondensed hydrocarbon gases and water are separated from the condensed reactor products.	Continuous
Stripper system	Removing the light ends (H_2S and water).	Continuous
Stripper reboiler (fired heater)	Heating stripper bottoms.	Continuous
Splitter system	Splits between C10+ and C10-.	Continuous
Splitter reboiler (fired heater)	Heating splitter bottoms.	Continuous
Platformer charge heater	Heating platformer reactor feed.	Continuous
Platforming reactors	Produces aromatics from paraffin and naphthene.	Continuous
Continuous catalyst regeneration system	Regenerates platformer catalyst on a continuous basis.	Continuous
Product separator	Hydrogen (H_2) is separated from the condensed platformer product.	Continuous
Debutanizer	Removes C4- from final product.	Continuous
Debutanizer reboiler (fired heater)	Heating debutanizer bottoms.	Continuous
Catalytic distillation hydrotreater		
Depentanizer (78VL-101)	Splits a liquid feed stream into C5 and C6+ streams. The C6+stream is sent to the alpha olefin plants for hexane extraction. The C5 stream is sent to 78VL-102 (CD hydro column)	Continuous

CD hydro column (78VL-102)	Hydro treats the C5 hydrocarbons of a catalyst to produce a diene-free feed to Unit 90.	Continuous
CD TAME		
Primary reactor (79RE-101)	79RE-101 (Primary reactor) - The first reaction between isoamylenes and methanol takes place in this reactor, with a conversion of at least 55%.	Continuous
Secondary reactor (79RE- 103)	The second reaction between iso-amylenes and methanol takes place in this reactor, with a conversion of at least 30%.	Continuous
CD TAME column (79VL-101)	The last phase of reactions take place in this column, with a conversion of 96%. This column also serves to separate the TAME product from the unreacted reactants.	Continuous
Methanol extraction column (79VL-102)	Uses a water stream to extract methanol from the C5 hydrocarbons. The C5 hydrocarbons are sent to storage, and the methanol-water stream is sent to 79VL-103.	Continuous
Methanol recovery column (79VL-103)	The water-methanol stream from 79VL-103 is split into methanol and water streams. The methanol is recycled to the front end of the process, and the water is recycled to 79VL-102 where it is used to extract the methanol.	Continuous
C5 Isomerisation		
Unit 90 – skeletal isomerisation reactor	The skeletal isomerisation unit converts the C5 feed from the CD-hydrotreating unit to iso-amylenes as feed to the CD tertiary amyl methyl ether (TAME) unit.	Continuous
Unit 90 – continuous catalyst regeneration tower	Regenerates skeletal isomerisation reactor's catalyst on a continuous basis and returns the catalyst back to the reactor.	Continuous
Depentanizer column (90VL- 101)	Splits a liquid feed stream into C5- and C6+ streams. The C6+ stream is sent to storage. The C5- stream is sent to 90VL-102 (debutanizer column)	Continuous
Debutanizer column (90VL-102)	Splits a liquid feed stream into C4- and C5 streams. The C4-stream is sent to the catalytic polymerization unit. The C5 stream is sent to the CDTAME unit for etherification.	Continuous
Vacuum distillation		
Vacuum distillation	The aim is to fractionate high boiling point hydrocarbons at low temperatures by lowering the pressure using decanted oil from Unit 020/220 and the heaviest fraction from Unit 029/229 is fractionated to a heavy and light vacuum gas oil and waxy oil.	Continuous
Distillate hydrotreater		
Distillation	The fractionation of the feed oil material into components of similar boiling range.	Continuous
Light diesel stripping	Separation of diesel (medium cut material) range boiling material from the feed stream using distillation.	Continuous
Naphtha stripping	Separation of naphtha (light material) range boiling material from the feed stream using distillation.	Continuous
Hydrogenation	The conversion of oxygenates and olefins into paraffin, the reaction is very exothermic.	Continuous
Catalyst sulphiding	This is to regulate catalyst activity.	Continuous

Water removal	Removal of water from the feed oil stream in a drum operated such that water settles in the drum's water boot.	Continuous
High separation temperature	Separate a feed stream into liquid and vapour streams in a drum at a high temperature.	Continuous
Low separation temperature	Separate a feed stream into liquid and gas streams in a drum at a low temperature.	Continuous
Hydrogen recycle	To reuse the hydrogen rich off gases leaving the cold separation drum.	Continuous
Heating	This is to preheat feed streams and cool down product streams.	Continuous
Distillate selective cracker		
Cracking reaction system	To selectively crack high pour point components (predominately paraffin), the reaction is not strongly exothermic.	Continuous
Distillation	Fractionation of the heavy oil material.	Continuous
Vacuum distillation	Separate the heavy distillate material mainly heavy diesel.	Continuous
Heating and cooling	Preheat feed material and cool down product streams.	Continuous
Water removal	Separate entrained water from feed stream.	Continuous
Hot separation temperature	Separate reactor product stream into a liquid and vapour stream	Continuous
Hydrogen recycle	Recycle the off gas rich stream separate from the reactor liquid stream.	Continuous
Catalyst sulphiding	To regulate the catalyst activity.	Continuous
Light oil fractionation		
Atmospheric distillation	This unit fractionates the stabilized light oil into different fractions of molecules used in downstream processes. The different fractions are C5/C6 to the CD Tame unit, naphtha to octene (and U30/230 NHT), light diesel to Safol (U35/235 DHT) and a heavy fraction to Unit 34/234.	Continuous
Polymer hydrotreater		
Polymer hydrotreater	This unit produces motor fuels namely petrol, diesel and jet fuel from a stream of C3/C4 through polymerisation over a phosphoric acid catalyst.	Continuous
Liquid petroleum gas (LPG) recovery	This section recovers unreacted paraffinic C3 and C4 material for LPG production.	Continuous
Tar and Phenosolvan		
Gas liquor separation		
Gas liquor separation	The gas liquor separation units separate various gaseous, liquid and solid components from the gas liquor streams.	Continuous
Phenosolvan		
Water purification	The system filters out any oil, tar and suspected solids. Solids-free gas liquor flows to the saturation column where its pH is 9 by dissolving CO_2 rich acid gases to prepare it for the extraction process.	Continuous

The extraction process	The extraction system removes phenols from gas liquor by using di-isopropyl ether (DIPE) as a solvent.	Continuous
DIPE recovery and phenol production	The DIPE and phenols are separated through several distillation processes.	Continuous
Ammonia recovery	Recovering of ammonia from gas liquor. The raffinate from Phenosolvan, with about 1% DIPE, is first sent to the de-acidifier to remove acid gases and then to the total stripper column where ammonia, CO2 and organics are stripped from the water stream.	Continuous
Acid gas scrubber	The system removes final traces of CO_2 from the ammonia rich vapour stream by forming ammonium bicarbonates inside two packed beds, which are washed down for reprocessing in the upstream units.	Continuous
Fractionation system	The ammonia leaving the acid gas scrubber overhead is firstly compressed prior to the fractionation process to facilitate liquefaction in the fractionator's column (X17VL-105). The distillate product of the fractionators is anhydrous NH_3 and the bottoms product is an organics rich waste stream, which is routed for reprocessing. The ammonia is cooled down, expanded and the final ammonia product is sent to tank farm.	Continuous
Carbo tar		
Coker	The delayed coker unit receives bottom of the barrel products from upstream units to produce coke.	Continuous
Calciner	The coke Calcining process thermally upgrades green coke to calcined coke	Continuous
Coal tar filtration (CTF)	CTF removes solids and water from tar by utilising three solids removal processes and one water removal process.	Continuous/ batch
Feed preparation (FPP, unit 86), unit	FPP removes solids and water from heavy residue streams by utilising solids removal and water removal processes.	Continuous except for the batch filtration processes
Unit 76	The unit consists mainly of conveyors systems combined with storage silos. Loading and weighting facilities are also on site.	Continuous
Water and Ash		
Bio-sludge (multi hearth sludge) incinerators	The system incinerates waste activated sludge generated by the biological treatment systems which treat industrial and domestic effluents respectively.	Continuous
High organic waste (HOW) incinerators	The system incinerates a high organic waste stream and a stream containing heavy ketones. Simultaneous combustion of fuel gas and the feed streams occur in the burner.	Continuous
Waste recycling facility (WRF)	The WRF is designed to treat waste products from various units in Sasol, which consists of oils, hydrocarbons, dissolved solids and suspended solids.	Continuous

5.4. Graphical Process Information

5.4.1. Utilities

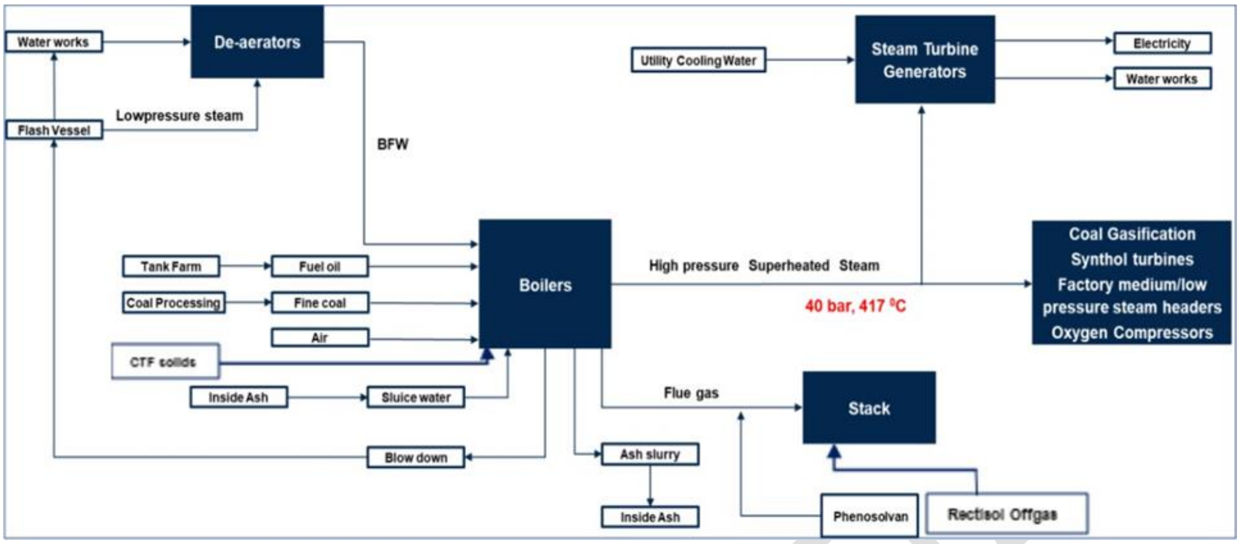

Figure 2: Steam Plant

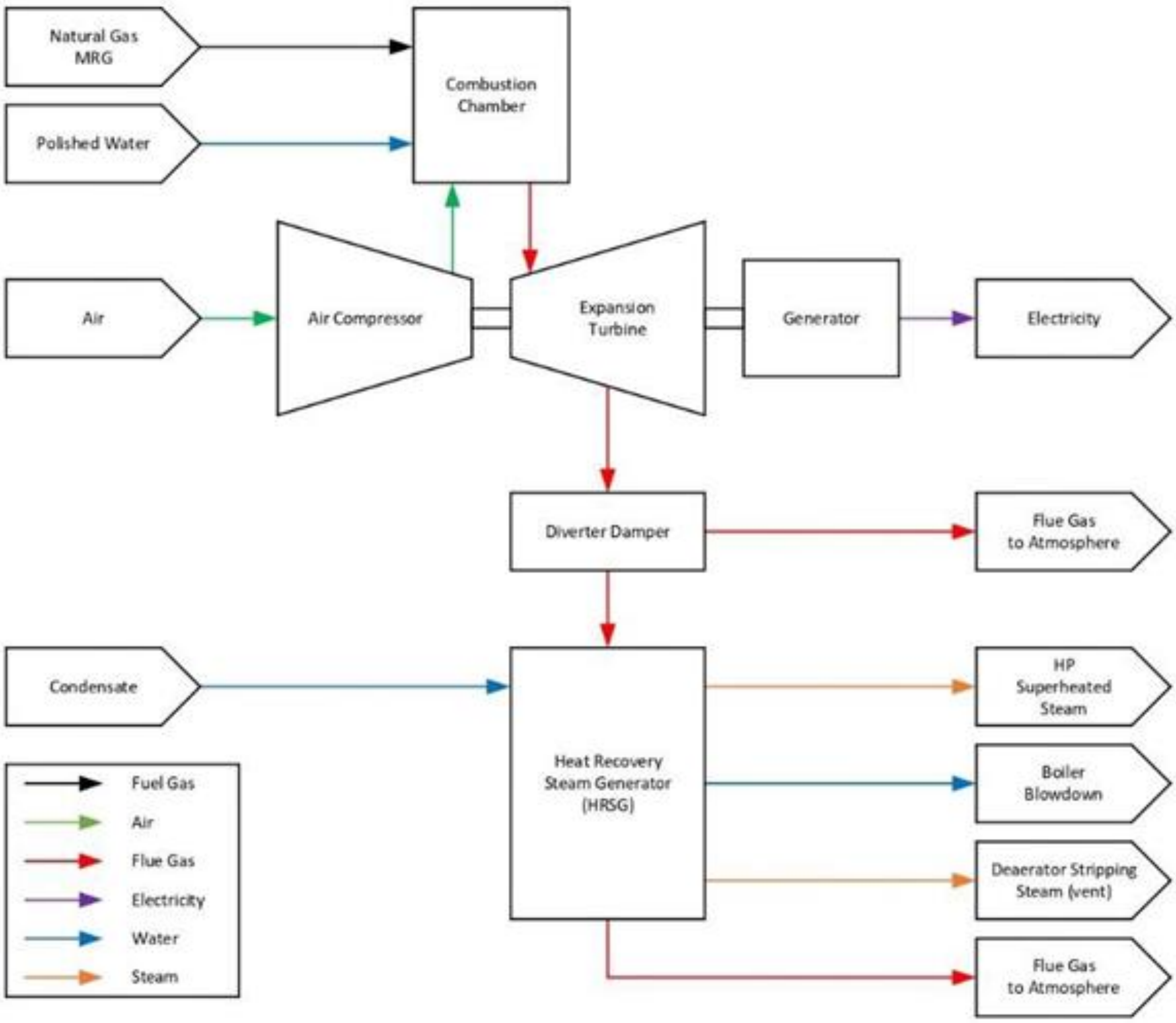

Figure 3: Gas Turbines

5.4.2. Gas Production

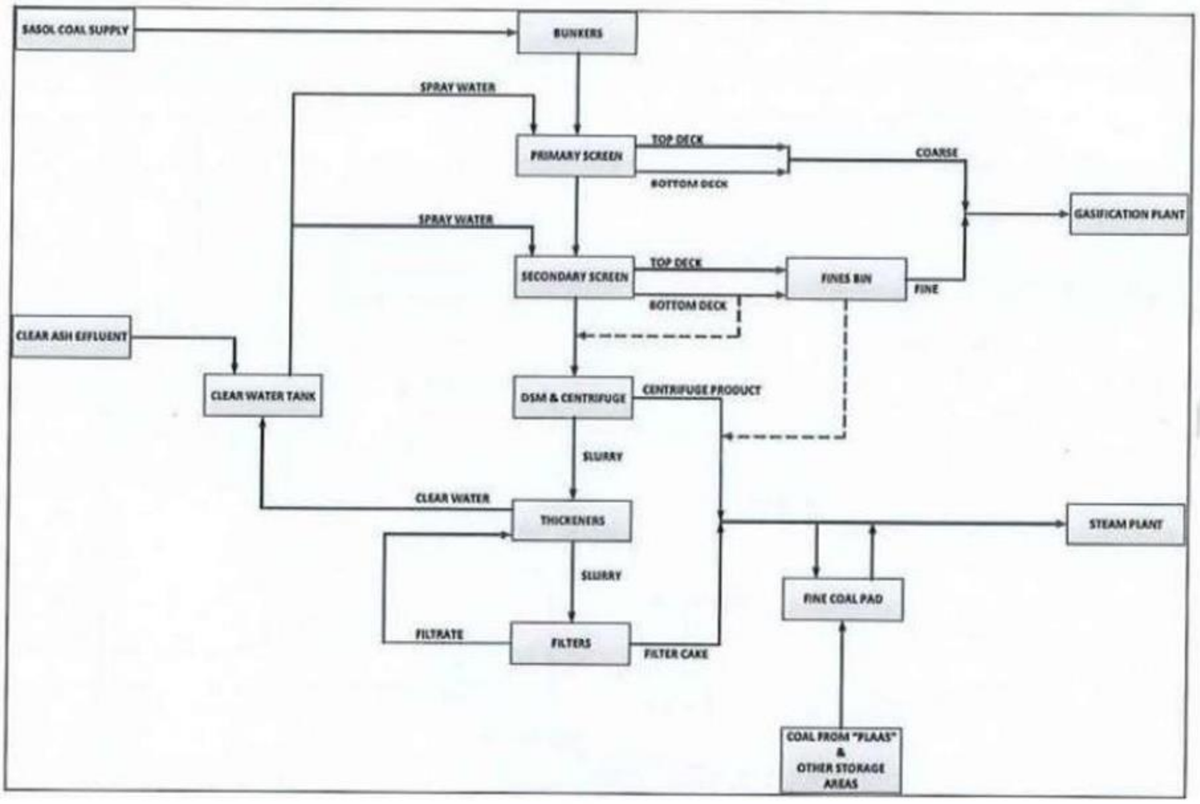

Figure 4: Coal Processing

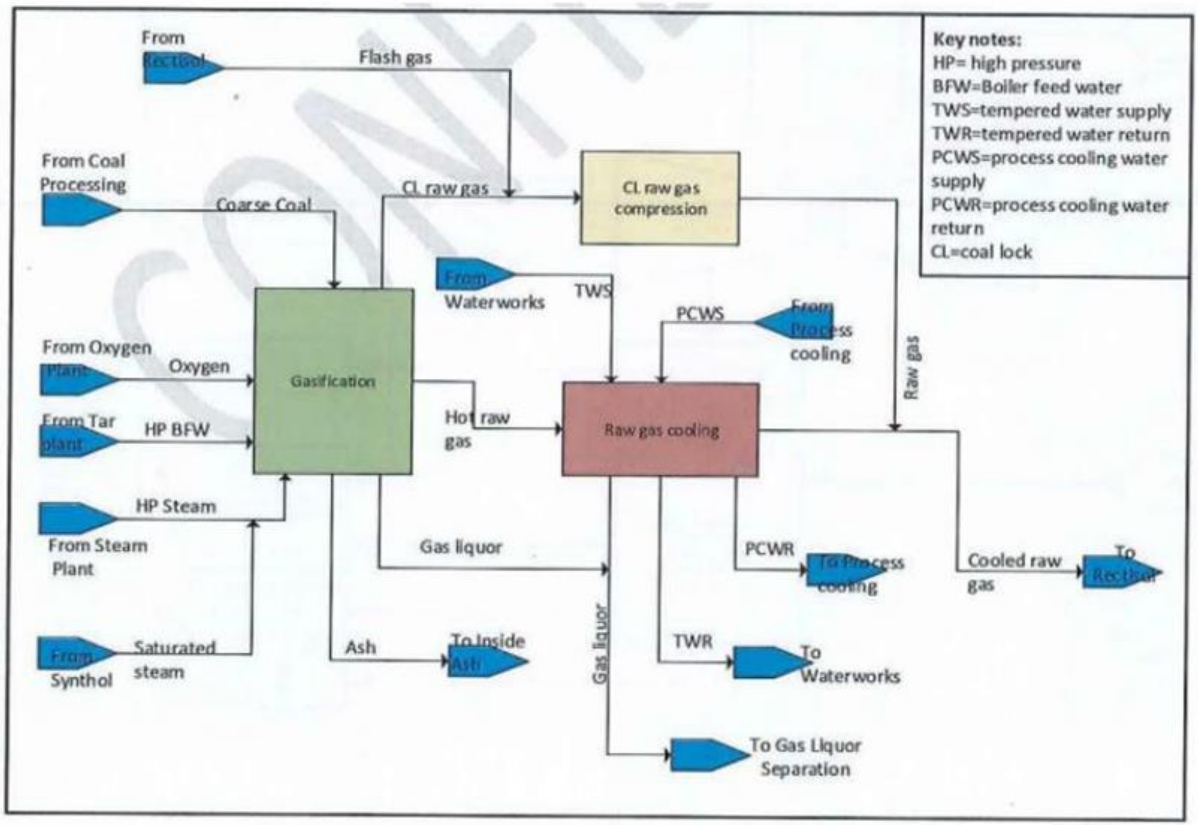

Figure 5: Gasification, coal lock raw gas compression and raw gas cooling

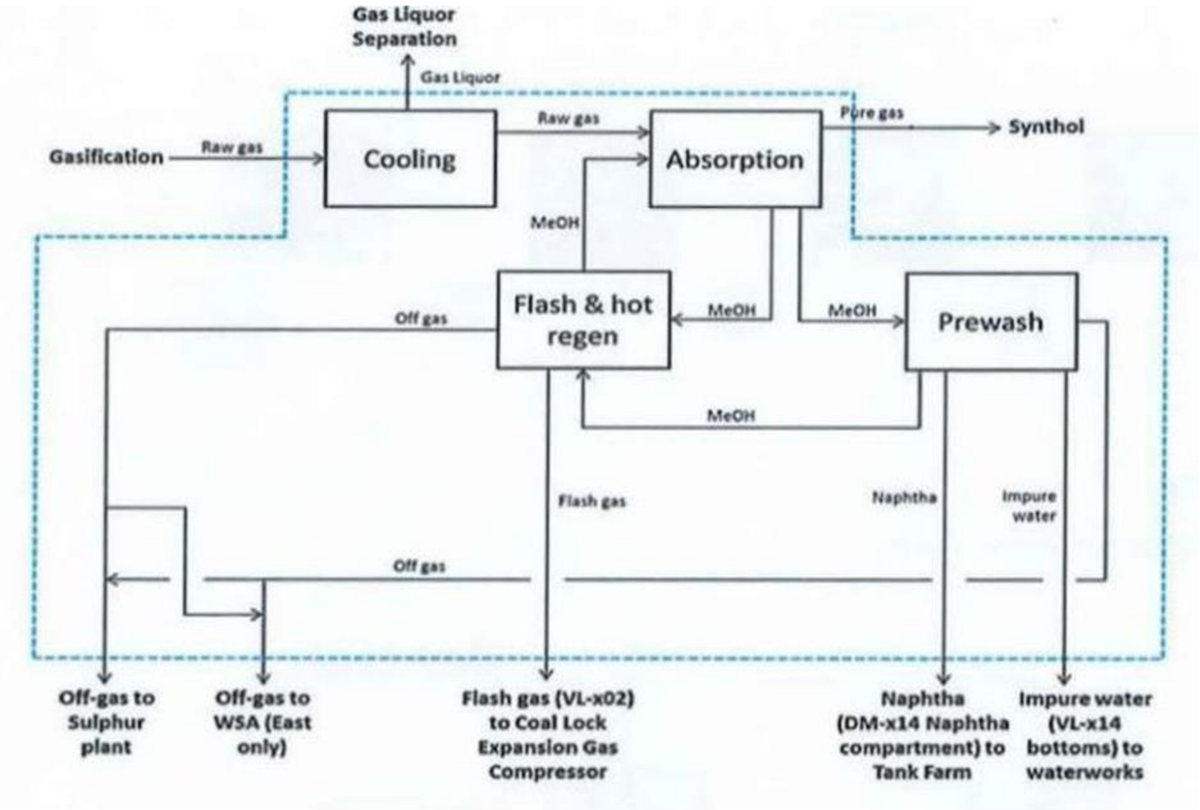

Figure 6: Rectisol

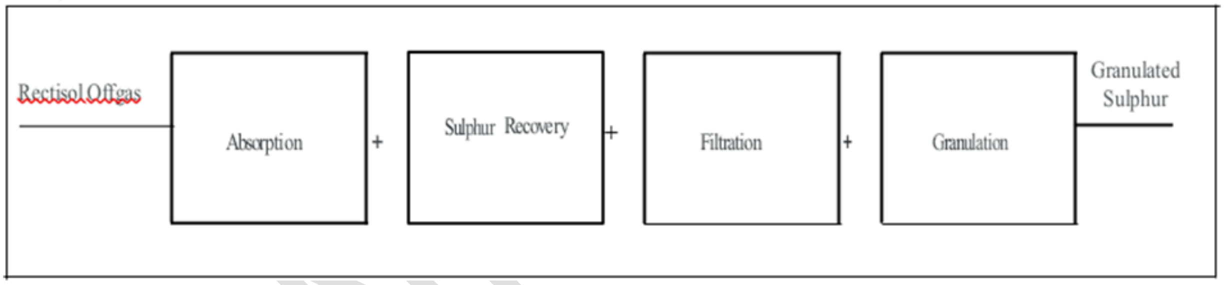

Figure 7: Sulphur recovery

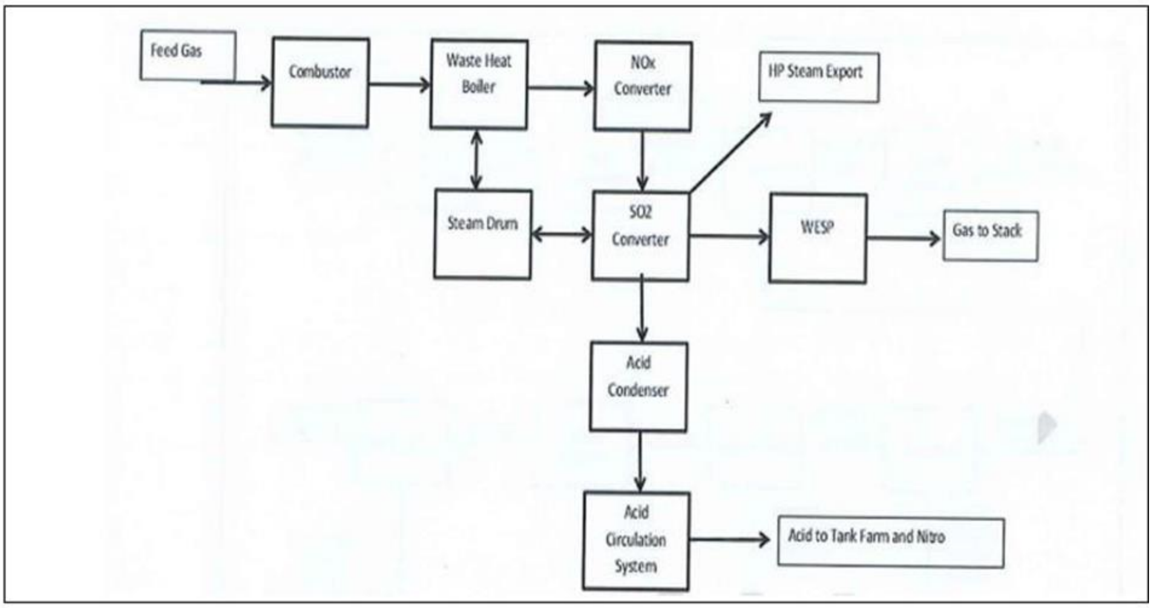

Figure 8: Wet Sulphuric Acid

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[redacted]

Figure 9: Catalyst Manufacturing and Catalyst Reduction

5.5.4. Refining

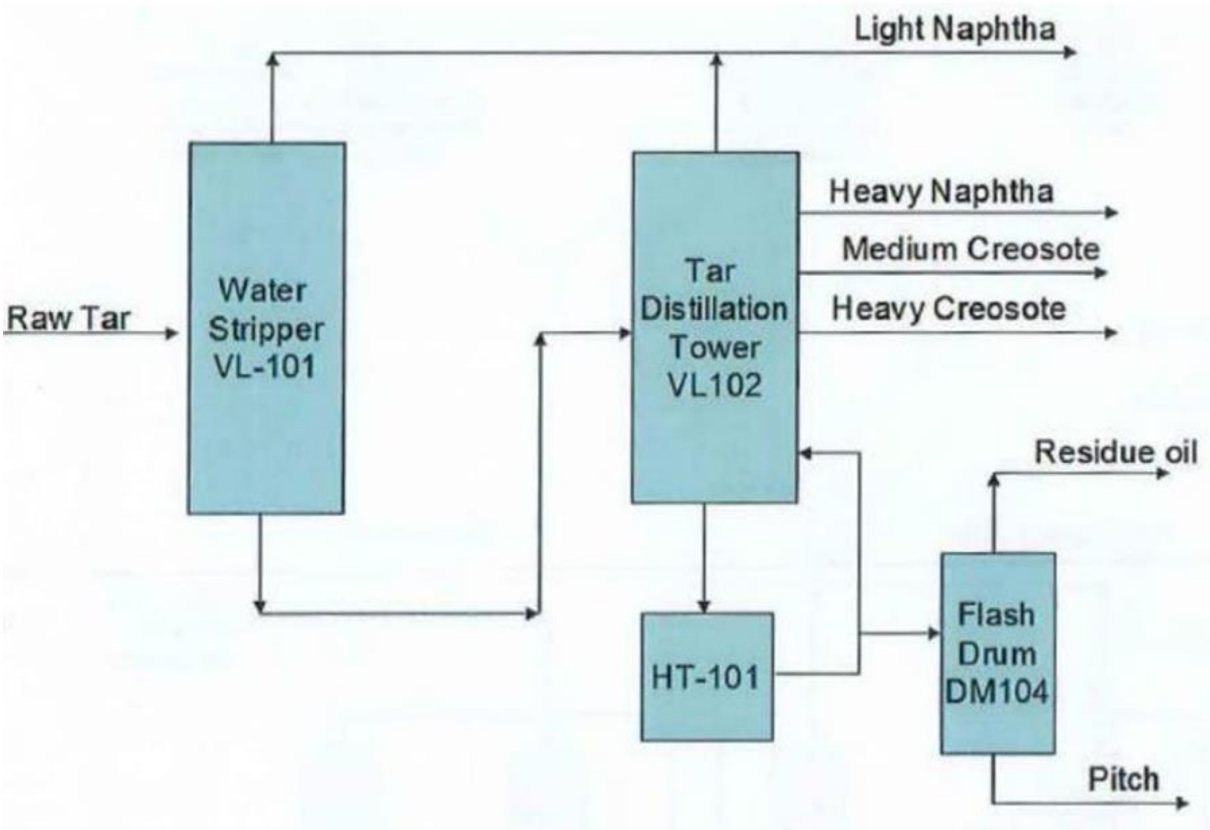


Figure 10: Tar Distillation (U14/214)

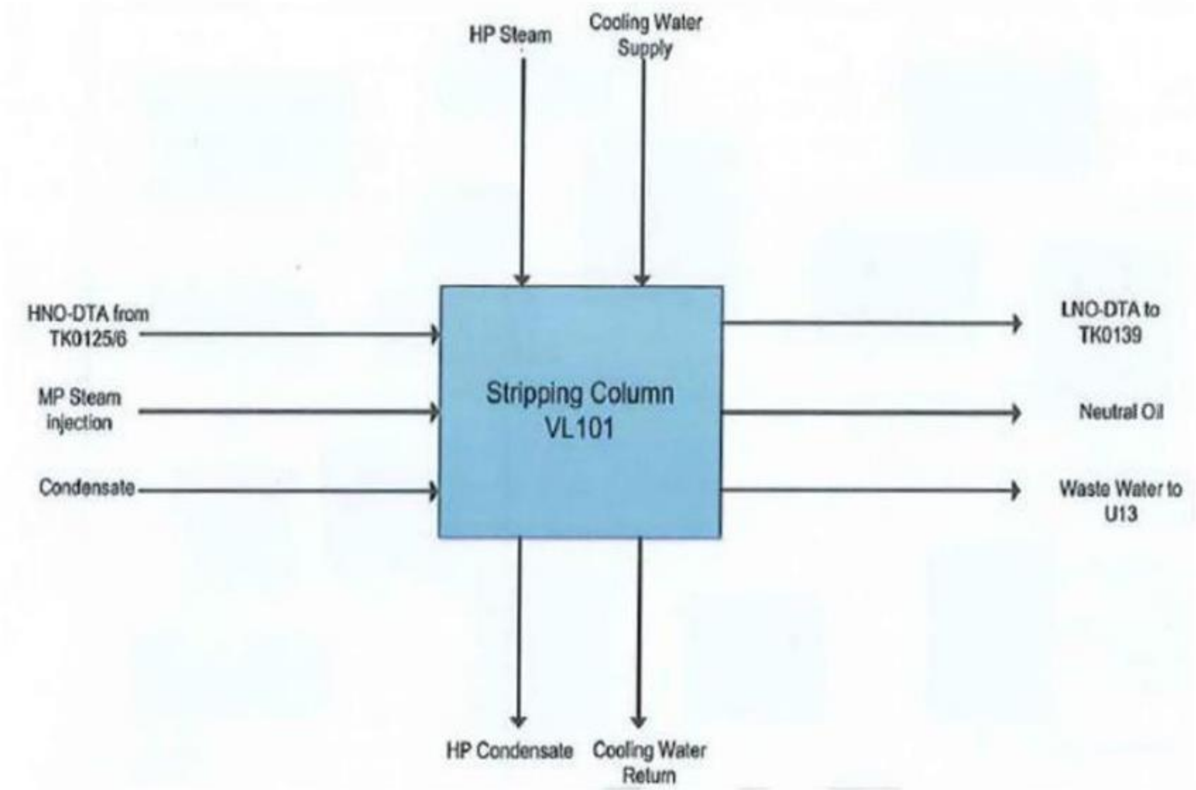


Figure 11: Neutral Oil Stripper (U27A)

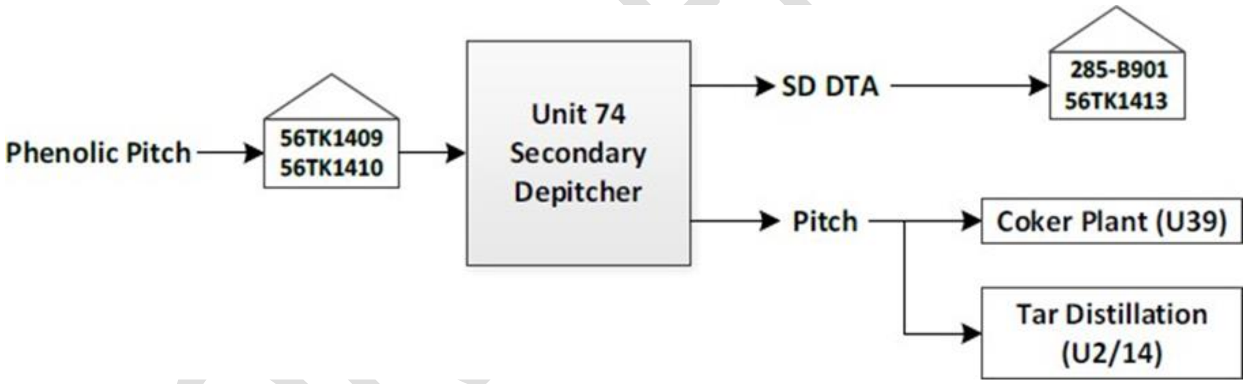


Figure 12: Secondary depitcher (U74)

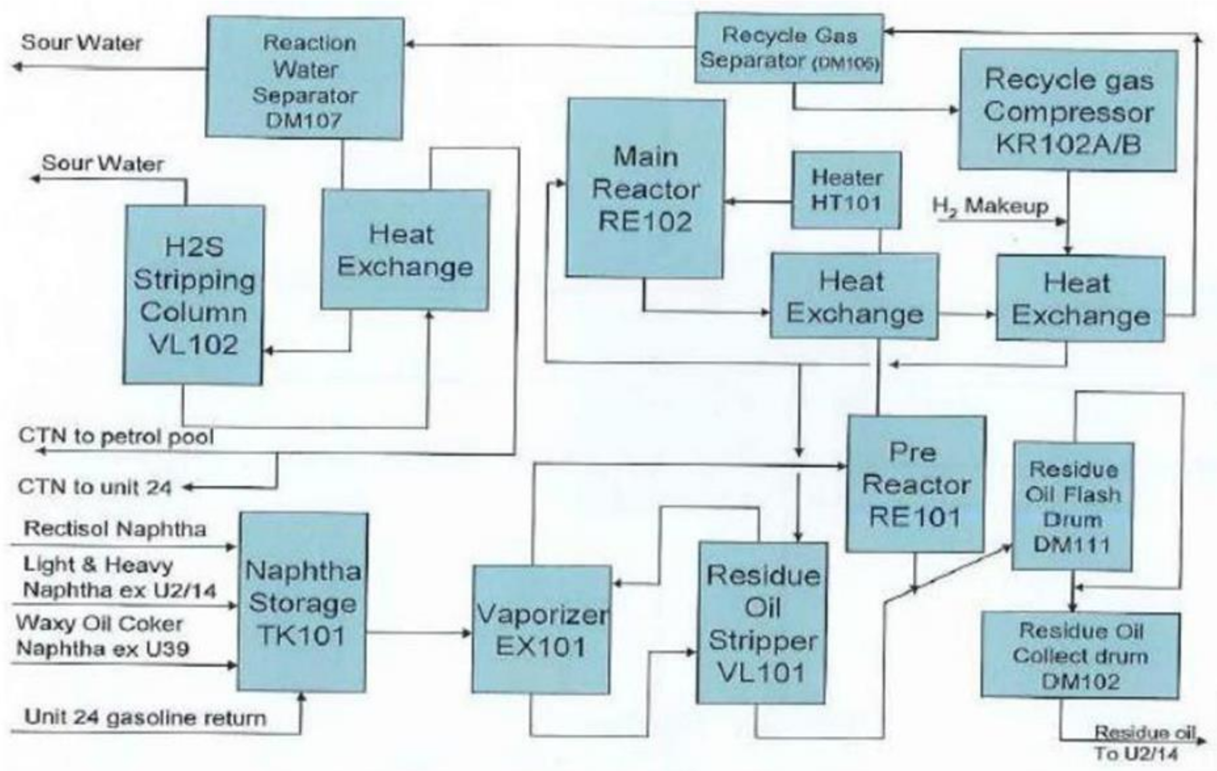


Figure 13: Coal Tar Naphtha Hydrogenation (U15/215)

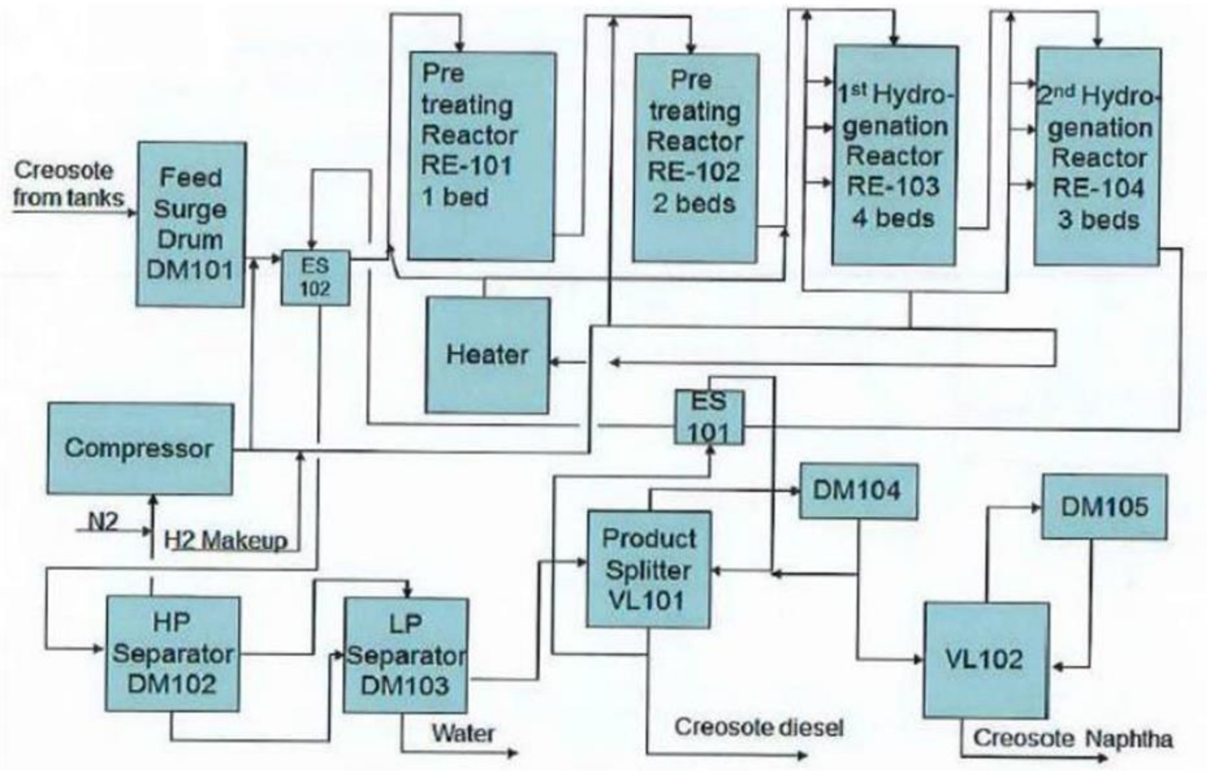


Figure 14: Creosote Hydrogenation (U228)

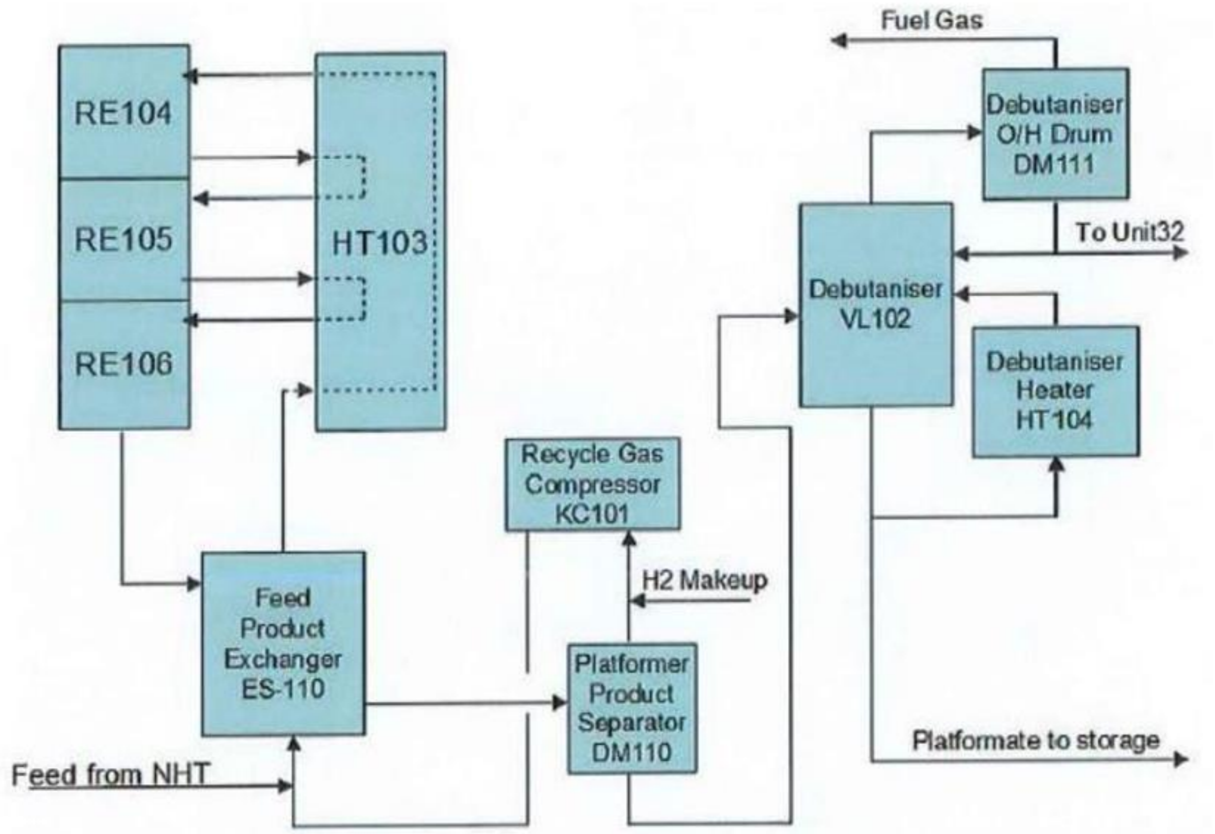


Figure 15: Naphtha Hydrotreater, Platformer and Continuous Catalyst Regeneration (Unit 30/230 & 31/331)

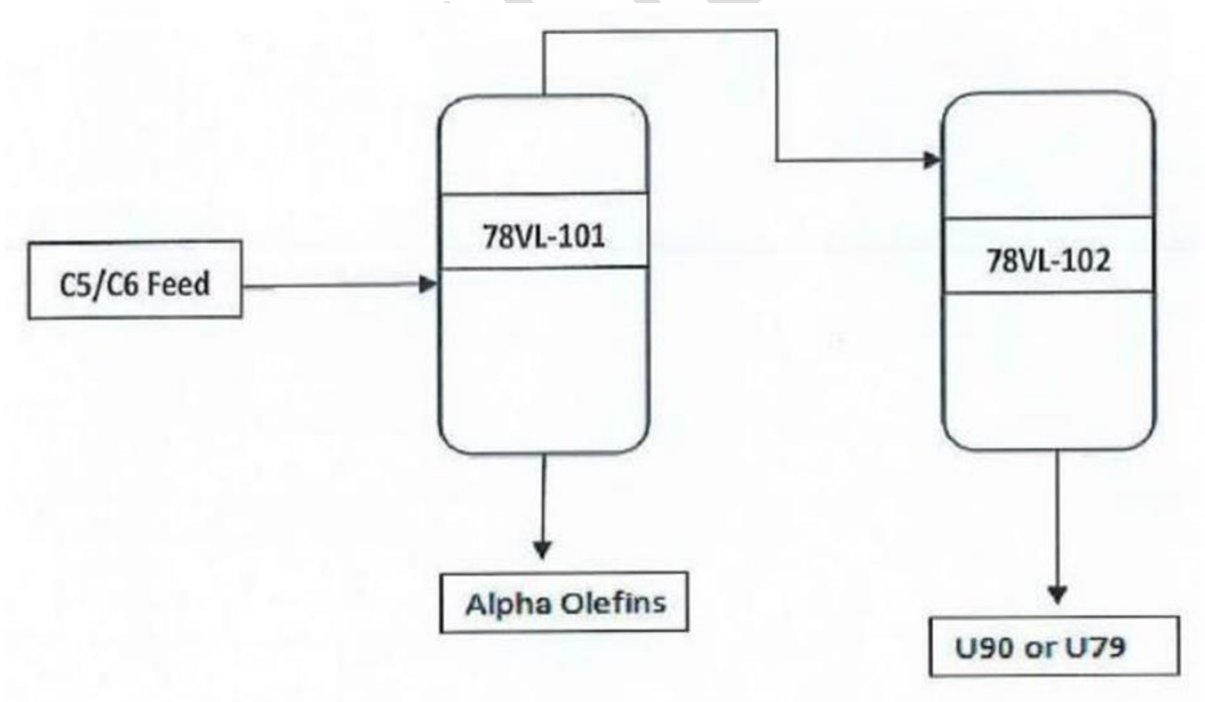


Figure 16: Catalytic Distillation Hydrotreater (U78)

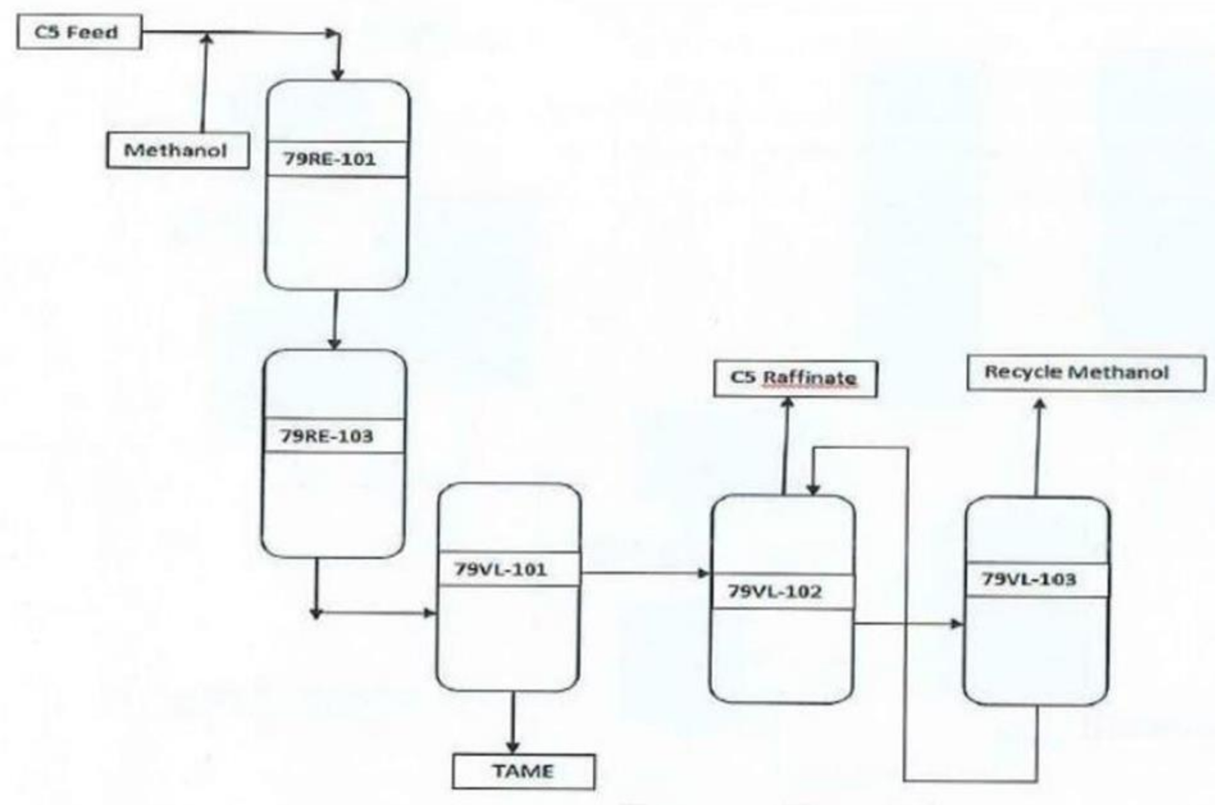


Figure 17: CD TAME (Unit 79)

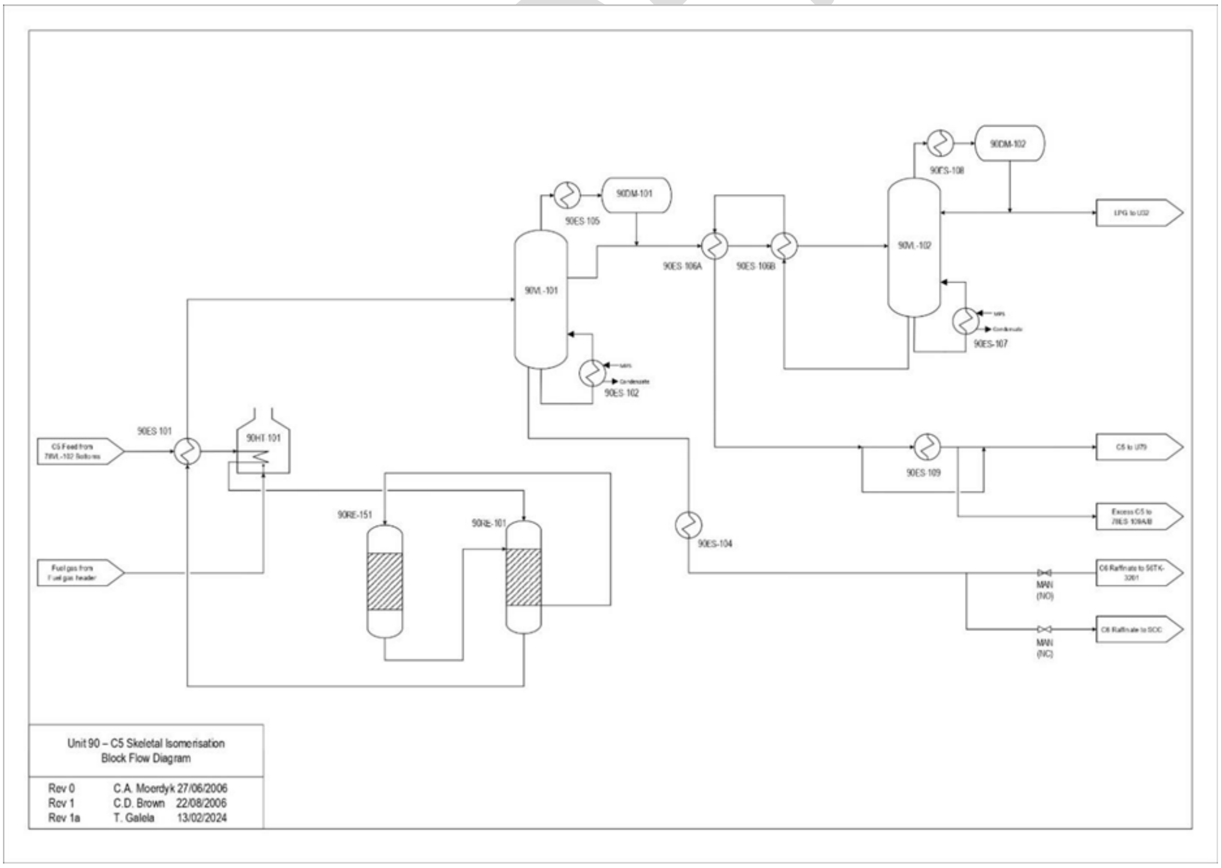


Figure 18: C5 skeletal Isomerisation (Unit 90)

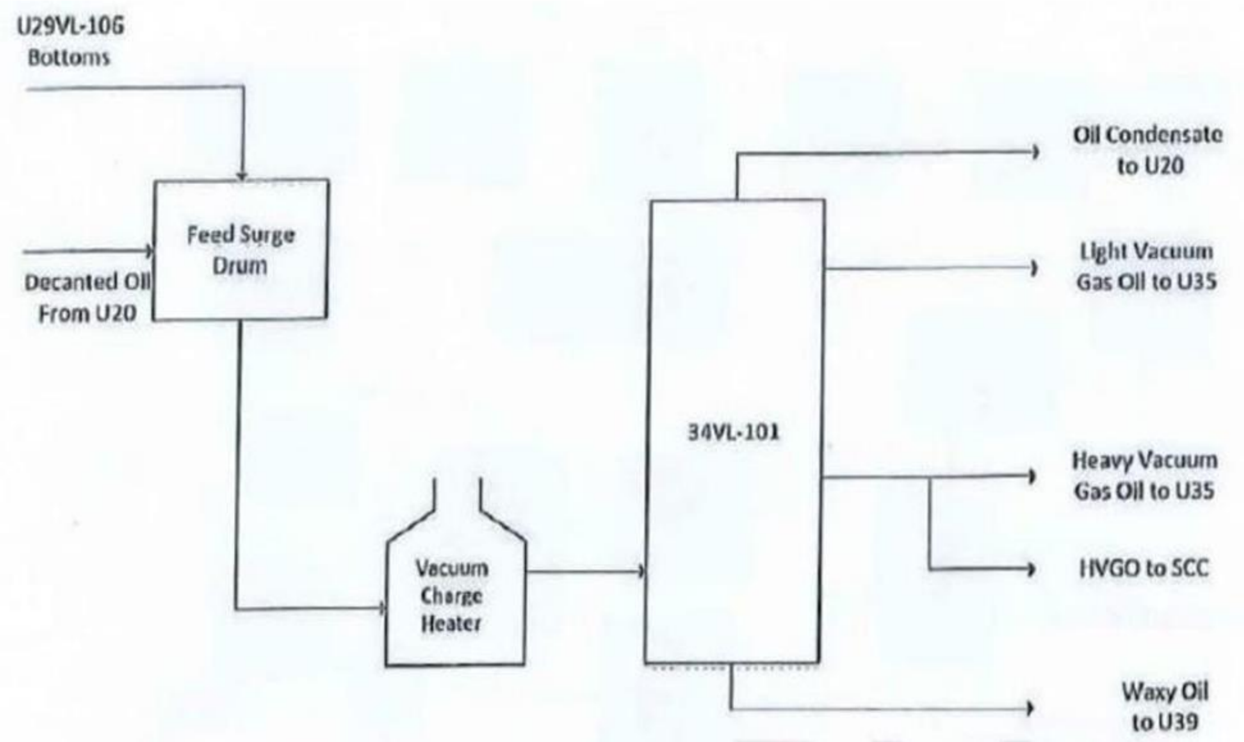


Figure 19: Vacuum Distillation (U34/234)

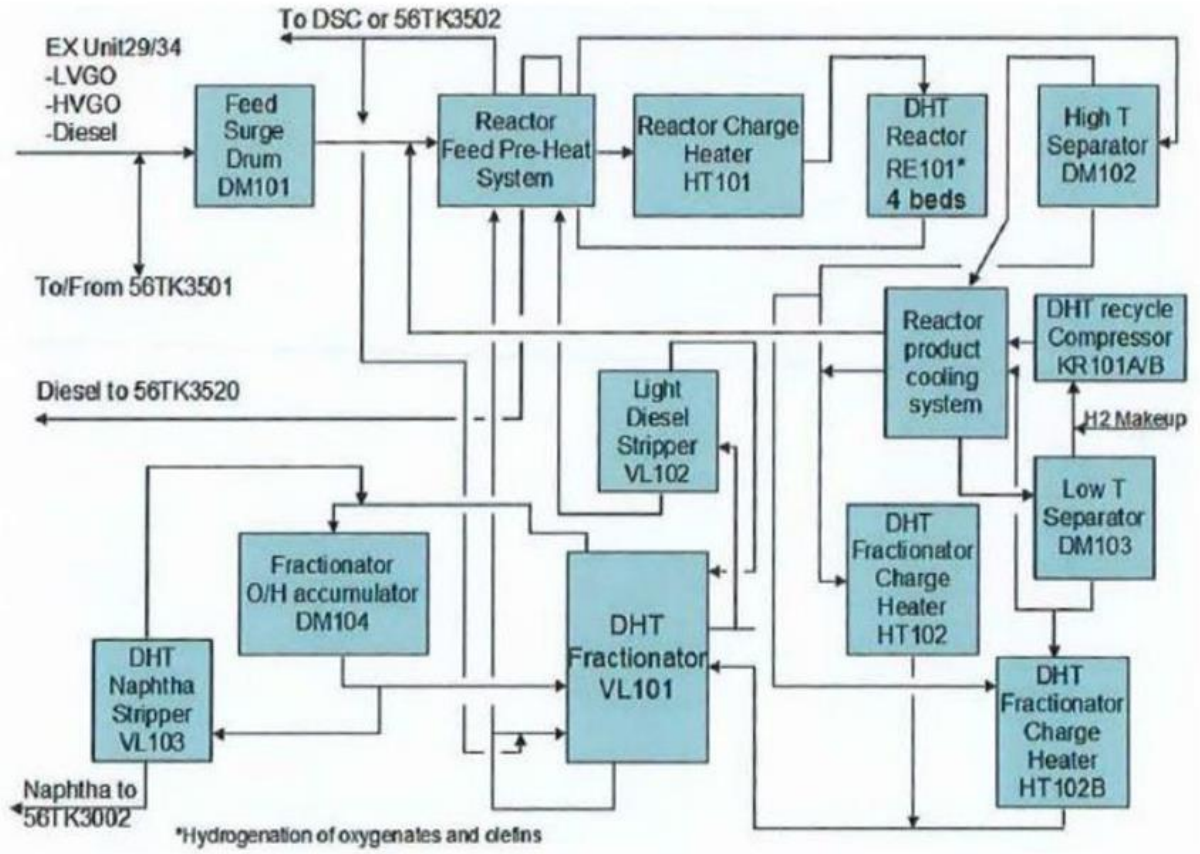


Figure 20: Distillate Hydrotreater (U35/235)

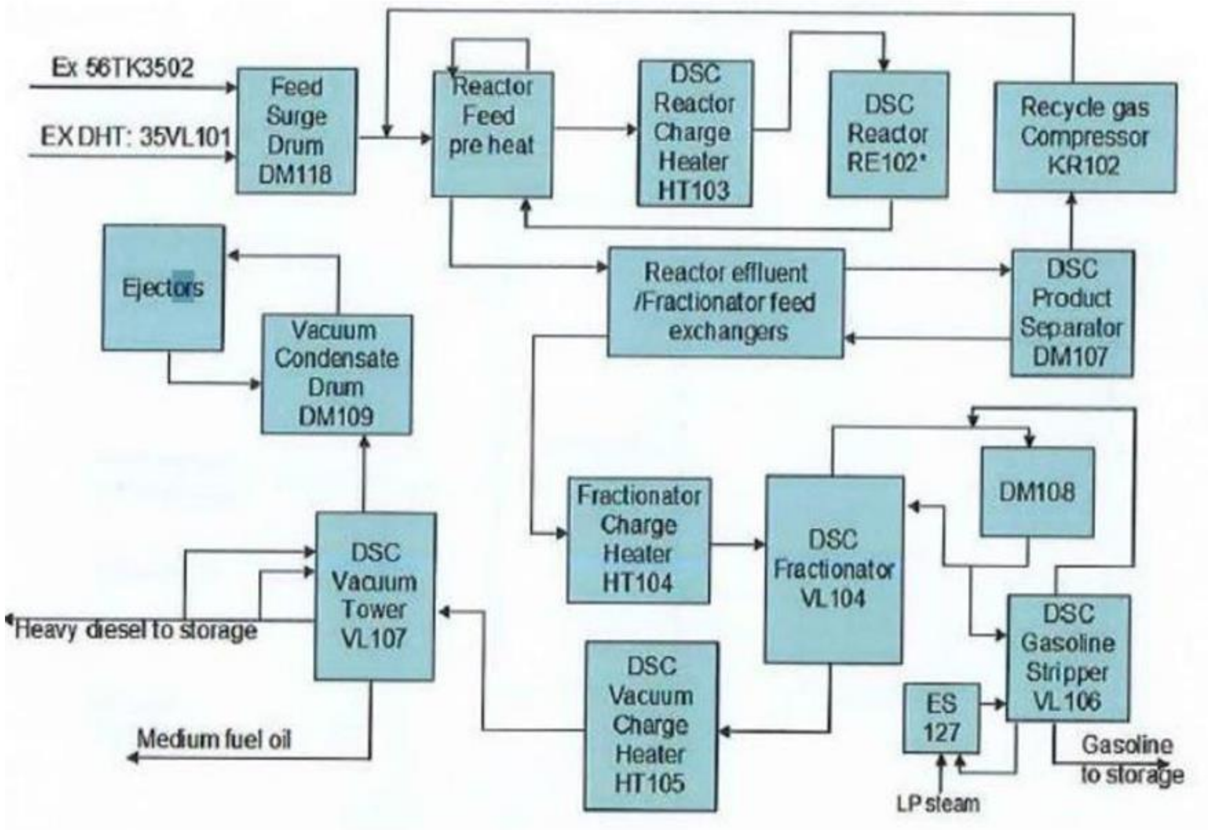
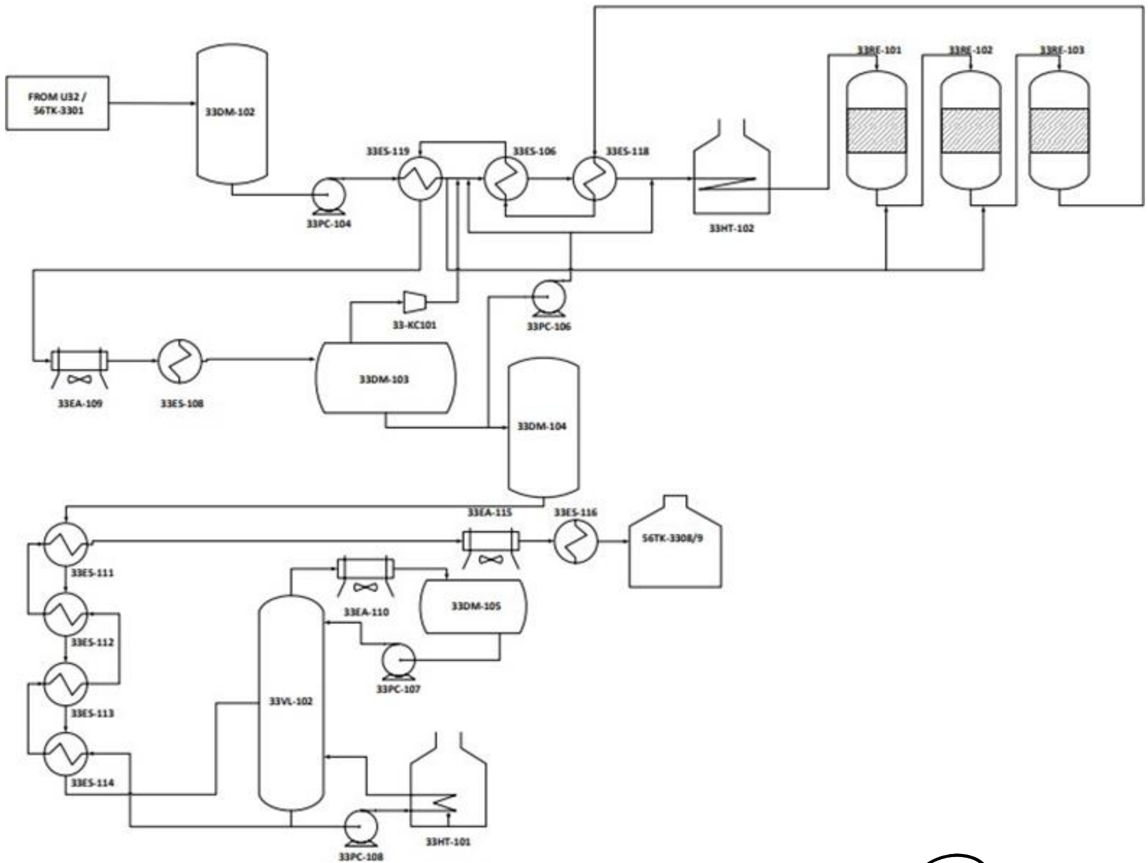
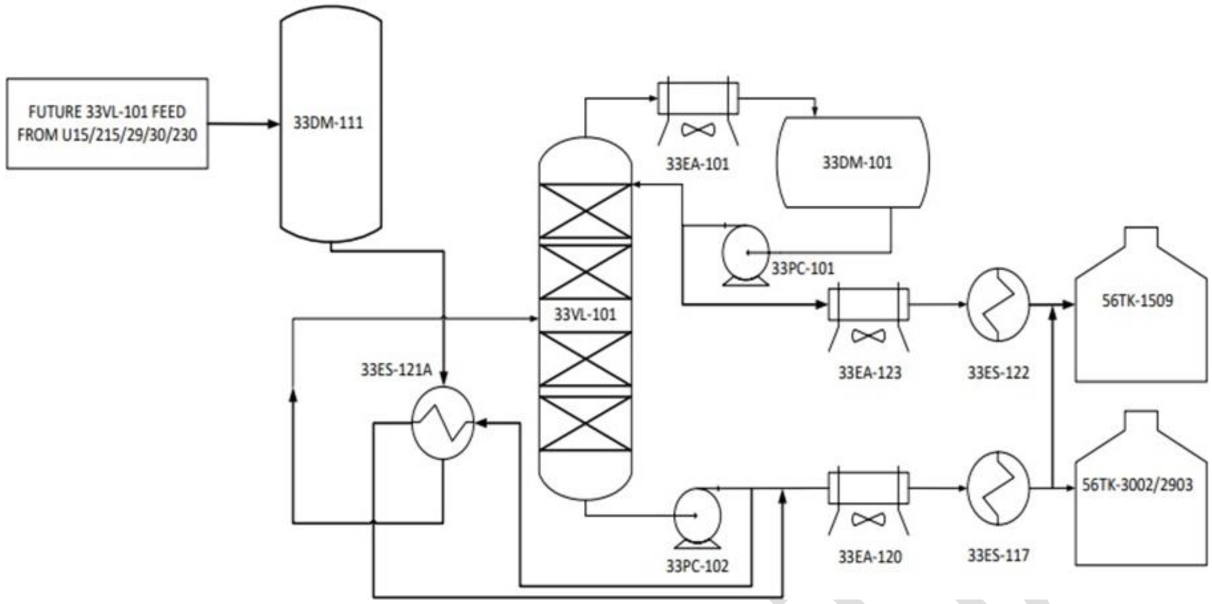


Figure 21: Distillate Selective Cracker (U35)

PHT Section



33VL-101 Section



33DM-112 Closed drain system

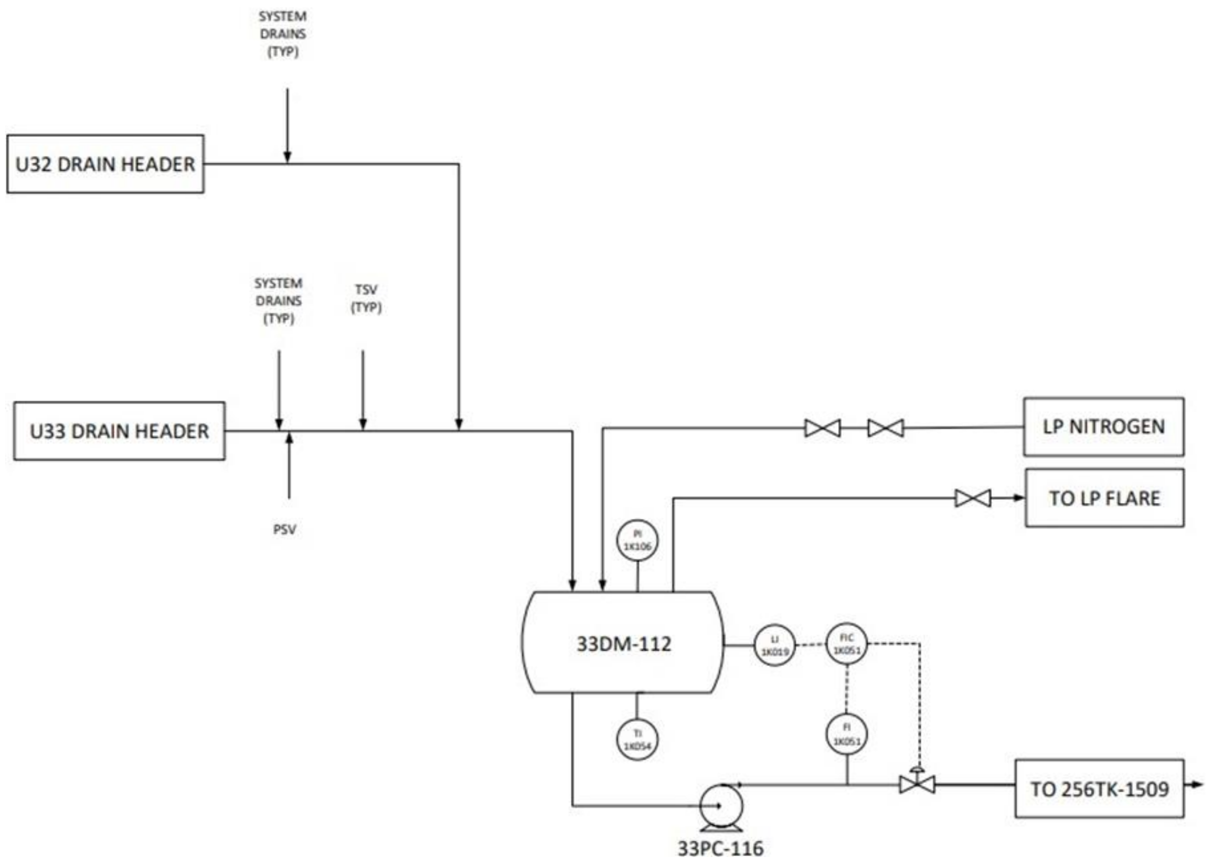


Figure 22: Poly Hydrotreating (U33)

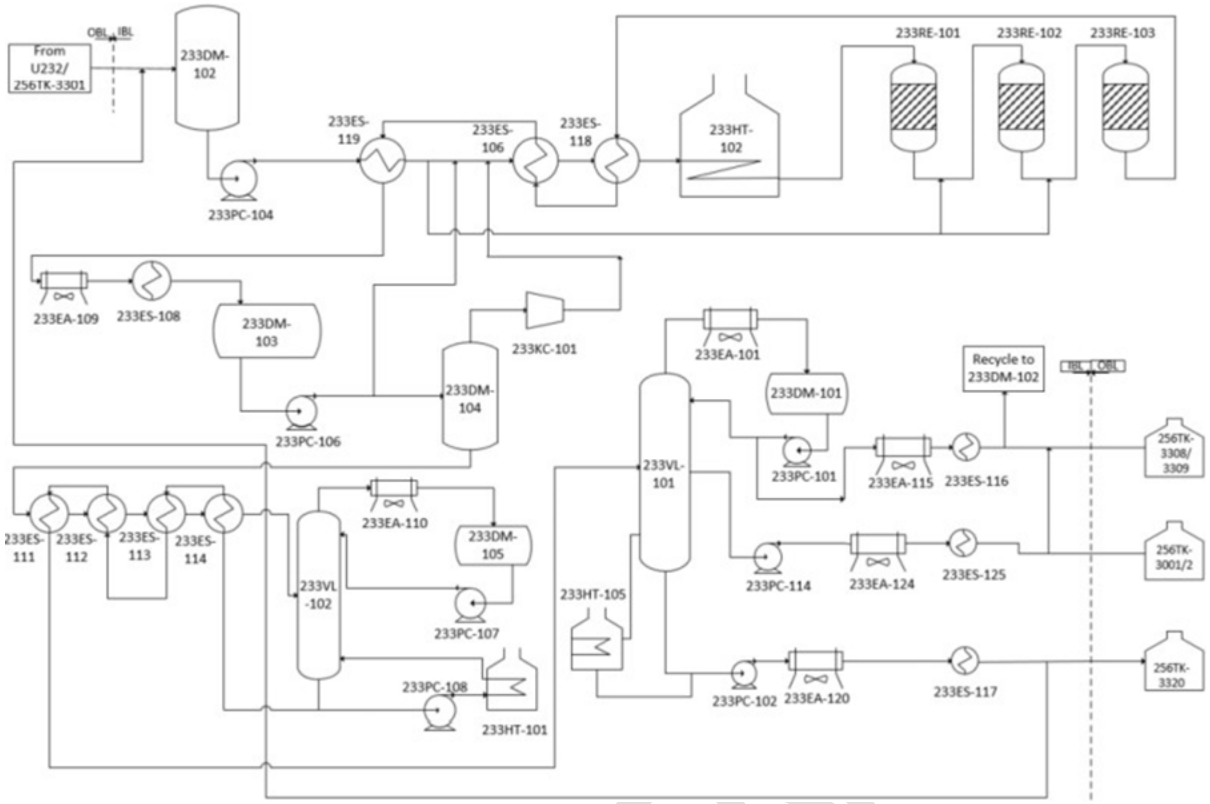


Figure 23: Polymer Hydrotreating (U233)

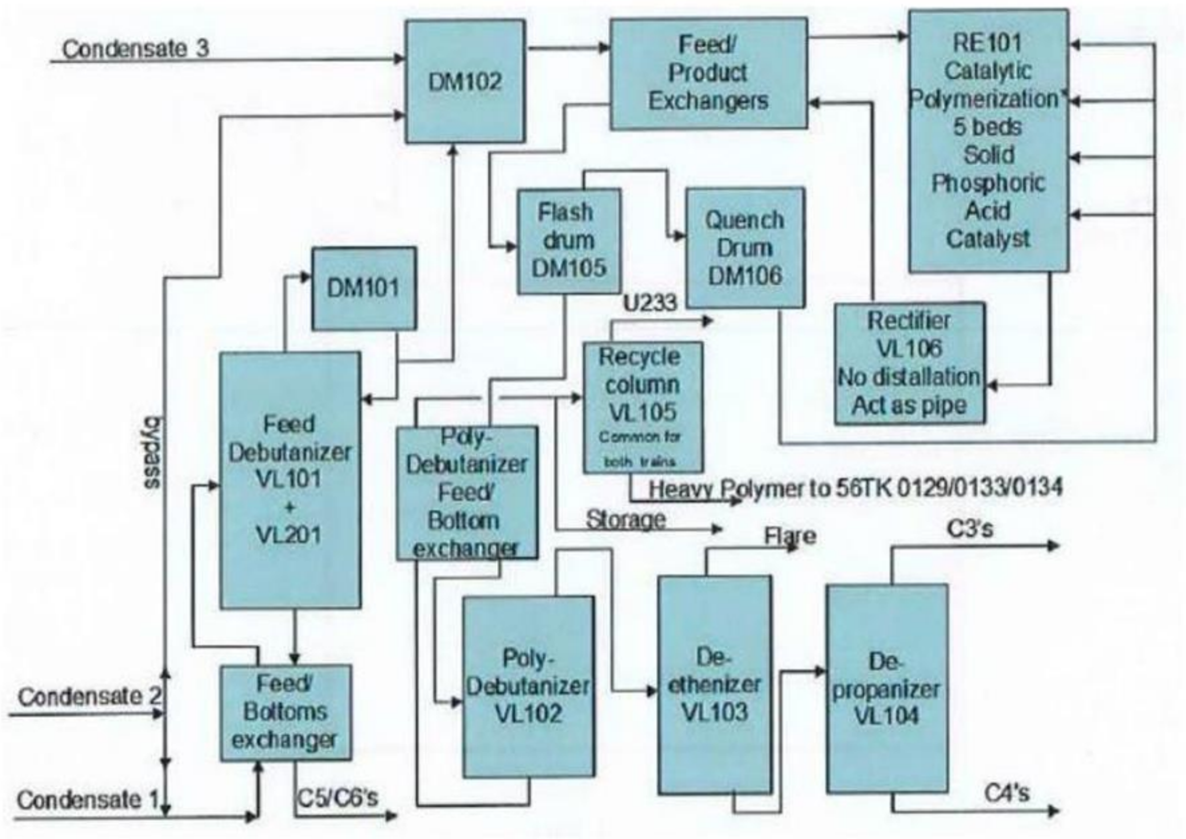
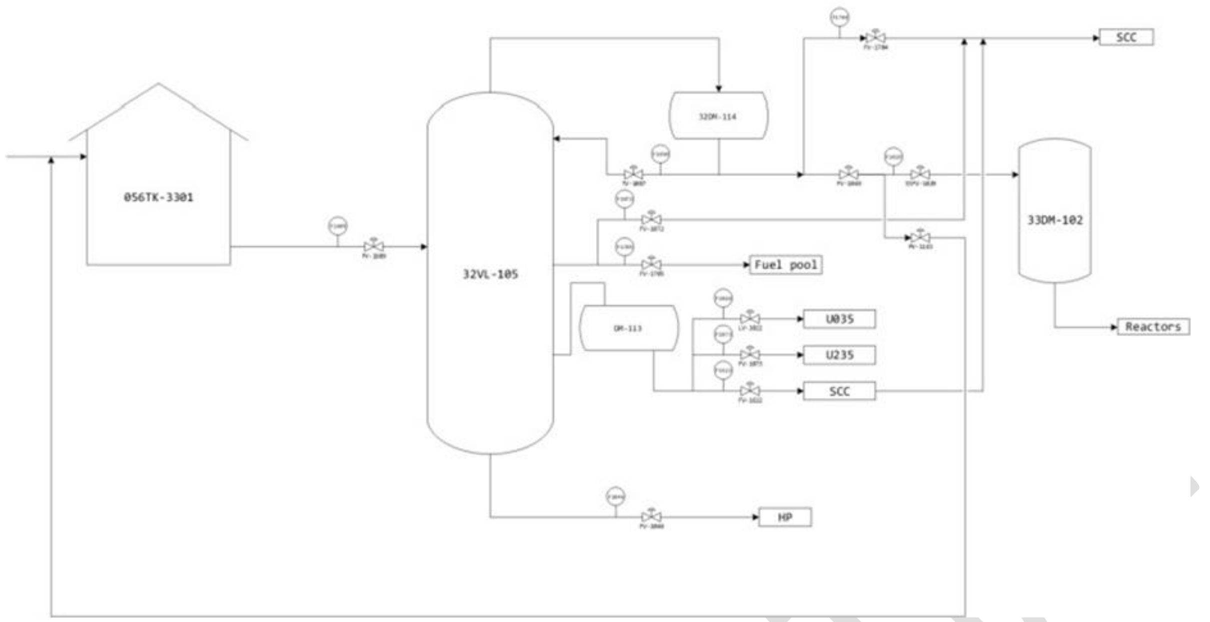


Figure 24: Catalytic Polymerisation and LPG Recovery (U32/232)

32VL-105 (Post CF2 mods)



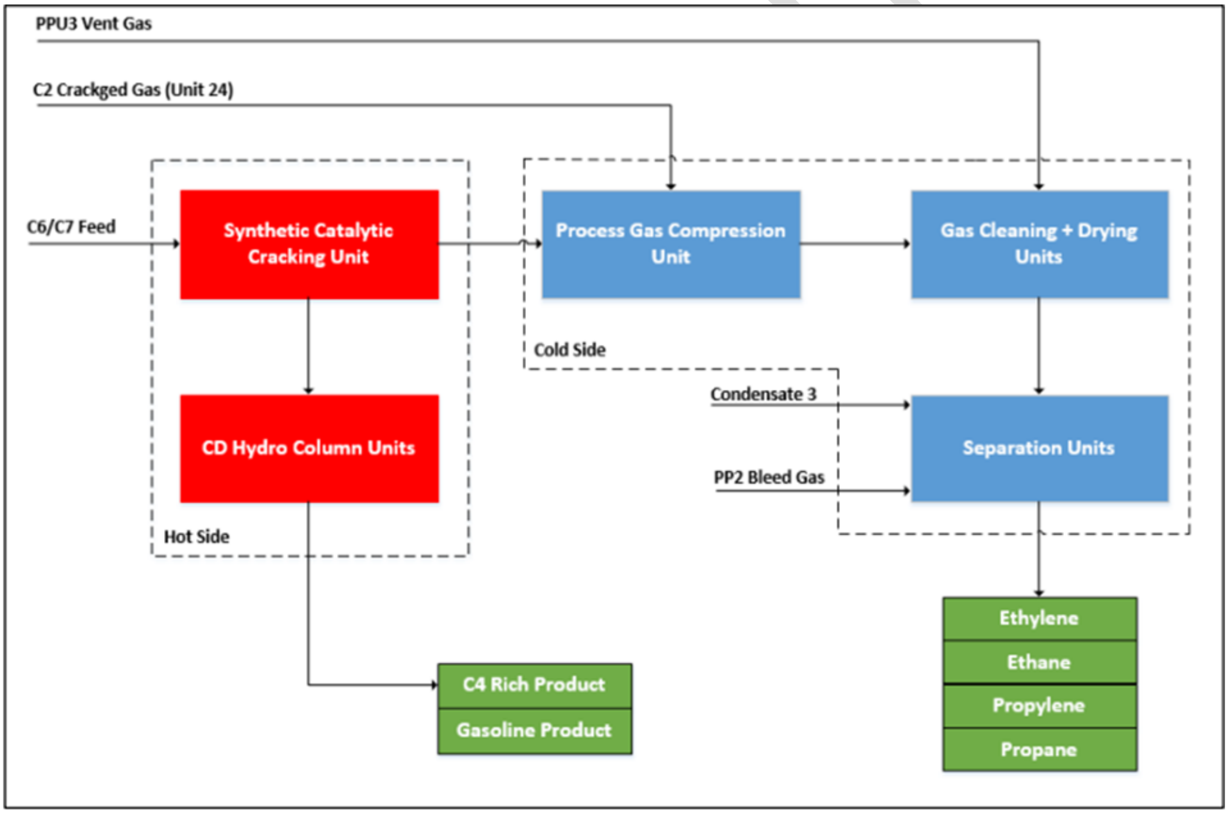


Figure 25: Sasol Catalytic Cracker (SCC)

5.5.5. Tar and Phenosolvan

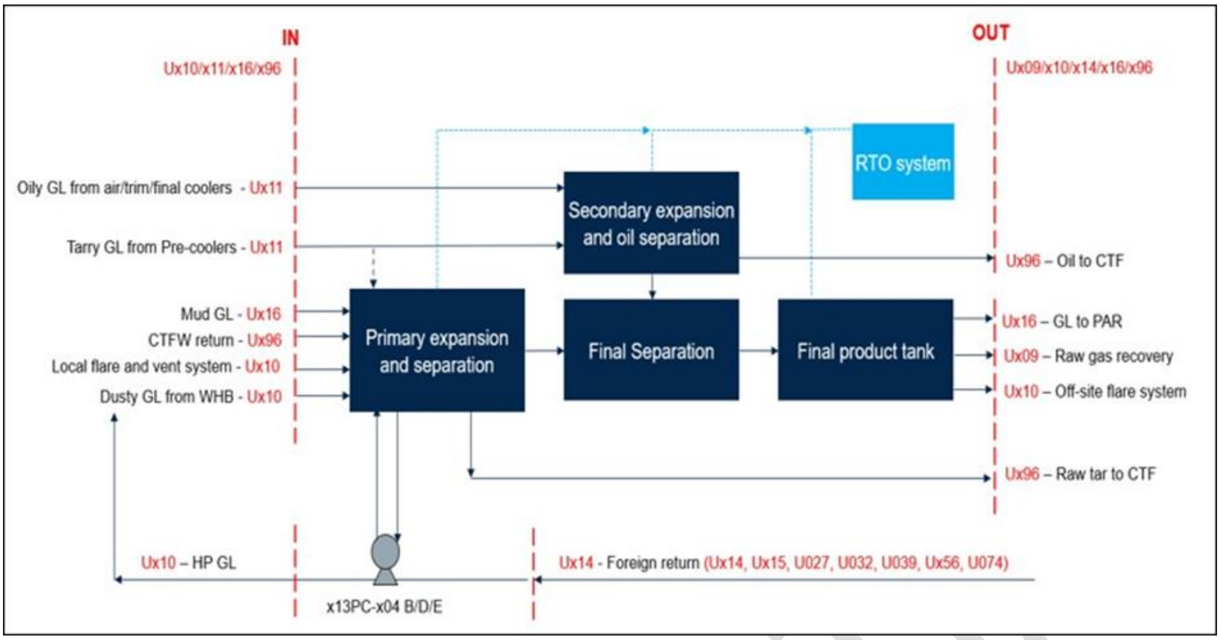


Figure 26: Gas Liquor Separation

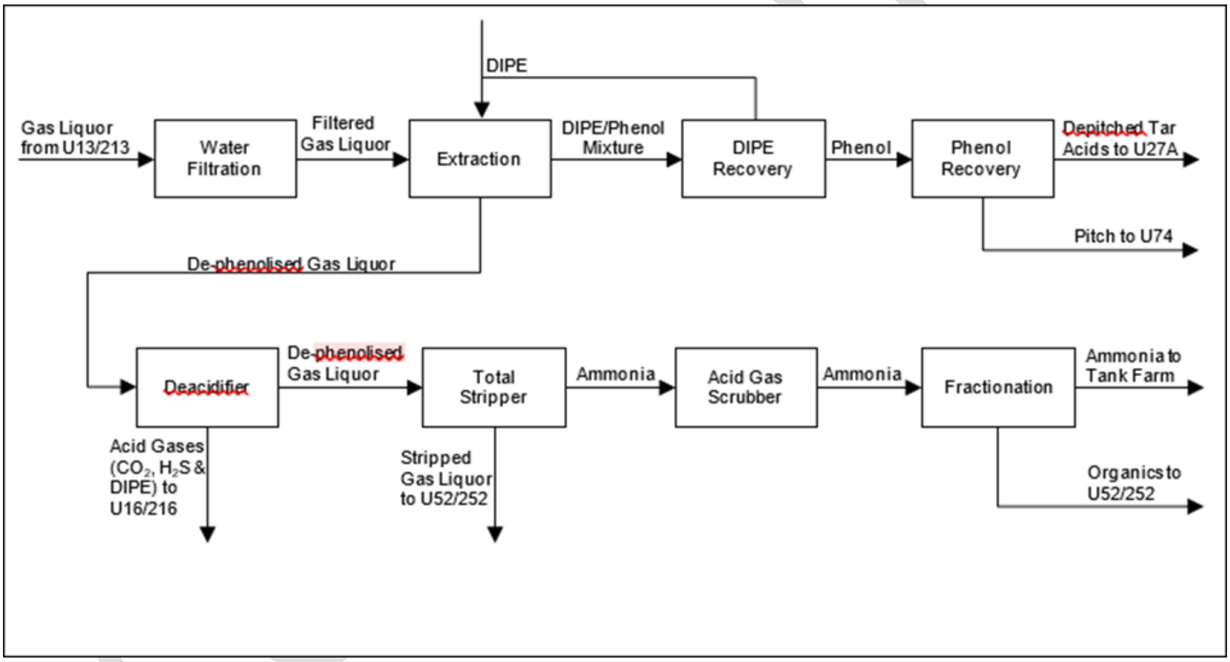


Figure 27: Phenosolvan

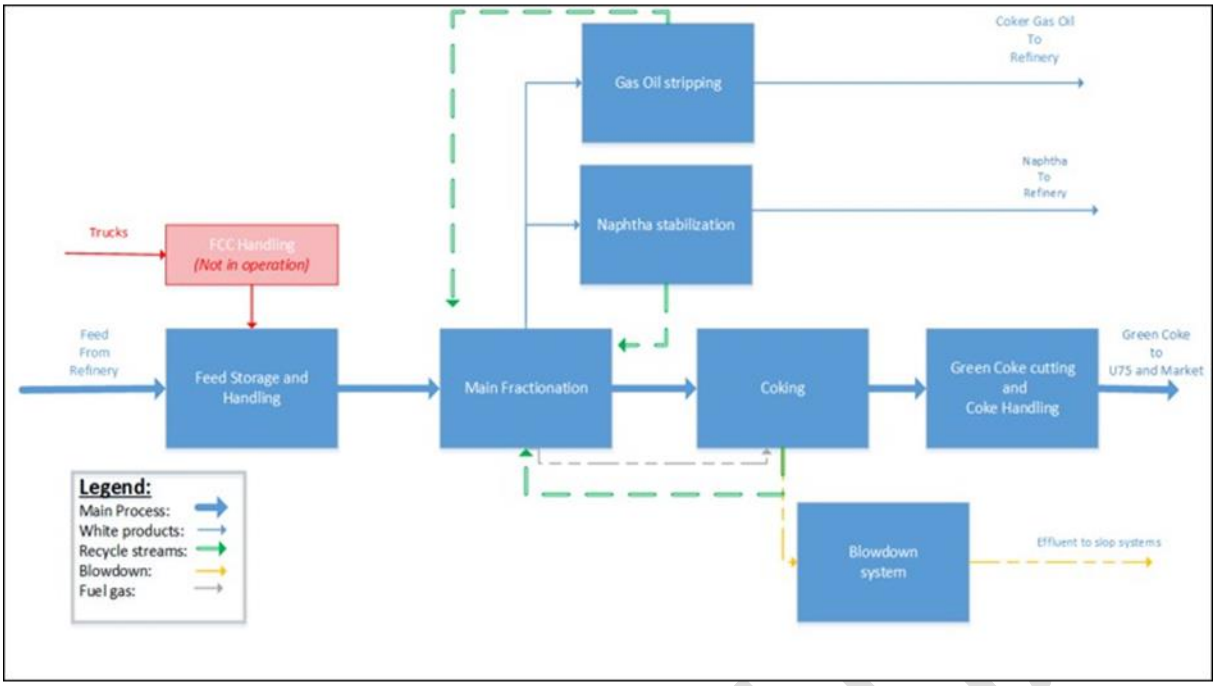


Figure 28: Coker (U39)

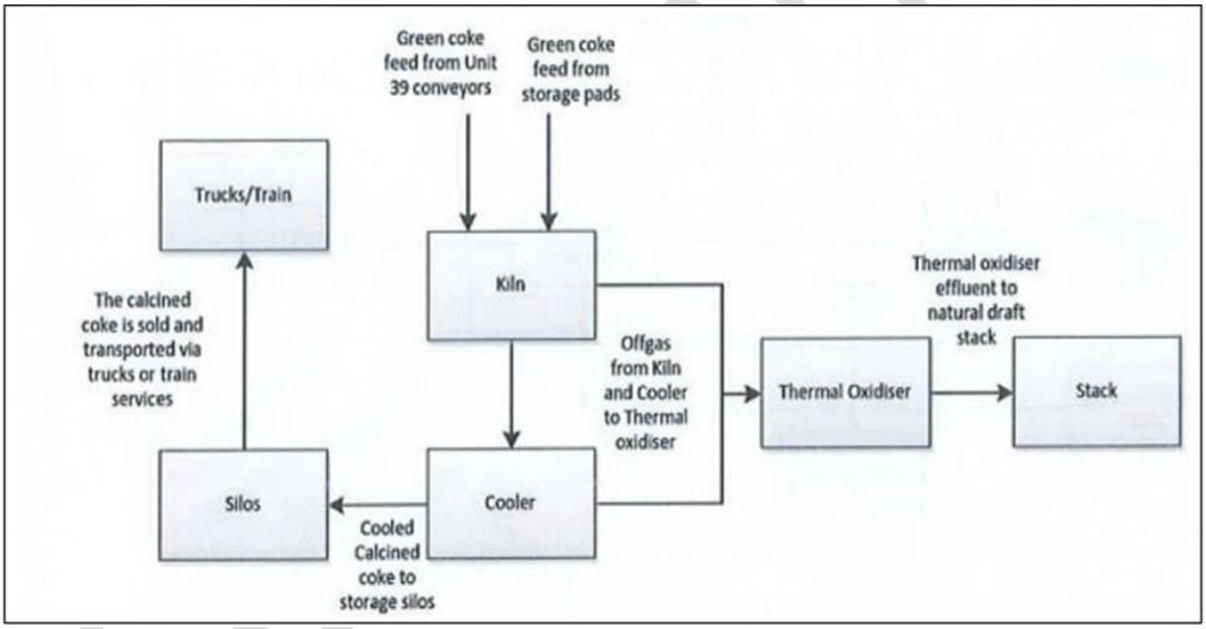


Figure 29: Calciner (U75) and Coke Storage Handling (Unit 76)

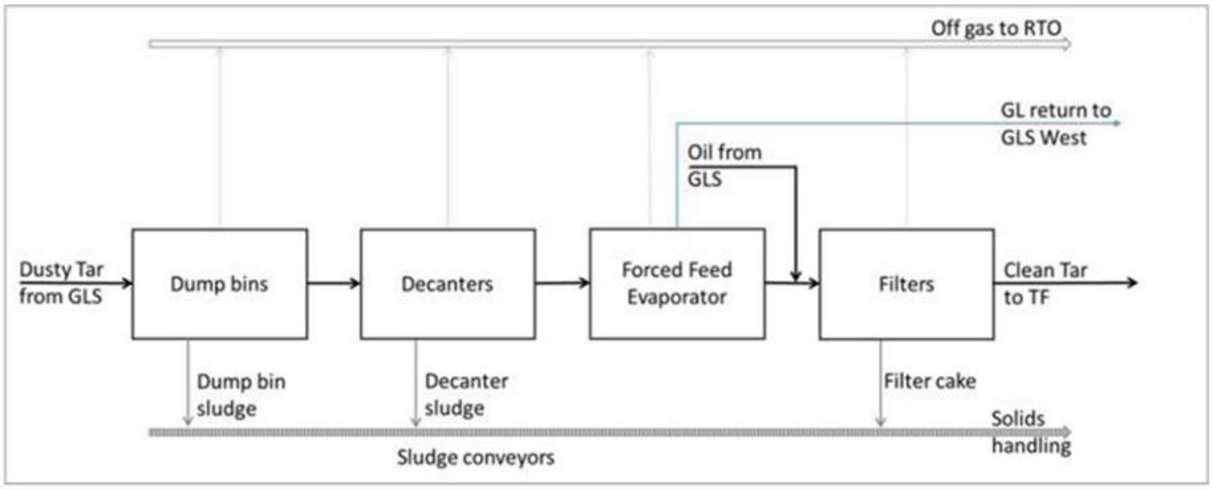
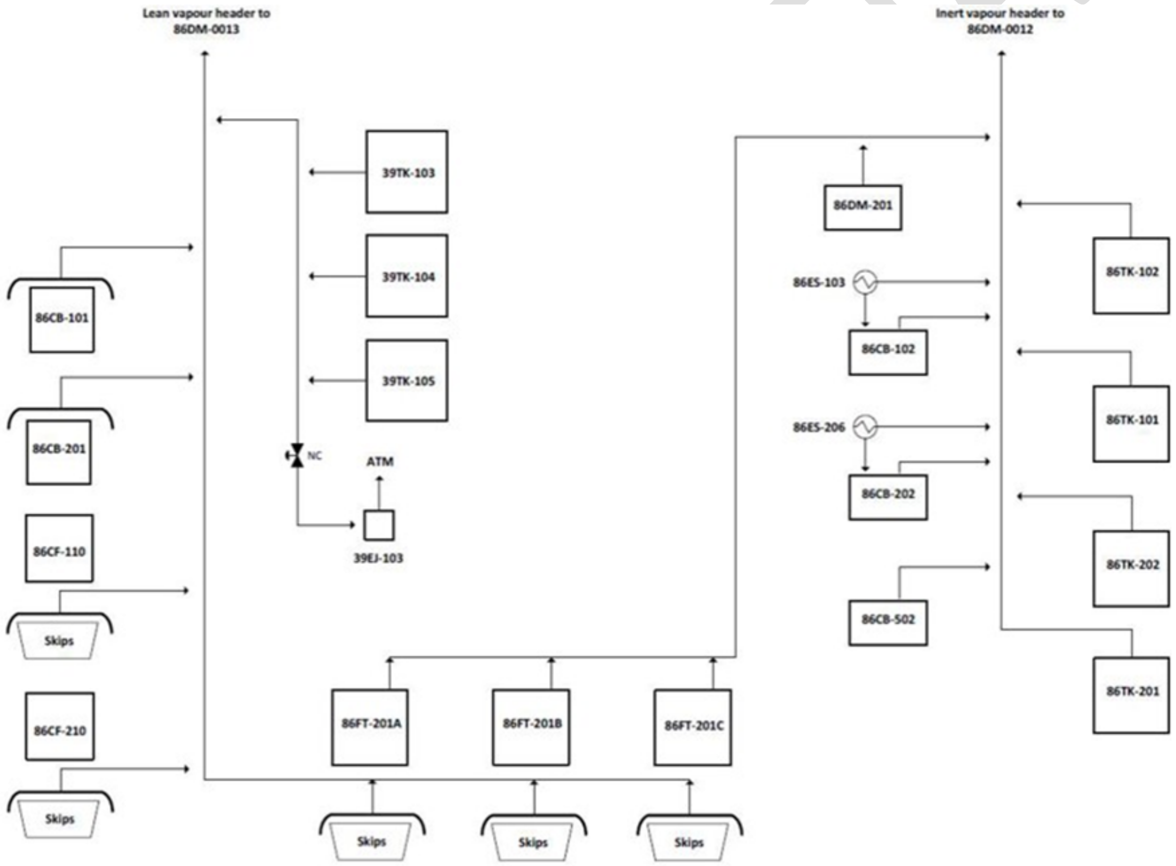


Figure 30: Coal Tar Filtration (Unit 96/296)



U86 RTO Collection header

Figure 31: Feed Preparation Plant (Unit 86)

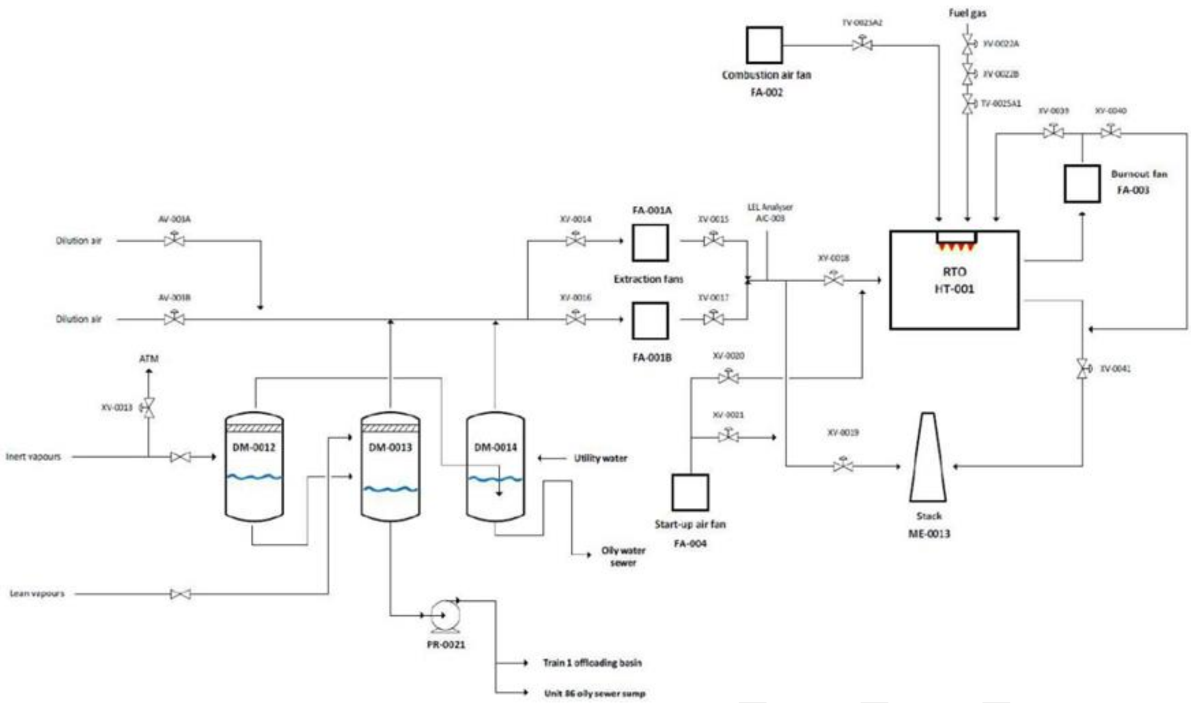


Figure 32: U86 RTO Collection header

5.5.6. Water and Ash

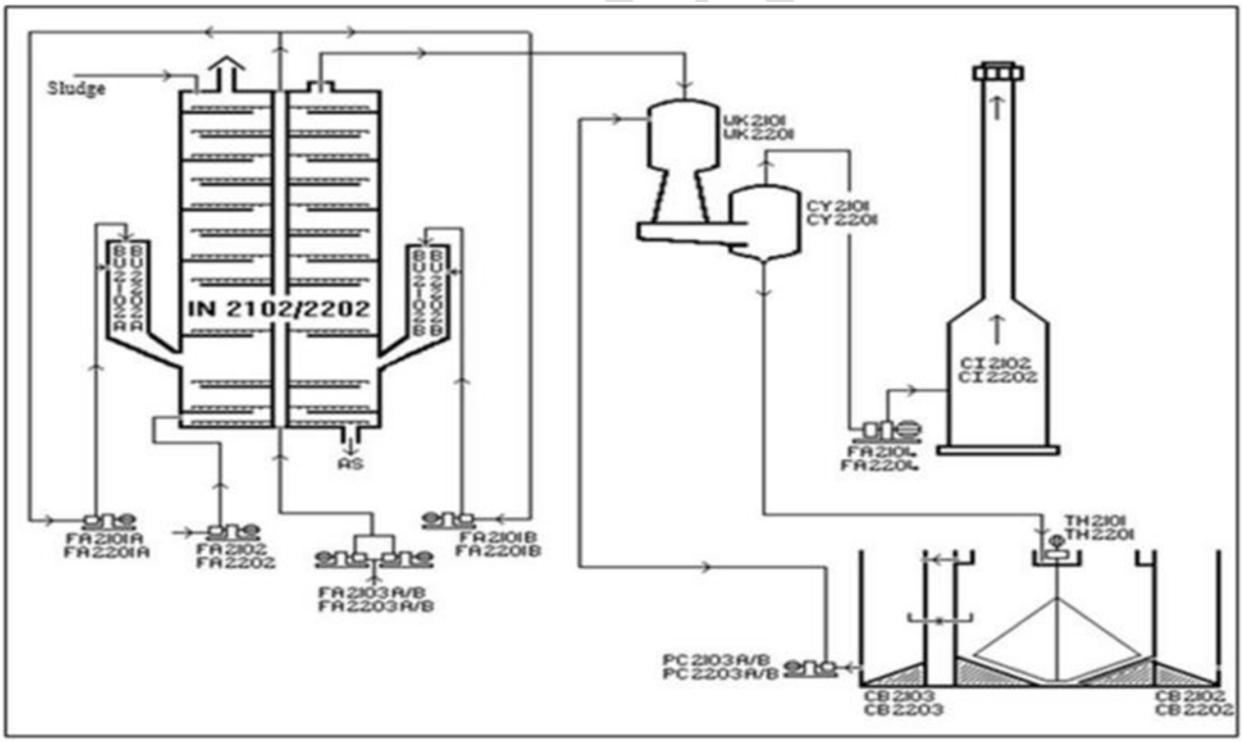


Figure 33: Bio-sludge incinerators

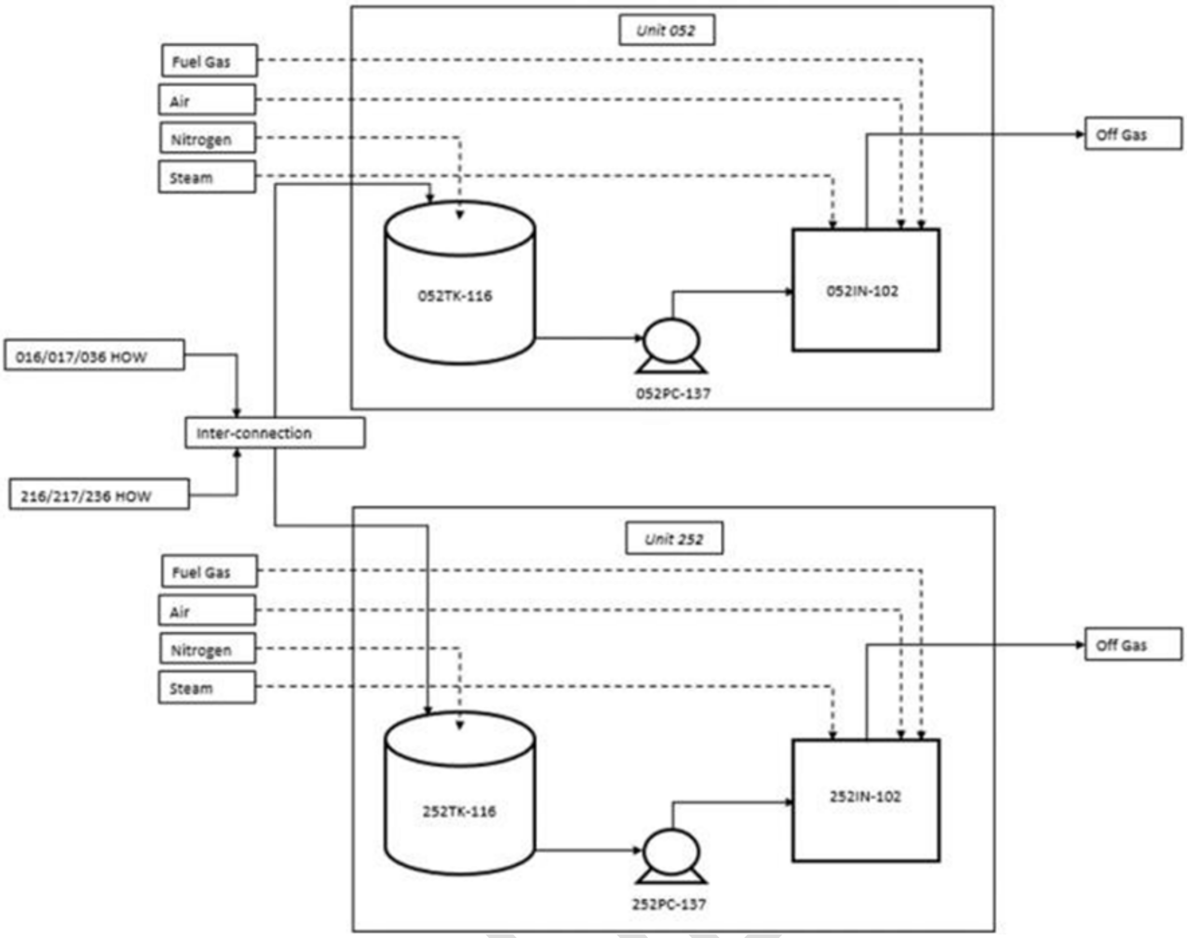


Figure 34: High Organic Waste (HOW) incinerators

6. RAW MATERIAL AND PRODUCTS

6.1. Raw material

6.1.1. Utilities

Raw material type	Maximum consumption rate	Units (quantity/period)
Steam Plant		
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
Gas Turbines		
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

6.1.2. Gas Production

Raw material type	Maximum consumption rate	Units (quantity/period)
Coal Processing		
[redacted]		
Gasification, coal lock raw gas compression and raw gas cooling		
[redacted]		
Rectisol		
[redacted]		
Sulphur Recovery		
[redacted]		
Wet Sulphuric Acid		
[redacted]		

6.1.3. Gas Circuit

Raw Material Type	Maximum Consumption Rate	Units (quantity/period)
Catalyst Manufacturing and Catalyst Reduction		
[redacted]		

6.1.4. Refining

Raw Material Type	Maximum Consumption Rate	Units (quantity/period)
Tar Distillation (Unit 14/241)		
[redacted]		
Unit 27A		
[redacted]		
Unit 74		
[redacted]		
Coal Tar Naphtha Hydrogenation (Unit 15/215)		
[redacted]		
Creosote Hydrogenation (Unit 228)		
[redacted]		

Naphtha Hydrotreater, Platformer and CCR (Unit 30/230, 31/231)
[redacted]
Catalytic Distillation Hydrotreater (Unit 78)
[redacted]
CD Tame (Unit 79)
[redacted]
C5 Isomerization (Unit 90)
[redacted]
Vacuum Distillation (Unit 34/234)
[redacted]
Distillate Hydrotreater (Unit 35/235)
[redacted]
Distillate Selective Cracker (Unit 35DSC)
[redacted]
Light Oil Fractionation (Unit 29/229)
[redacted]
Polymer Hydrotreater (Unit 33/233)
[redacted]
Total Refinery
[redacted]
Sasol Catalytic Cracker (SCC)
[redacted]

6.1.5. Tar and Phenosolvan

Raw Material Type	Maximum Consumption Rate	Units (quantity/period)
Gas Liquor Separation		
[redacted]		
Phenosolvan		
[redacted]		
Carbo Tar and Coal Tar Filtration		
[redacted]		

6.1.6. Water and Ash

Raw Material Type	Maximum Consumption Rate	Units (quantity/period)
Multi hearth incinerator (Bio-sludge)		
[redacted]		
HOW incinerator		
[redacted]		
Waste Recycling Facility (WRF)		
[redacted]		

6.2. Production rates

6.2.1. Utilities

Product Name	Maximum Production Capacity	Units (Quantity/Period)
Steam Plant		
[redacted]		

[redacted]

Gas Turbines
[redacted]

6.2.2. Gas Production

Product Name	Maximum Production Capacity	Units (quantity/period)
Coal Processing		
[redacted]		
Gasification, coal lock raw gas compression and raw gas cooling		
[redacted]		
Rectisol		
[redacted]		

6.3. By-products

6.3.1. Gas Production

By-Product	Maximum Production Capacity	Units (quantity/period)
Gasification, coal lock raw gas compression and raw gas cooling		
[redacted]		
Sulphur Recovery		
[redacted]		
Wet Sulphuric Acid		
[redacted]		

6.3.2. Gas Circuit

By-Product Name	Maximum Production Capacity	Units (quantity/period)
Catalyst Manufacturing		
[redacted]		

6.3.3. Refining

By-Product Name	Maximum Production Capacity	Units (quantity/period)
Tar distillation (U14/214)		
[redacted]		
Unit 27A		
[redacted]		
Unit 74		
[redacted]		
Coal Tar Naphtha Hydrogenation (Unit 15/215)		
[redacted]		
Creosote Hydrogenation (Unit 228)		
[redacted]		
Naphtha Hydrotreater, Platformer and CCR (Unit 30/230, 31/231)		
[redacted]		
Catalytic Distillation Hydrotreater (Unit 78)		
[redacted]		
CD Tame (Unit 79)		
[redacted]		
C5 Isomerization (Unit 90)		
[redacted]		
Vacuum Distillation (Unit 34/234)		
[redacted]		
Distillate Hydrotreater (Unit 35/235)		
[redacted]		
Distillate Selective Cracker (Unit 35DSC)		
[redacted]		

[redacted]

Light Oil Fractionation (Unit 29/229)
[redacted]
Catalytic polymerization and LPG recovery (Unit 32/232)
[redacted]
Polymer Hydrotreater (Unit 33)
[redacted]
Polymer Hydrotreater (33VL-101 system)
[redacted]
Polymer Hydrotreater (Unit 233)
[redacted]
Sasol Catalytic Converter (SCC)
[redacted]

6.3.4. Tar and Phenosolvan

By-Product Name	Maximum Production Capacity	Units (quantity/period)
Gas Liquor Separation		
[redacted]		
Phenosolvan		
[redacted]		
Carbo Tar and Coal Tar Filtration		
[redacted]		

6.3.5. Water and Ash

By-Product Name	Maximum Production Capacity	Units (quantity/period)
Bio-sludge incinerator		
[redacted]		
HOW incinerator		
[redacted]		
Waste recycling facility (WRF)		
[redacted]		

6.4. Material used in energy sources

Energy Source	Maximum Consumption Rate	Units (quantity/period)	Sulphur %	Ash %
Imported electricity (Eskom)	[redacted]			
SSO feed to electricity (Natural gas and Methane Rich Gas to gas turbines)				
SSO feed to steam (fine coal to boilers)				
Fuel gas				

6.5. Sources of atmospheric emission

6.5.1. Point source parameters

6.5.1.1. Utilities

Point source code	Source code	Latitude (decimal degrees)	Longitude (decimal degrees)	Height of release above ground (m)	Height above nearby building (m)	Diameter at stack tip / vent exit (m)	Gas exit temperature (°C)	Gas volumetric flow (m^3/h)	Gas exit velocity (m/s)
B1	West stack	[redacted]		250	230	13.6	205	12 028 128	23
B2	East stack	[redacted]		301	281	14.4	205	13 439 950	23
GT1	Gas turbine stack	[redacted]		40	37	5.3	200	3 175 200	40
GT2	Gas turbine stack	[redacted]		40	37	5.3	200	3 175 200	40

6.5.1.2. Gas Production

Point source code	Source code	Latitude (decimal degrees)	Longitude (decimal degrees)	Height of release above ground (m)	Height above nearby building (m)	Diameter at stack tip / vent exit (m)	Gas exit temperature (°C)	Gas volumetric flow (m3/h)	Gas exit velocity (m/s)
Rectisol									
Rectisol west (B1)	Off gas to main stack west (B1)	[redacted]		250	230	13.6	205	729 000	23
Rectisol east (B2)	Off gas to main stack west (B2)	[redacted]		301	281	14.4	205	720 000	23
Gasification west									
Gasification west air ejector 1	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 2	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 3	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 4	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 5	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 6	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24

Gasification west air ejector 7	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 8	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 9	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 10	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 13	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 14	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 15	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 16	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 17	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 18	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 19	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 20	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 21	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 22	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 23	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 25	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 26	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification west air ejector 27	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24

Gasification west air ejector 28	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 29	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 30	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 31	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 32	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 33	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 34	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 35	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 37	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 38	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 39	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 40	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 41	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 42	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 43	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 44	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 45	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24
Gasification west air ejector 46	Low pressure coal lock raw gas to atmosphere	[redacted]		39	2	0.2	20-30	1 525	24

Gasification East								
Gasification east air ejector 1	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 2	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 3	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 4	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 5	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 6	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 7	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 8	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 9	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 10	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 13	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 14	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 15	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 16	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 17	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 18	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 19	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24

Gasification east air ejector 20	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 21	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 22	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 23	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 25	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 26	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 27	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 28	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 29	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 30	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 31	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 32	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 33	Low pressure coal lock raw gas to atmosphere2	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 34	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 35	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 37	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 38	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 39	Low pressure coal lock raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24

Gasification east air ejector 40	Low pressure coal lock-raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 41	Low pressure coal lock-raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 42	Low pressure coal lock-raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 43	Low pressure coal lock-raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 44	Low pressure coal lock-raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 45	Low pressure coal lock-raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Gasification east air ejector 46	Low pressure coal lock-raw gas to atmosphere	[redacted]	39	2	0.2	20-30	1 525	24
Sulphur Recovery West								
018DM-102-ME1	018DM-102 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-102-ME2	018DM-102 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-102-ME3	018DM-102 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-102-ME4	018DM-102 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-104-ME1	018DM-104 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-104-ME2	018DM-104 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-104-ME3	018DM-104 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-104-ME4	018DM-104 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-203-ME1	018DM-203 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-203-ME2	018DM-203 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-203-ME3	018DM-203 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-203-ME4	018DM-203 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-204-ME1	018DM-204 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-204-ME2	018DM-204 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-204-ME3	018DM-204 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
018DM-204-ME4	018DM-204 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
Sulphur Recovery East								
218DM-103-ME1	218DM-103 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
218DM-103-ME2	218DM-103 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46
218DM-103-ME3	218DM-103 Oxidizer Vent	[redacted]	18.88	15.38	0.4	40	39 600	1.46

218DM-103-ME4	218DM-103 Oxidizer Vent	[redacted]		18.88	15.38	0.4	40	39 600	1.46
218DM-104-ME1	218DM-104 Oxidizer Vent	[redacted]		18.88	15.38	0.4	40	39 600	1.46
218DM-104-ME2	218DM-104 Oxidizer Vent	[redacted]		18.88	15.38	0.4	40	39 600	1.46
218DM-104-ME3	218DM-104 Oxidizer Vent	[redacted]		18.88	15.38	0.4	40	39 600	1.46
218DM-104-ME4	218DM-104 Oxidizer Vent	[redacted]		18.88	15.38	0.4	40	39 600	1.46
218DM-203-ME1	218DM-203 Oxidizer Vent	[redacted]		18.88	15.38	0.4	40	39 600	1.46
218DM-203-ME2	218DM-203 Oxidizer Vent	[redacted]		18.88	15.38	0.4	40	39 600	1.46
218DM-203-ME3	218DM-203 Oxidizer Vent	[redacted]		18.88	15.38	0.4	40	39 600	1.46
218DM-203-ME4	218DM-203 Oxidizer Vent	[redacted]		18.88	15.38	0.4	40	39 600	1.46
218DM-204-ME1	218DM-204 Oxidizer Vent	[redacted]		18.88	15.38	0.4	40	39 600	1.46
218DM-204-ME2	218DM-204 Oxidizer Vent	[redacted]		18.88	15.38	0.4	40	39 600	1.46
218DM-204-ME3	218DM-204 Oxidizer Vent	[redacted]		18.88	15.38	0.4	40	39 600	1.46
218DM-204-ME4	218DM-204 Oxidizer Vent	[redacted]		18.88	15.38	0.4	40	39 600	1.46
Wet Sulphuric Acid (WSA)									
WSA1	WSA stack	[redacted]		75	65	2.75	41	206 640	9.7

6.5.1.3. Gas Circuit

Point source code	Source code	Latitude (decimal degrees)	Longitude (decimal degrees)	Height of release above ground (m)	Height above nearby building (m)	Diameter at stack tip / vent exit (m)	Gas exit temperature (°C)	Gas volumetric flow (m^3/h)	Gas exit velocity (m/s)
Catalyst Manufacturing									
CM1	West kiln stack	[redacted]		36	12	0.9	180	32 400	15
CM2	West arc furnace stack	[redacted]		25	2	1.5	100	33 840	5.2
CM3	East A kiln stack	[redacted]		36	12	0.9	180	32 400	15
CM4	East arc furnace stack	[redacted]		25	12	1.5	100	68 400	10.4
CM5	East B kiln stack	[redacted]		36	12	0.9	180	32 400	15

6.5.1.4. Refining

Point source code	Source code	Latitude (decimal degrees)	Longitude (decimal degrees)	Height of release above ground (m)	Height above nearby building (m)	Diameter at stack tip / vent exit (m)	Gas exit temperature (°C)	Gas volumetric flow (m³/h)	Gas exit velocity (m/s)
Tar distillation									
R1 (14HT101)	Tar distillation reboiler stack outlet	[redacted]	[redacted]	51.876	46.876	0.894	440	7 380	3.27
R2 (14HT201}	Tar distillation reboiler stack outlet	[redacted]	[redacted]	51.876	46.876	0.894	440	7 380	3.27
R3 (214HT101}	Tar distillation reboiler stack outlet	[redacted]	[redacted]	51.876	46.876	0.894	440	7 380	3.27
R4 (214HT201}	Tar distillation reboiler stack outlet	[redacted]	[redacted]	51.876	46.876	0.894	440	7 380	3.27
R21 (U14/214 RTOs}	RTOs stack	[redacted]	[redacted]	20	15	2.3	100	246 240	16.47
Creosote hydrogenation		[redacted]	[redacted]						
R5 (228HT101)	Heater stack outlet	[redacted]	[redacted]	41.274	36.274	0.914	318	9 216	3.9
Naphtha hydrotreater, platformer and continuous catalyst regeneration (CCR)									
R6 (30HT101)	NHT charge heate stack outlet	[redacted]	[redacted]	51.876	46.876	1.22	298	6 228	1.48
R7 (30HT102)	Stripper reboile heater stack outlet	[redacted]	[redacted]	38.4	33.4	0.99	304	11 520	4.16
R8 (30HT103)	Platformer charg heater stack outlet	[redacted]	[redacted]	51.7	46.7	2.362	177	37 728	2.39
R9 (30HT104)	Debutanizer Reboile heater stack outlet	[redacted]	[redacted]	43.0	38.0	1.28	360	8 280	1.79
R10 (30HT105)	Splitter Reboile heater stack outlet	[redacted]	[redacted]	38.4	33.4	0.99	313	6 840	2.47
R11 (230HT101)	NHT charge heate stack outlet	[redacted]	[redacted]	51.9	46.9	1.22	298	9 720	2.3
R12 (230HT102	Stripper reboiler stac outlet	[redacted]	[redacted]	38.4	33.4	0.99	304	8 568	3.09
R13 (230HT103)	Platformer charg heater stack outlet	[redacted]	[redacted]	51.7	46.7	2.362	177	40 788	2.59
R14 (230HT104)	Debutanizer reboile	[redacted]	[redacted]	43.0	38.0	1.28	360	3 312	0.79

	stack outlet							
R15 (230HT105)	Splitter reboiler stack outlet	[redacted]	38.4	33.4	0.99	313	7 092	2.57
Vacuum distillation								
R17 (34HT101)	Vacuum heater stack outlet	[redacted]	32.0	27.0	1.27	321	10 728	2.35
R18 (234HT101)	Vacuum heater stack outlet		32.0	27.0	1.27	321	10 728	2.35
Distillate hydrotreater								
R19 (35HT101	Reactor charge heater stack outlet		41.3	36.3	0.99	299	7 848	1.92
R20 (35HT102)	Fractionators charge heater stack outlet		44.2	39.2	1.350	345	11 160	1.76
R22 (235HT101)	Reactor charge heater stack outlet		41.3	36.3	1.308	299	6 804	1.31
R23 (235HT102)	Fractionators charge heater stack outlet		44.2	39.2	1.35	310	12 636	2.45
Distillate Selective Cracker								
R24 (35HT103)	Reactor charge heater stack outlet		31.4	26.4	0.87	388	3 492	1.63
R25 (35HT104)	Fractionators charge heater stack outlet		35.0	30.0	0.99	221	3 132	1.13
R26 (35HT105)	Vacuum charge heater stack outlet		31.0	26.0	0.684	340	3 708	2.82
Light Oil Fractionation								
R27 (29HT101)	Light oil splitter reboiler stack outlet		48.0	43	1.808	280	21 348	2.31
R28 (29HT102)	Diesel splitter reboiler stack outlet		42.6	37.6	1.200	267	13 716	3.37
R29 (229HT101)	Light oil splitter reboiler stack outlet		47.7	42.7	1.727	367	36 144	4.28
Polymer Hydrotreating								
R30 (33HT101)	Stripper reboiler stack outlet		34.9	29.9	1.53	393	7 560	3.23
R31 (33HT102)	Charge heater stack		38.68	33.68	1.4	279	5 400	2.38

	outlet	[redacted]						
R32 (33HT105)	Splitter reboiler stack outlet		46	41	1.37	389	11 880	6.45
R33 (233HT101)	Splitter reboiler stack outlet		34.9	29.9	1.53	393	7 560	3.23
R34 (233HT102)	Charge heater stack outlet		38.68	33.68	1.4	279	5 400	2.38
R35 (233HT105)	Splitter reboiler stack outlet		46	41	1.37	389	11 880	6.45
Catalytic Polymerisation and LPG recovery								
R36 (32HT101)	Poly debutanizer reboiler stack outlet		37.2	32.2	1.24	344	8 280	5.18
R37 (32HT201)	Poly debutanizer reboiler stack outlet		37.2	32.2	1.24	358	7 920	5.03
R38 (32HT102)	Recycle column reboiler stack outlet		51.5	46.5	2.13	369	25 920	5.63
R39 (232HT101)	Poly debutanizer reboiler stack outlet		37.2	32.2	1.24	344	8 280	5.18
R40 (232HT201)	Poly debutanizer reboiler stack outlet		37.2	32.2	1.24	358	7 920	5.03
R41 (232HT102)	Recycle column reboiler stack outlet		51.5	46.5	2.13	369	25 920	5.63
R16 (90HT101/90HT151)	Reactor feed heater/ regenerator furnace stack outlet		60.0	55.5	1.45	298	20 520	3.48
Sasol Catalytic Cracker (SCC)								
SCC 1 Stack	Main stack		80	76	1.067	232	295 200	91.7

6.5.1.5. Tar and Phenosolvan

Point source code	Source code	Latitude (decimal degrees)	Longitude (decimal degrees)	Height of release above ground (m)	Height above nearby building (m)	Diameter at stack tip / vent exit (m)	Gas exit temperature (°C)	Gas volumetric flow (m³/h)	Gas exit velocity (m/s)
Phenosolvan									
P1	Ammonia vent line at west stack	[redacted]	[redacted]	250	230	0.6	33	29.88	0.114
P2	Ammonia vent line at east stack	[redacted]	[redacted]	301	281	0.6	31	29.88	0.114
PAR west depitcher	Depitcher (016VL-107) ejector system vents	[redacted]	[redacted]	17.1	2.5	0.102	95	1 008	34.3
PAR east depitcher	Depitcher (216VL-107) ejector system vents	[redacted]	[redacted]	17.1	2.5	0.102	95	1 008	34.3
PAR phase 1 filter vent	016FT-101 vents (filter vents during back wash operations)	[redacted]	[redacted]	10.1	2.5	0.152	64	900	13.75
PAR phase 2 filters Vent	016FT-401vents (filter vents during back wash operations)	[redacted]	[redacted]	10.1	2.5	0.152	64	900	13.75
PAR phase 3 filter Vent	216FT-101 vents (filter vents during back wash operations)	[redacted]	[redacted]	10.1	2.5	0.152	64	900	13.75
PAR phase 4 filter vent	216FT-401 vents (filter vents during back wash operations)	[redacted]	[redacted]	10.1	2.5	0.152	64	900	13.75
Gas liquor separation (GLS), coal tar filtration (CTF) and tar processes									
GLS1 (U13 RTOs)	RTO stack	[redacted]	[redacted]	20	15	2.3	60	129 600	4.17
GLS2 (U213 RTOs)	RTO stack	[redacted]	[redacted]	20	15	2.3	60	129 600	4.17
FPP (U86 RTO)	RTO stack	[redacted]	[redacted]	6	15	1.12	861	50 400	4.17
CTF East	CTF East stack	[redacted]	[redacted]	15	10	0.2	36.6	0.16-0.44 m³/s	276 – 762
39HT101	Heater stack	[redacted]	[redacted]	54	50	1.3	388	8 064 m³n/h	1.2
39HT102A & B	Heater stack	[redacted]	[redacted]	54	50	1.5	388	8 064 m³n/h	1.2
Calciner stack	Calciner stack	[redacted]	[redacted]	77	72	4.2	897	123 984	2.49

6.5.1.6. Water and Ash

Point source code	Source code	Latitude	Longitude	Height of release above ground (m)	Height above nearby building (m)	Diameter at stack tip / vent exit (m)	Gas exit temperature (°C)	Gas volumetric flow (m^3/h)	Gas exit velocity (m/s)
Bio-sludge (multi hearth) incinerators									
WA1 (52WK2102)	Stack	[redacted]		30	10	1.4	65	35	25.2
WA2 (52WK2202)	Stack			30	10	1.4	65	35	25.2
WA3 (252WK2102)	Stack			30	10	1.4	65	35	25.2
WA4 (252WK2202)	Stack			30	10	1.4	65	35	25.2
High organic water (HOW) incinerators									
HOW1 (052CI101)	Stack			15	7	1.95	400	59	21.8
HOW2 (252CI101)	Stack			15	7	1.95	400	59	21.8
Waste Recycling Facility (WRF)									
WRF	WRF stack			20	15	1.25	815	0.51	0.44

6.5.2. Area source parameters

6.5.2.1. Gas production

Area source code	Source code	Latitude (decimal degrees)	Longitude (decimal degrees)	Height of release above ground (m)	Length of area (m)	Width of area (m)
CP1	East Coal storage	[redacted]		0	454	276
CP2	West Coal storage			0	432	357

6.5.2.2. Refining

Area source code	Source code	Latitude (decimal degrees)	Longitude (decimal degrees)	Height of release above ground (m)	Length of area (m)	Width of area (m)
15TK101	Coal tar naphtha, Unit 15 feed tank	[redacted]		7.5	N/A	N/A
215TK101	Coal tar naphtha U215 feed tank			7.2	N/A	N/A
Synfuels Catalytic Cracker (SCC)						
SCC2 (TK1001)	Slurry storage tank - N_2 blanketing			11	N/A	N/A
SCC3 (TK 1002)	Fuel oil storage tank - N_2 blanketing			11	N/A	N/A
SCC4 (TK1003)	Fuel oil makeup tank - N_2 blanketing			7	N/A	N/A

SCCS (TK3201)	DEA storage tank - N_2 blanketing	[redacted]		9	N/A	N/A
SCC6 (TK 3202)	Slop oil tank - N_2 blanketing	[redacted]		5.7	N/A	N/A
SCC7 (TK 3401)	Caustic storage tank - N_2 blanketing	[redacted]		5.5	N/A	N/A
SCC8 (TK3402)	Spent caustic tank - N_2 blanketing	[redacted]		5.5	N/A	N/A

6.5.2.3. Tar, Phenosolvan and Sulphur

Area source code	Source code	Latitude (decimal degrees)	Longitude (decimal degrees)	Height of release above ground (m)	Length of area (m)	Width of area (m)
Gas liquor separation (GLS), coal tar filtration (CTF) and tar processes						
FPP3 (86TK203)	Storage and mixing tank	[redacted]		18	N/A	N/A
FPP4 (86TK204)	Storage and mixing tank	[redacted]		18	N/A	N/A
CT1 (39TK101)	Waxy Oil 30 tank	[redacted]		10	N/A	N/A
CT 2 (39TK102)	Waxy Oil 30 tank	[redacted]		10	N/A	N/A
CT3 (39TK103)	Pitch tank	[redacted]		10	N/A	N/A
CT4 (39TK104)	Pitch tank	[redacted]		10	N/A	N/A
CT5 (39TK105)	Pitch tank	[redacted]		10	N/A	N/A
CT10	Fuel Oil 10 tank	[redacted]		8	N/A	N/A
CT11 (39TK202)	Low sulphur heavy fuel oil tank	[redacted]		8	N/A	N/A
CT12 (39TK203)	Low sulphur heavy fuel oil tank	[redacted]		8	N/A	N/A
CT13 (39TK204)	Heavy tar oil tank	[redacted]		8	N/A	N/A

6.5.2.4. Water and Ash

Area source code	Source code	Latitude (decimal degrees)	Longitude (decimal degrees)	Height of release above ground (m)	Length of area (m)	Width of area (m)
Waste recycling facility						
TK2005	Phenosolvan oily waste tank	[redacted]		20	N/A	N/A
TK2011	Oily waste tank	[redacted]		20	N/A	N/A

7. APPLIANCES AND MEASURES TO PREVENT AIR POLLUTION

7.1. Appliances and control measures

7.1.1. Utilities

Associated source code	Appliances			Abatement Equipment Control Technology								
	Process Equipment number	Serial Nr	Appliance type / Description	Abatement Equipment Tech Name and Model	Installed on	Abatement Eq Tech Manufacture Date	Commission date	Date of Significant Modification / Upgrade	Technology Type	Design Capacity	Minimum Control Efficiency (%)	Minimum Utilization (%)
Utilities												
B1 & B2	431243FTX01	None	Electrostatic precipitators	Lurgi x 16, Lodge Cottrell x 1	All boilers	1977 – 1983 1987	1977 – 1983 1987	2010	Wire/Plate ESP's	PM < 200mg/ Nm^3	Unknown	> 95%
B1	None	None	High frequency transformers	High frequency transformers	All boilers	2018- 2019 2018 - 2019 2023	2018- 2019 2023	None, new installations	High frequency controllers	PM < 50 mg/Nm^3 at 10% O_2	Unknown	> 95%
B2	None	None	High frequency transformers	High frequency transformers	All boilers	2020 - 2023	2020 - 2023	None, new installations	High frequency controllers	PM < 50 mg/Nm^3 at 10% O_2	Unknown	> 95%
B1	None	None	Low NOx burners	Low NOx burners	All boilers	1996 2018 2023	1996 2018 2023	2018 New installations	Low NOx burners	NOx < 750 mg/Nm^3 at 10% O_2	Unknown	> 95%
B2	None	None	Low NOx burners	Low NOx burners	All boilers	2022 - 2023	2022 - 2023	New installations	Low NOx burners	NOx < 750mg/ Nm^3 at 10% O_2	Unknown	> 95%

7.1.2. Gas Production

Associated source code	Appliances			Abatement Equipment Control Technology							
	Process Equipment number	Serial Nr	Appliance type / Description	Abatement Eq Tech Name and Model	Abatement Eq Tech Manufacture Date	Commission date	Date of Significant Modification/ Upgrade	Technology Type	Design Capacity	Minimum Control Efficiency (%)	Minimum Utilization (%)
Wet Sulphuric Acid (WSA)											
WSA1	518ME-1003	None	Wet Electrostatic precipitator	Not available	2007	2009	None	Electrostatic precipitator	[redacted]	75%	[redacted]
WSA1	518RE-1001	None	DeNOx converter	Reactor	2007	2009	None	None	[redacted]	63%	[redacted]

7.1.3. Gas Circuit

Associated source code	Appliances			Abatement Equipment Control Technology							
	Process Equipment number	Serial Nr	Appliance type / Description	Abatement Eq Tech Name and Model	Abatement Eq Tech Manufacture Date	Commission date	Date of Significant Modification / Upgrade	Technology Type	Design Capacity	Minimum Control Efficiency (%)	Minimum Utilization (%)
Catalyst Manufacturing											
CM1	U04 Kiln (004DC-101- A-D)	None	Stainless steel filter element	Not available	Not available	1980	2011	Filtration	[redacted]	95%	[redacted]
CM2	U04 Arc furnace (04DC141-A-D)	None	Filter cloths	Not available	Not available	1980	2020	Filtration	[redacted]	95%	[redacted]
CM3	U204 Kiln A (204DC-101- A-D)	None	Stainless steel filter element	Not available	Not available	1984	2008	Filtration	[redacted]	95%	[redacted]
CM4	U204 Arc Furnace (204DC-141-A-D)	None	Filter cloths	Not available	Not available	1984	2017	Filtration	[redacted]	95%	[redacted]
CM5	U204 Kiln B (204DC-101- A-D	None	Stainless steel filter element	Not available	Not available	1984	2008	Filtration	[redacted]	95%	[redacted]

7.1.4. Refining

Associated source code	Abatement Equipment Control Technology										
	Process Equipment number	Serial Nr	Appliance type / Description	Abatement Eq Tech Name and	Abatement Eq Tech Manufacture	Commission date	Date of Significant Modification	Technology Type	Design Capacity	Minimum Control Efficiency	Minimum Utilization (%)
Tar Distillation											
R21 (U14/214 RTO's)	Regenerative thermal oxidizer 014HT102/ 214HT102	None	Regenerative thermal oxidiser	Not available	Not available	2017	2023	Thermal oxidiser	[redacted]	Not available	[redacted]
SCC											
SCC 1 stack	SCC multistage cyclone	None	SCC multistage cyclone	Three stage cyclone	2004	2006	None	Cyclones	[redacted]	71%	[redacted]

7.1.5. Tar and Phenosolvan

Associated source code	Appliances			Abatement Equipment Control Technology							
	Process Equipment number	Serial Nr	Appliance type / Description	Abatement Eq Tech Name and Model	Abatement Eq Tech Manufacture Date	Commission date	Date of Significant Modification / Upgrade	Technology Type	Design Capacity	Minimum Control Efficiency (%)	Minimum Utilization (%)
Gas Liquor Separation (GLS)											
GLS 1(U13 RTO's)	Regenerative Thermal oxidiser 013HT-101/013HT	None	Regenerative Thermal Oxidiser	Not available	Not available	2017	None	Thermal oxidiser	[redacted]	98%	[redacted]
GLS2 (U213 RTO's)	Regenerative thermal oxidiser 213HT-101/213HT	None	Regenerative Thermal Oxidiser	Not available	Not available	2017	None	Thermal oxidiser	[redacted]	98%	[redacted]
Feed Preparation Plant (U86)											
FPP 1 (U86-RTO)	Regenerative Thermal oxidiser 086HT-0001	None	Regenerative Thermal Oxidiser	Not	Not available	2016	2020	Thermal oxidiser	[redacted]	98%	[redacted]

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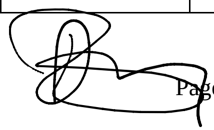

7.1.6. Water and Ash

Associated source code	Appliances			Abatement Equipment Control Technology							
	Process Equipment number	Serial Nr	Appliance type / Description	Abatement Eq Tech Name and Model	Abatement Eq Tech Manufacture Date	Commission date	Date of Significant Modification / Upgrade	Technology Type	Design Capacity	Minimum Control Efficiency (%)	Minimum Utilization (%)
Bio-sludge incinerators											
WA1, WA2, WA3, WA4	052WK2101 052WK2201 252WK2101 252WK2201	None	Wet Scrubber	Not available	1978	1978	None	Solid / Gas Separation	[redacted]	HCL: 60% HF: 75.9%	[redacted]

7.2. Point Source – maximum emission rates (under normal working conditions)

7.2.1. Utilities (Sub-category 1.1)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 10% O_2, 273 Kelvin and 101.3kPa	Compliance Timeframe		
B1 (West Stack)	Particulate matter (PM)	100	1 April 2020-31 March 2025	Daily	Continuous
		50	1 April 2025 onwards	Daily	Continuous
	SO_2	2 000	1 April 2020-31 March 2025	Daily	Continuous
		1 700 with load-based limit of 503t/day monthly	1 April 2025-31 March 2030	Monthly	Continuous
	NOx (as NO_2)	1 000	1 April 2020-31 March 2025	Daily	Continuous
		750	1 April 2025 onwards	Daily	Continuous
B2 (East Stack)	Particulate matter (PM)	100	1 April 2020-31 March 2025	Daily	Continuous
		50	1 April 2025 onwards	Daily	Continuous
	SO_2	2 000	1 April 2020-31 March 2025	Daily	Continuous
		1 400 with load-based limit of 503t/day monthly	1 April 2025-31 March 2030	Monthly	Continuous
	NOx (as NO_2)	1 000	1 April 2020-31 March 2025	Daily	Continuous
		750	1 April 2025 onwards	Daily	Continuous

The following arrangements shall apply:

i. NOx and PM emissions must comply with the new plant standards from 1 April 2025, failing which the alternatives limits for SO_2 emissions will be withdrawn.

ii. The license holder must continue to implement its integrated solution and must achieve the reductions in emissions as undertaken in its 12A application and appeal thereof.

iii. The National Air Quality Officer must monitor and evaluate the appellant's compliance with its load-based limit from 2025 onwards. In this regard, the license holder currently conducts continuous stack monitoring on the east and west stacks. The license holder must send stack monitoring data (emission concentration and volumetric flow) at a 10-minute resolution to the licensing authority weekly.

iv. Additionally, a monthly report must be compiled by the license holder's independent consultant, which should (a) analyze the data and assess compliance with any stipulated concentration standards and (b) assess compliance with any mass-based standards. This report must be submitted monthly to NAQO to ensure compliance with the stipulated concentration standards.

v. For transparency, the above-mentioned report must be made publicly available on the license holders' website.

vi. Any exceedances of the above standards for SO_2 on load-based limit will require a full Atmospheric Dispersion Assessment to determine likely health incidents (with reporting that is line with the Atmospheric Impact Report Regulations) and for any exceedance of the above standard of SO_2 on concentration limit will require to report the incident in line with Section 30 NEMA.

7.2.2. Gas Turbines (Sub-category 1.4)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 3% O_2, 273 Kelvin and 101.3kPa	Compliance Timeframe		
GT1 (Gas Turbines Stack)	Particulate matter (PM)	10	Immediately	Daily	Continuous
	SO_2	400	Immediately	Daily	Continuous
	NOx (as NO_2)	50	Immediately	Daily	Continuous
GT2 (Gas Turbines Stack)	Particulate matter (PM)	10	Immediately	Daily	Continuous
	SO_2	400	Immediately	Daily	Continuous
	NOx (as NO_2)	50	Immediately	Daily	Continuous

7.2.3. Refinery Heaters (Sub-category 2.1)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 10% O_2, 273 Kelvin and 101.3kPa	Compliance Timeframe		
Tar Distillation					
R1 (14HT101) Tar distillation reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R2 (14HT201) Tar distillation reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R3 (214HT101) Tar distillation reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R4 (214HT201) Tar distillation reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
Creosote Hydrogenation					
R5 (228HT101) heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
Naphtha Hydrotreater, Platformer and Continuous Catalyst Regeneration (CCR)					
R6 (30HT101) NHT charge heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous

R7 (30HT102) Stripper reboiler heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R8 (30HT103) Tar Platformer charge heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R9 (30HT104) Tar Debutaniser reboiler heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R10 (30HT105) Splitter reboiler heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R11 (230HT101) NHT charge heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R12 (230HT102) Stripper reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R13 (230HT103) Platformer charge heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R14 (230HT104) Debutaniser reboiler heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous

R15 (230HT105) Splitter reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO2	1 000	Immediately	Daily	Continuous
R16 (90HT101/90HT151	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO2	1 000	Immediately	Daily	Continuous
Vacuum Distillation					
R17 (34HT101) Vacuum heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO2	1 000	Immediately	Daily	Continuous
R18 (234HT101) Vacuum heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO2	1 000	Immediately	Daily	Continuous
Distillate Hydrotreater					
R19 (35HT101) Reactor charge heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R20 (35HT102) Fractionators charge heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R22 (235HT101) Reactor charge heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R23 (235HT102)	PM	70	Immediately	Daily	Continuous

Fractionators charge heater stack outlet	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
Distillate Selective Cracker					
R24 (35HT103) Reactor charge heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R25 (35HT104) Fractionators charge heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R26 (35HT105) Vacuum charge heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
Light Oil Fractionation					
R27 (29HT101) Light oil splitter reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R28 (29HT102) Diesel splitter reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R29 (229HT101) Light oil splitter reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
Polymer Hydrotreating					
R30 (33HT101)	PM	70	Immediately	Daily	Continuous

Stripper reboiler stack outlet	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R31 (33HT102) Charge heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R32 (33HT105) Splitter reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R33 (233HT101) Splitter reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R34 (233HT102) Charge heater stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R35 (233HT105) Splitter reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
Catalytic Polymerization and LPG Recovery					
R36 (32HT101) Poly debutaniser reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R37 (32HT201) Poly debutaniser reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous

R38 (32HT102) Recycle column reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R39 (232HT101) Poly debutaniser reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R40 (232HT201) Poly debutaniser reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
R41 (232HT102) Recycle column reboiler stack outlet	PM	70	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous

The following special arrangements shall apply:

i. No continuous flaring of hydrogen sulphide-rich gases shall be allowed.

ii. A bubble cap of combustion installations and catalytic cracking units shall be at 1.2 kg SO_2/ton.

7.2.4. Catalytic Cracker (Sub-category 2.2)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 10% O_2, 273 Kelvin and 101.3kPa	Compliance Timeframe		
SCC 1 Stack	PM	300	1 April 2020-31 March 2025	Daily	Continuous
		100	From 1 April 2025	Daily	Continuous
	SO_2	1 500	Immediately	Daily	Continuous
	NOx	400	Immediately	Daily	Continuous

7.2.5. Calciner and Coke Handling (Sub-category 3.2)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 273 Kelvin and 101.3kPa	Compliance Timeframe		
Calciner Stack	H_2S	7[(i)]	Immediately	Daily	Continuous

[(i)]from point source

7.2.6. Tar Processes (Sub-category 3.3)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 273 Kelvin and 101.3kPa	Compliance Timeframe		
39HT101 Heater Stack	Total VOCs	130	Immediately	Daily	Continuous
39HT102 A & B Heater Stack	Total VOCs	130	Immediately	Daily	Continuous

7.2.7. Tar Distillation Regenerative Thermal Oxidiser (Sub-category 3.3)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 273 Kelvin and 101.3kPa	Compliance Timeframe		
R21 (U14/214 RTOs)	Total VOCs	130	Immediately	Daily	Continuous

7.2.8. Tar and Phenosolvan (Sub-category 3.6)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 273 Kelvin and 101.3kPa	Compliance Timeframe		
Gas Liquor Separation					
GLS1 (U13 Regenerative Thermal Oxidisers)	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC's	130	Immediately	Daily	Continuous
	SO_2	500	Immediately	Daily	Continuous

GLS2 (U213 Regenerative Thermal Oxidisers)	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC's	130	Immediately	Daily	Continuous
	SO_2	500	Immediately	Daily	Continuous
FPP1 (U86 RTO)	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC's	130	Immediately	Daily	Continuous
	SO_2	500	Immediately	Daily	Continuous
Phenosolvan					
PAR West Depitcher	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC's	65 000	1 October 2022-31 March 2025	Daily	Continuous
		130	Immediately	Daily	Continuous
	H_2S	500	Immediately	Daily	Continuous
PAR East Depitcher	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC's	65 000	1 October 2022-31 March 2025	Daily	Continuous
		130	Immediately	Daily	Continuous
	H_2S	500	Immediately	Daily	Continuous
PAR phase 1 filter vent	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC's	5 200	1 October 2022-31 March 2025	Daily	Continuous
		130	Immediately	Daily	Continuous
	H_2S	500	Immediately	Daily	Continuous
PAR phase 2 filters Vent	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC's	5 200	1 October 2022-31 March 2025	Daily	Continuous
		130	Immediately	Daily	Continuous

	H_2S	500	Immediately	Daily	Continuous
PAR phase 3 filter Vent	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC's	5 200	1 October 2022-31 March 2025	Daily	Continuous
		130	Immediately	Daily	Continuous
	H_2S	500	Immediately	Daily	Continuous
PAR phase 4 filter vent	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC's	5 200	1 October 2022-31 March 2025	Daily	Continuous
		130	Immediately	Daily	Continuous
	H_2S	500	Immediately	Daily	Continuous

7.2.9. Gas Production

7.2.9.1. Rectisol (Sub-category 3.6)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 273 Kelvin and 101.3kPa	Compliance Timeframe		
Rectisol East (B2 off gas to main stack measured at sulphur recovery)	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC	130	Immediately	Daily	Continuous
	SO_2	500	Immediately	Daily	Continuous
Rectisol West (B1 off gas to main stack measured at sulphur recovery)	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC	130	Immediately	Daily	Continuous
	SO_2	500	Immediately	Daily	Continuous

7.2.9.2. Gasification (Sub-category 3.6)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 273 Kelvin and 101.3kPa	Compliance Timeframe		
Gasification Ejector Vents (West and East)	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC	130	Immediately	Daily	Continuous
	SO_2	500	Immediately	Daily	Continuous

The following arrangements shall apply:

i. The average of 5 gasification ejector vent emissions measured will represent compliance to the emission limit for all gasification ejector vents. However, if this average is in non-compliance with the minimum emission standards, all gasification ejector vents will be in non-compliance with the minimum emission standards.

7.2.9.3. Sulphur Recovery (Sub-category 3.6)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 273 Kelvin and 101.3kPa	Compliance Timeframe		
Sulphur Recovery Oxidiser Vent Phase 1	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC	130	Immediately	Daily	Continuous
	SO_2	500	Immediately	Daily	Continuous
Sulphur Recovery Oxidiser Vent Phase 2	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC	130	Immediately	Daily	Continuous
	SO_2	500	Immediately	Daily	Continuous
Sulphur Recovery Oxidiser Vent Phase 3	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC	130	Immediately	Daily	Continuous
	SO_2	500	Immediately	Daily	Continuous
Sulphur Recovery Oxidiser Vent Phase 4	H_2S	3 500	Immediately	Daily	Continuous
	Total VOC	130	Immediately	Daily	Continuous
	SO_2	500	Immediately	Daily	Continuous

The following arrangements shall apply:

i. One (1) oxidiser vent emission measured per phase represents the phase's compliance with the emission limit. However, if 1 oxidiser vent emission per phase is in non-compliance with the minimum emission standards, all oxidiser vents within that phase will be in non-compliance with the minimum emission standards.

7.2.10. Gas Circuit

7.2.10.1. Catalyst Manufacturing (Sub-category 4.1)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 273 Kelvin and 101.3kPa	Compliance Timeframe		
CM1 (West Kiln Stack)	PM	50	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
	NOx	500	Immediately	Daily	Continuous
CM3 (East Kiln A Stack)	PM	500	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
	NOx	500	Immediately	Daily	Continuous
CM5 (East Kiln B Stack)	PM	50	Immediately	Daily	Continuous
	SO_2	1 000	Immediately	Daily	Continuous
	NOx	500	Immediately	Daily	Continuous

7.2.10.2. Catalyst Manufacturing (Sub-category 4.7)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 273 Kelvin and 101.3kPa	Compliance Timeframe		
CM2 (West Arc Furnace)	PM	30	Immediately	Daily	Continuous
	SO_2	500	Immediately	Daily	Continuous
	NOx	500	Immediately	Daily	Continuous
CM4 (East Arch Furnace Stack)	PM	30	Immediately	Daily	Continuous
	SO_2	500	Immediately	Daily	Continuous
	NOx	500	Immediately	Daily	Continuous

7.2.11. Wet Sulphuric Acid (Sub-category 7.2)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 273 Kelvin and 101.3kPa	Compliance Timeframe		
WSA1 (Wet Sulphuric Acid Stack)	F as HF	5	Immediately	Daily	Continuous
	HCl (Hydrogen chloride from primary production of hydrochloric acid)	15	Immediately	Daily	Continuous
	HCl (Hydrogen chloride from secondary production of hydrochloric acid)	30	Immediately	Daily	Continuous
	SO_2	350	Immediately	Daily	Continuous
	SO_3	25	Immediately	Daily	Continuous
	NOx (as NO_2)	350	Immediately	Daily	Continuous

7.2.12. Water and Ash

7.2.12.1.*Bio-sludge Incinerators (Sub-category 8.1)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 273 Kelvin and 101.3kPa	Compliance Timeframe		
WA1 (052WK-2102)	PM	800	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	CO	4 310	1 April 2020-31 March 2025	Daily	Continuous
		50	From 1 April 2025	Daily	Continuous
	SO_2	210	1 April 2020-31 March 2025	Daily	Continuous
		50	From 1 April 2025	Daily	Continuous
	NOx	630	1 April 2020-31 March 2025	Daily	Continuous
		200	From 1 April 2025	Daily	Continuous
	HCl	20	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous

	HF	20	1 April 2020-31 March 2025	Daily	Continuous
		1	From 1 April 2025	Daily	Continuous
	Pb+As+Sb+Cr+Co+Cu +Mn+Ni+V	8	1 April 2020-31 March 2025	Daily	Continuous
		0.5	From 1 April 2025	Daily	Continuous
	Hg	2.5	1 April 2020-31 March 2025	Daily	Continuous
		0.05	From 1 April 2025	Daily	Continuous
	Cd+Tl	0.12	1 April 2020-31 March 2025	Daily	Continuous
		0.05	From 1 April 2025	Daily	Continuous
	TOC	3 675	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	NH_3	100	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	Dioxins and furans (PCDD/PCDF)	**0.3	1 April 2020-31 March 2025	Daily	Continuous
		**0.1	From 1 April 2025	Daily	Continuous
WA2 (052WK- 2202)	PM	800	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	CO	4 310	1 April 2020-31 March 2025	Daily	Continuous
		50	From 1 April 2025	Daily	Continuous
	SO_2	210	1 April 2020-31 March 2025	Daily	Continuous
		50	From 1 April 2025	Daily	Continuous
	NOx	630	1 April 2020-31 March 2025	Daily	Continuous
		200	From 1 April 2025	Daily	Continuous
	HCl	20	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous

	HF	20	1 April 2020-31 March 2025	Daily	Continuous
		1	From 1 April 2025	Daily	Continuous
	Pb+As+Sb+Cr+Co+Cu +Mn+Ni+V	8	1 April 2020-31 March 2025	Daily	Continuous
		0.5	From 1 April 2025	Daily	Continuous
	Hg	2.5	1 April 2020-31 March 2025	Daily	Continuous
		0.05	From 1 April 2025	Daily	Continuous
	Cd+Tl	0.12	1 April 2020-31 March 2025	Daily	Continuous
		0.05	From 1 April 2025	Daily	Continuous
	TOC	3 675	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	NH_3	100	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	Dioxins and furans (PCDD/PCDF)	**0.3	1 April 2020-31 March 2025	Daily	Continuous
		**0.1	From 1 April 2025	Daily	Continuous
WA3 (252WK- 2102)	PM	800	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	CO	4 310	1 April 2020-31 March 2025	Daily	Continuous
		50	From 1 April 2025	Daily	Continuous
	SO_2	210	1 April 2020-31 March 2025	Daily	Continuous
		50	From 1 April 2025	Daily	Continuous
	NOx	630	1 April 2020-31 March 2025	Daily	Continuous
		200	From 1 April 2025	Daily	Continuous
	HCl	20	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous

	HF	20	1 April 2020-31 March 2025	Daily	Continuous
		1	From 1 April 2025	Daily	Continuous
	Pb+As+Sb+Cr+Co+Cu +Mn+Ni+V	8	1 April 2020-31 March 2025	Daily	Continuous
		0.5	From 1 April 2025	Daily	Continuous
	Hg	2.5	1 April 2020-31 March 2025	Daily	Continuous
		0.05	From 1 April 2025	Daily	Continuous
	Cd+Tl	0.12	1 April 2020-31 March 2025	Daily	Continuous
		0.05	From 1 April 2025	Daily	Continuous
	TOC	3 675	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	NH_3	100	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	Dioxins and furans (PCDD/PCDF)	**0.3	1 April 2020-31 March 2025	Daily	Continuous
		**0.1	From 1 April 2025	Daily	Continuous
WA4 (252WK-2202)	PM	800	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	CO	4 310	1 April 2020-31 March 2025	Daily	Continuous
		50	From 1 April 2025	Daily	Continuous
	SO2	210	1 April 2020-31 March 2025	Daily	Continuous
		50	From 1 April 2025	Daily	Continuous
	NOx	630	1 April 2020-31 March 2025	Daily	Continuous
		200	From 1 April 2025	Daily	Continuous
	HCl	20	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous

	HF	20	1 April 2020-31 March 2025	Daily	Continuous
		1	From 1 April 2025	Daily	Continuous
	Pb+As+Sb+Cr+Co+Cu +Mn+Ni+V	8	1 April 2020-31 March 2025	Daily	Continuous
		0.5	From 1 April 2025	Daily	Continuous
	Hg	2.5	1 April 2020-31 March 2025	Daily	Continuous
		0.05	From 1 April 2025	Daily	Continuous
	Cd+Tl	0.12	1 April 2020-31 March 2025	Daily	Continuous
		0.05	From 1 April 2025	Daily	Continuous
	TOC	3 675	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	NH_3	100	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	Dioxins and furans (PCDD/PCDF)	**0.3	1 April 2020-31 March 2025	Daily	Continuous
		**0.1	From 1 April 2025	Daily	Continuous
Exit gas temperature must be maintained at 200^{0}C.					

*The facility must complete the bio-sludge to gasification project by 31 March 2025.

**ng I-TEQ/Nm^3 under normal conditions of 10% oxygen, 273 Kelvin and 101.3kPa.

7.2.12.2. High Organic Water Incinerators (Sub-category 8.1)

Point Source Name/Code	Pollutant Name	Maximum Release Rates		Average Period	Duration of Emissions
		(mg/Nm³) under normal conditions of 273 Kelvin and 101.3kPa	Compliance Timeframe		
HOW1 (052CI-101	PM	900	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	CO	1300	1 April 2020-31 March 2025	Daily	Continuous

		50	From 1 April 2025	Daily	Continuous
	SO_2	400	1 April 2020-31 March 2025	Daily	Continuous
		50	From 1 April 2025	Daily	Continuous
	NOx	4000	1 April 2020-31 March 2025	Daily	Continuous
		200	From 1 April 2025	Daily	Continuous
	HCl	50	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	HF	3	1 April 2020-31 March 2025	Daily	Continuous
		1	From 1 April 2025	Daily	Continuous
	Pb+As+Sb+Cr+Co+Cu +Mn+Ni+V	21	1 April 2020-31 March 2025	Daily	Continuous
		0.5	From 1 April 2025	Daily	Continuous
	Hg	0.43	1 April 2020-31 March 2025	Daily	Continuous
		0.05	From 1 April 2025	Daily	Continuous
	Cd+Tl	0.12	1 April 2020-31 March 2025	Daily	Continuous
		0.05	From 1 April 2025	Daily	Continuous
	TOC	113	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	NH_3	13	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	Dioxins and furans (PCDD/PCDF)	**4.2	1 April 2020-31 March 2025	Daily	Continuous
		**0.1	From 1 April 2025	Daily	Continuous
HOW2 (252CI-101	PM	900	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	CO	1300	1 April 2020-31 March 2025	Daily	Continuous

		50	From 1 April 2025	Daily	Continuous
	SO_2	400	1 April 2020-31 March 2025	Daily	Continuous
		50	From 1 April 2025	Daily	Continuous
	NOx	4000	1 April 2020-31 March 2025	Daily	Continuous
		200	From 1 April 2025	Daily	Continuous
	HCl	50	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	HF	3	1 April 2020-31 March 2025	Daily	Continuous
		1	From 1 April 2025	Daily	Continuous
	Pb+As+Sb+Cr+Co+Cu +Mn+Ni+V	21	1 April 2020-31 March 2025	Daily	Continuous
		0.5	From 1 April 2025	Daily	Continuous
	Hg	0.43	1 April 2020-31 March 2025	Daily	Continuous
		0.05	From 1 April 2025	Daily	Continuous
	Cd+Tl	0.12	1 April 2020-31 March 2025	Daily	Continuous
		0.05	From 1 April 2025	Daily	Continuous
	TOC	113	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	NH_3	13	1 April 2020-31 March 2025	Daily	Continuous
		10	From 1 April 2025	Daily	Continuous
	Dioxins and furans (PCDD/PCDF)	**4.2	1 April 2020-31 March 2025	Daily	Continuous
		**0.1	From 1 April 2025	Daily	Continuous
Exit gas temperature must be maintained at 200^0C.					

**ng I-TEQ/Nm^3 under normal conditions of 10% oxygen, 273 Kelvin and 101.3kPa.

7.3. Point source – maximum emission rates (under start-up, maintenance, and shut-down conditions)

Point Source Name/Code	Pollutant Name	Maximum Release Rate		Averaging Period	Maximum Gas Volumetric Flow (m³/hr)	Maximum Gas Exit Velocity (m/s)	Emission Hours	Maximum Permitted Duration of Emissions
		(mg/Nm³)	Date to be Achieved By					
All point sources	All point source pollutant	N/A	N/A	N/A	N/A	N/A	N/A	Within 48 hours after commissioning of plant or equipment

Should normal start-up, maintenance, upset and shut-down conditions exceed a period of 48 hours, Section 30 of the National Environmental Management, 1998 (Act No. 107 of 1998), shall apply unless otherwise specified by the Licensing Authority.

7.4. Point source – emission monitoring and reporting requirements

Point Source Name/Code	Emission Sampling Method	Sampling Frequency	Sampling Duration	Parameters to be Measured	Parameters to be Reported	Reporting Frequency	Conditions under which Monitoring could be Stopped
B1 & B2	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
GT1 & GT2	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
R1 to R41	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
SCC1	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority

Point Source Name/Code	Emission Sampling Method	Sampling Frequency	Sampling Duration	Parameters to be Measured	Parameters to be Reported	Reporting Frequency	Conditions under which Monitoring could be Stopped
R21 (U14/214 RTO's)	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
GLS1 & GLS2	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
FPP1 (U86 RTO)	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
PAR Depitcher East & West	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
PAR phase 1 to phase 4	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
Calciner Stack	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
39HT101 Heater Stack	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority

Point Source Name/Code	Emission Sampling Method	Sampling Frequency	Sampling Duration	Parameters to be Measured	Parameters to be Reported	Reporting Frequency	Conditions under which Monitoring could be Stopped
30HT102 A&B Heater Stack	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
Rectisol East & West	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
Gasification Ejector Vent West & East	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
Sulphur Recovery Oxidiser Vents phase 1 to phase 4	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
CM1, CM2, CM3, CM4 & CM5	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
WSA1	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority
WA1, WA2, WA3 & WA4	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority

Point Source Name/Code	Emission Sampling Method	Sampling Frequency	Sampling Duration	Parameters to be Measured	Parameters to be Reported	Reporting Frequency	Conditions under which Monitoring could be Stopped
HOW1 & HOW2	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	In line with GNR 893 in Government Gazette 37054 of 22 November 2013	Only on written authorisation by the Licensing Authority

7.5. Area source – management and mitigation measures

Area and/or Line Source Name/Code	Area and/or Line Source Description	Description of Specific Measures	Timeframe for Achieving Required Control Efficiency	Method of Monitoring Measures Effectiveness	Contingency Measures
CP1 & CP2	Coal Stockpiles	In line with the National Dust Control Regulations	Immediately	Submit dust monitoring reports quarterly reports to Licensing Authority.	In line with Sasol Synfuels approved site fugitive management plan.
Storage Tanks	Storage Tanks	In line with the fugitive emission management plan	Immediately	Submit quarterly reports to the Licensing Authority on the implementation of fugitive emission management plan	In line with Sasol Synfuels fugitive emissions management plan.
Tar Value Chain Phase 1 and Phase 2	Tar Value Chain Phase 1 and Phase 2	In line with the fugitive emission management plan	Immediately	Submit quarterly reports to the Licensing Authority on the implementation of fugitive emission management plan	In line with Sasol Synfuels fugitive emissions management plan.

7.6. Routine reporting and record-keeping

7.6.1. Complaints register.

The licence holder must maintain complaints register at its premises, and such register must be made available for inspections. The complaints register must include the following information: the name of the complainant, 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 licensing authority in a summarised format on the total number of complaints logged. The complaints must be reported in the following format:

a) Root cause analysis.
b) Calculation of impacts / emissions associated with incidents and dispersion modelling of pollutants, where applicable.
c) Measures implemented or to be implemented to prevent recurrence; and
d) 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 Emergency Incidents

The licence holder must keep records of all plant failures that would have caused or contributed to section 30 incidents and submit to the licence authority quarterly a report detailing the following:

a) Type of plant and summary description of the equipment
b) Reasons for failure or cause
c) Previous occurrence on the same plant and number of times similar incident occurred
d) Mitigation instituted to prevent similar occurrence
e) Any breach of internal standard operating procedure
f) Number of times similar incident occurred

7.6.3. Annual reporting

The licence holder must complete and submit to the licensing authority an annual report after the facility annual financial year, 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 sixty (60) days after the end of each reporting period. The annual report must include, amongst others the following:

a) The name, description, and licence reference number of the plant as reflected in the Atmospheric Emission Licence.
b) The name and address of the accredited measurement service provider that carried out or verified the emission test, including the test report produced by the accredited measurement.
c) The date and time on which emission test was carried out.
d) A declaration by the licence holder to the effect that normal operating conditions were maintained during the emission tests.
e) Pollutant emissions trend for listed activity.
f) External Atmospheric Emission Licence compliance audit report.
g) Major upgrades projects (i.e. abatement equipment or process equipment).
h) Complaints received and action taken to address complains received.
i) Proof of annual reporting of greenhouse gas emissions to the National Department in accordance with the National Greenhouse Gas Emission Reporting Regulations Government Gazette No. 40762 of 03 April 2017.
j) Compliance status to statutory obligation (4.5) including any other issued authorisations.

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

7.7. Investigation

Investigation	Purpose	Completion Date
Minimum Control Efficiency- Electrostatic Precipitators, High frequency controllers & Low NOx Burners at East (B2) and West (B1) Stack.	To measure and establish minimum control efficiency of abatement equipment's and report to the licensing authority	Eighteen (18) months after date of issue of this licence.

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

Source Code/Name	Waste/Effluent Type	Hazardous Components Present	Method of Disposal
B1 & B2	Ash	Alkaline dust containing heavy metal trace elements as well as silica and quartz	In line with the requirements of NEMA and the SEMA
CM1, CM3 & CM5	Catalyst dust	Magnetite	In line with the requirements of NEMA and the SEMA
WA1, WA2, WA3 & WA4	Ash	Heavy metals trace elements	In line with the requirements of NEMA and the SEMA
WSA1	Weak sulphuric acid, spent catalyst	Sulphuric acid, vanadium-based catalyst	In line with the requirements of NEMA and the SEMA

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

Failure to comply with the 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 Chapter 7 Section 52 of NEMAQA (Act No. 39 of 2004), including any penalties contained in the Gert Sibande District Municipality By-laws.

10. APPEAL OF LICENCE

10.1 The Licence Holder must notify every registered interested and affected party, in writing and within ten (10) working days of receiving the District's decision.

10.2 The notification referred to in 10.1. must –

- 10.2.1 Inform the registered interested and affected parties of the appeal procedure provided for in Chapter 7 Part 3 Section 62 of Municipal Systems Act, 2000 (Act 32 of 2000), as amended.
- 10.2.2 Advise the interested and affected parties that a copy of the Atmospheric Emission Licence and reasons for the decision will be furnished on request.
- 10.2.3 An appeal against the decision must be lodged in terms of Chapter 7 Part 3 Section 62 of Municipal Systems Act, 2000 (Act 32 of 2000), from the date of issue of this Atmospheric Emission Licence, with:

  Municipal Manager,
  PO Box 1748,
  Ermelo
  2350
  Fax No. 017-811 1207.

  And

10.3. Specify the date on which the Atmospheric Emission Licence was issued.

11. REVIEW OF ATMOSPHERIC EMISSION LICENCE

In terms of NEMAQA (Act No. 39 of 2004) as amended, this Atmospheric Emission Licence is valid for five (05) years from date of issue of the licence.

LICENSING OFFICER