Simple Process Flow for Customer

Crude oil
Storage Floating Top Tanks

11x4
Crude oil

350C
Crude oil

Atmospheric Distillation

Gas vapor

Condenser Reflux Drum

Naphtha

Gasoline

Kerosene / Jet Fuel

Diesel Oil

Fuel Oil

Reboiler

Bitumen and Residual

Asphalt and tar products

Not pure – must be further refined
see picture sheet 5

Heavy fuel oil for ships / lubricating oil
Mixes with fuel oil output from Vacuum tower to go to FCC unit

Gas Processing

LPG

Butane

Propane

Gas vapor

Condenser Reflux Drum

Naphtha

Gasoline

Kerosene / Jet Fuel

Diesel Oil

Fuel Oil

Reboiler

Bitumen and Residual

Asphalt and tar products

Heavy fuel oil for ships / lubricating oil
Mixes with fuel oil output from Vacuum tower to go to FCC unit
Generalized Output Flow

Fractionating Column

C\textsubscript{1} to C\textsubscript{4} gases

20°C

C\textsubscript{1} to C\textsubscript{9} naphta

70°C

C\textsubscript{5} to C\textsubscript{10} gasoline

120°C

C\textsubscript{10} to C\textsubscript{16} kerosene

170°C

C\textsubscript{14} to C\textsubscript{20} diesel

270°C

C\textsubscript{20} to C\textsubscript{50} lubricants

700°C

C\textsubscript{70} and above Bitumen asphalt

Crude Boiler

LPG Domestic gas Petrochemical feedstock

Petrochemical products

Car Gasoline

Jet Fuel Kerosene for lighting and heating

Diesel fuels

Lubricants Waxes Polishes

Bunker fuel Boilers District heating

Asphalt for Roads and Roofing
Heavy versus Light Crude Output Flow

Heavy Crude
- Liquid Petroleum Gas - LPG
- Naptha
- Kerosene – Jet fuel
- Diesel
- Fuel Oil
- Residual
- Bitumen / Asphalt

Light Crude
- Liquid Petroleum Gas - LPG
- Gasoline
- Kerosene – Jet fuel
- Diesel
- Fuel Oil
- Residual
- Bitumen / Asphalt
Generalized Output Flow

Liquid Petroleum Gas - LPG

Naptha
Gasoline
Kerosene – Jet fuel
Diesel
Fuel Oil
Residual
Bitumen / Asphalt

Reformer

Cracking

Alky Unit

Coker

Coke
Vacuum tower

Gasoline Blending

High octane
**Simple Process Flow for Customer**

- **Vacuum Tower**
  - Light Gas oil
  - Heavy Gas oil

- **HydroCracking Unit**
  - Gasoline and Diesel fuel to distillation tower for separation
  - Mixes with gas oil from Vacuum tower to go to FCC unit

- **Twin Reactors**

- **Catalytic Cracking Unit**
  - Olefins

- **Alkylation Unit**
  - Alkylate to gasoline blending

- **Delayed Coking Unit**
  - Not Designed
  - Vacuum residuum
  - Petroleum Coke

- **Vacuum Tower**
  - Diesel fuel

- **Medium Atmospheric Distillation**
  - Gasoline to blending
  - Kerosene – Jet fuel

- **Small Atmospheric Distillation**
  - Naphtha to gasoline blending

- **FCC Gasoline to blending**

- **FCC Fuel Oil**

- **Gasoline to blending**

- **Jet fuel**

- **Kerosene**

- **Naphtha**

- **FCC Fuel Oil**
- Finished products are shown in blue.
- Sour waters are derived from various distillation tower reflux drums in the refinery.
- The "other gases" entering the gas processing unit includes all the gas streams from the various process units.
Distillation tower

Crude

Pump

Reboiler

Steam

External reflux cools top of tower to liquidize heavier fractions thus purifying vapor

Used to control heat in tower and to add more vapor product

Reflux Drum / Accumulator

Condenser

Cooling water

Pressure Valve

To gas burn off

To Blender / Storage or next operation

Note – condenser and accumulator are only used for tops (vapor)

Vapors

Helps control pressure at top of tower