Crude Distillation Unit

HISTORY

1962  Commissioned at 68,500 BPSD capacity

1969  Debottlenecked to 100,000 BPSD
- added second parallel preheat exchanger train
- doubled overhead cooling capacity, and
- installed booster feed pump

Installed new desalter

1975  Modified tower internals removed two trays and replaced two others with packed section and bubble cap tray

1992  CDU Encon Project Phase-I
- installed four preheat exchangers (two new and two idle)
- modified tower internals, and
- raised gas oil draw

1994  CDU EnCon Project Phase-II
- installed six new preheat exchangers

1997  CDU Tower Modifications
- installed new sieve trays at stripping section
- installed new steam distributors at stripping section
- installed new VEP type gravity liquid distributor
- removed random packing and
- removed bubble cap tray no 6 installed new low pressure drop de-entrainment tray
- installed new HGO draw nozzles

CUTS

<table>
<thead>
<tr>
<th>ASTM end point °C</th>
<th>Light products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is a naphtha</td>
<td>71</td>
</tr>
<tr>
<td>swing stream # 1</td>
<td>82</td>
</tr>
<tr>
<td>swing stream # 2</td>
<td>104</td>
</tr>
<tr>
<td>h s e naphtha</td>
<td>154</td>
</tr>
<tr>
<td>swing stream # 3</td>
<td>160</td>
</tr>
<tr>
<td>swing stream # 4</td>
<td>171</td>
</tr>
<tr>
<td>swing stream # 5</td>
<td>182</td>
</tr>
<tr>
<td>kerosene</td>
<td>271</td>
</tr>
<tr>
<td>kerosene</td>
<td>310</td>
</tr>
<tr>
<td>swing stream # 6</td>
<td>310</td>
</tr>
</tbody>
</table>
Naphtha Catalytic Hydrodesulphurization Unit

**NCHD(200)**

**HISTORY**

1962 Commissioned at 19,000 BPSD capacity

1969 Debottlenecked to 21,700 BPSD
 - added preheat exchangers

1998 Debottlenecking to 24,000 BPSD has been implemented
 - 3 ea new preheat exchangers has been installed

**UNIT CAPACITY**

24,000 BPSD 158.9 m³/hr

**CATALYST**

Akzo KJ-752-3Q 7,560 kg
Criterion C-448 TL + 7,780 kg
Total 15,340 kg

Platinum Reforming Unit

**PtR (300)**

**HISTORY**

1962 Commissioned at 8,000 BPSD capacity

1970 Installed spare smaller capacity recycle gas compressor

1991 Expanded to 14,000 BPSD
 - re-trayed stabilizer tower
 - added five new exchangers, and
 - added fourth reactor (radial flow)

1996 New Recycle gas compressor shifted

**UNIT CAPACITY**

14,000 BPSD 92.7 m³/hr
six-month cycle @ 96 RON clear severity

**CATALYST**

U O P R – 62 Pt / Rh :

<table>
<thead>
<tr>
<th>Reactor</th>
<th>Pt / Rh</th>
<th>Kilograms</th>
</tr>
</thead>
<tbody>
<tr>
<td># 1 (D-300)</td>
<td></td>
<td>6,000</td>
</tr>
<tr>
<td># 2 (D-301)</td>
<td></td>
<td>6,617</td>
</tr>
<tr>
<td># 3 (D-302)</td>
<td></td>
<td>6,645</td>
</tr>
<tr>
<td># 4 (D-351)</td>
<td>+</td>
<td>29,956</td>
</tr>
<tr>
<td></td>
<td></td>
<td>49,218</td>
</tr>
</tbody>
</table>

(Regenerated in October 2001)
Kerosene Catalytic Hydrodesulfurization Unit  

**KCHD (400)**

**HISTORY**

1962  Commissioned at 8,000 BPSD capacity
      Designed for mild desulfurization of kerosene

1969  Expanded to 12,000 BPSD kerosene
      Diesel specification reduced to 0.7 %wt. Began desulfurizing gas oil at 10,000 BPSD maximum in blocked operation.

1988

1997  Dense loading of reactor performed. New distributor tray installed.

**UNIT CAPACITY**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Volume/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>12,000 BPSD Kerosene:</td>
<td>79.5 m³/hr</td>
</tr>
<tr>
<td>10,000 BPSD Gas oil:</td>
<td>66.25 m³/hr</td>
</tr>
</tbody>
</table>

**CATALYST**

Liquefied Petroleum Gas Unit  

**LPG (600)**

**HISTORY**

1967  Commissioned at 2,800 BPSD capacity
      Designed for mild desulfurization of kerosene

1970  Expanded to 4,000 BPSD along with PtR

**UNIT CAPACITY**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Volume/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,000 BPSD</td>
<td>26.5 m³/hr</td>
</tr>
</tbody>
</table>

**Sulfur Recovery**

20 tons/day of sulfur produced by running 100 TBD highest sulfur crude through existing facilities to produce 0.7 wt% sulfur APD. This matches the desulfurizing capability of the existing KCHD at a 65% sulphur removal rate.

Amine Treating Unit  

**ARU(700)**

**HISTORY**

Commissioned to treat 18,500 m³/hr fuel gas containing 26 kgmoles/hr HZS.
      Specified to meet 0.4 – 5.0 %vol H2S in fuel gas (- 2 tons/day)

**UNIT CAPACITY**

18,500 M³/HR Fuel Gas
Sulfur Recovery Unit  

**HISTORY**

1995  Commissioned to recover 20 tons/day sulfur  
- Three-converter Claus plant, single train: 6.6 to 1 turn-down ratio.  
  Incinerator but no tail gas unit  
- Sulfur Recovery is 97% at SOR, 96% at EOR  
- $SO_2$ emission < 1 kg mole/hr  

**UNIT CAPACITY**

20 tons/day

Solid Sulfur Forming Unit  

**HISTORY**

1995  Commissioned to process 30 tons/day liquid sulphur solid sulfur flakes