Crude Distillation Simulation and Tutorial

A self-paced MultiMedia based Tutorial/CBT and real-time dynamic simulation of a Crude Distillation Unit (CDU).

Tutorial/CBT:

This interactive tutorial provides an Overview, Fundamental Principles, and Control and Operating Principles for an Atmospheric Crude Distillation Unit using Voice, Video, Animation and Graphics.

Overview
• Introduction
• Crude Oil
• Process Overview
• Downstream Refinery Units

CDU Process Components
• Crude Preparation
• Desalter
• Preheat Train
• Preflash Unit
• Crude Heater
• Distillation System

Operating Examples
• Change in Crude Characteristics
• Increase Kerosene Production Rate
• Decrease IBP of LGO

Key Performance and Operating Variables
• Introduction
• Product Specification
• Desalter
• Crude Heater Outlet Temperature
• Tower Pressures
• Tower Temperatures
• Pumparound Rates
• Overflash Flow
• Product Rates
• Main Tower Stripping Steam Rate
• Side Stripper Stripping Steam Rates

• Tutorial has a built-in Quiz and comes with a Learning Management System (LMS) called TutAdmin. The LMS allows an instructor to register trainees and monitor their performance and Quiz scores
• Tutorial is available as a Standalone or Web based application
• Available in English, Chinese, Danish, Dutch, French, German, Spanish and Swedish

GSE Systems
www.gses.com/EnVision
Simulation

GSE’s EnVision simulation is a real-time dynamic process simulation program used for Operator Training. It is based upon a rigorous and High-Fidelity mathematical process model to provide a realistic dynamic response of a process unit.

Simulation program is available in these variations:
- Atmospheric Crude Distillation
- Atmospheric and Mild Vacuum Crude Distillation
- Atmospheric and High Vacuum Crude Distillation

Atmospheric Crude Distillation

Major Equipment:
- Crude Desalter
- Crude Preheat Trains
- Pre-flasher
- Crude Heater
- Crude Tower
- Overhead Condenser & Cooler
- Overhead Accumulator
- Kerosene Stripper
- LGO Stripper
- HGO Stripper
- 3 Pumparounds

Key Operating Variables:
- Feed: 662 M3/H (100.0 MBPD)
- Naphtha: 122 M3/H (18.5 MBPD)
- Kerosene: 105 M3/H (15.8 MBPD)
- Light Gas Oil: 98 M3/H (14.8 MBPD)
- Heavy Gas Oil: 32 M3/H (4.8 MBPD)
- Residue: 295 M3/H (44.5 MBPD)

The Simulator allows a Trainee to Practice:
- Startup and Shutdown Operations
- Normal Operations
- Emergency Shutdown Operation
- Control Exercises
- Troubleshoot and practice recovery from Equipment, Instrument, and Control Valve Malfunctions
Atmospheric and Mild Vacuum Crude Distillation

Major Equipment:

- Crude Desalter
- Pre-flash Drum
- Crude Heater
- Atm. Tower
- Atm. Tower Overhead
- Kerosene Stripper
- LGO Stripper
- Vacuum Furnace
- Vacuum Tower
- Vacuum Overhead
- Debutanizer
- Naphtha Splitter

Key Operating Variables:

- Feed: 1000 M3/H (150 MBPD)
- LPG: 24 M3/H (3.6 MBPD)
- C5, C6: 110 M3/H (16.6 MBPD)
- Naphtha: 91 M3/H (13.7 MBPD)
- Kerosene: 157 M3/H (23.7 MBPD)
- LGO: 157 M3/H (23.7 MBPD)
- LVGO: 96 M3/H (14.5 MBPD)
- HVGO: 97 M3/H (14.6 MBPD)
- Residue: 260 M3/H (39 MBPD)
- Crude Heater Out Temp.: 340 C (645 F)
- Atm. Tower Pressure: 2.3 BAR (35.0 PSIG)
- Vac. Furnace Out Temp.: 335 C (635 F)
- Vac. Tower Pressure: 230 mBARA (6.8 INHGA)
Crude Distillation Simulation and Tutorial

Atmospheric and High Vacuum Crude Distillation

Major Equipment:

- Crude Desalter
- Pre-flash Drum
- Crude Heater
- Atm. Tower
- Atm. Tower Overhead
- Kerosene Stripper
- LGO Stripper
- HGO Stripper
- Vacuum Furnace
- Vacuum Tower
- Vacuum Overhead

Key Operating Variables:

- Feed: 676 M3/H (100 MBPD)
- Naphtha: 124 M3/H (18.5 MBPD)
- Kerosene: 106 M3/H (15.8 MBPD)
- LGO: 98 M3/H (14.8 MBPD)
- HGO: 32 M3/H (4.8 MBPD)
- LVGO: 47 M3/H (7.0 MBPD)
- HVGO: 124 M3/H (18.7 MBPD)
- Residue: 126 M3/H (19.0 MBPD)
- Crude Heater Out Temp.: 340 C (644 F)
- Atm. Tower Pressure: 0.9 BAR (13.1 PSIG)
- Vac. Furnace Out Temp.: 421 C (790 F)
- Vac. Tower Pressure: 94 mBARA (2.8 INHG ABS)

A variation of the above simulation program is also available. In the alternative program:

- The Forced Draft Atmospheric Furnace is used instead of the Balanced Draft Atmospheric Furnace.
- In the Vacuum Tower, the Vacuum System uses a Vacuum Pump for the third stage ejection instead of a Steam Ejector.

Simulation comes with a Learning Management System (LMS) called SimAdmin that allows an instructor to register trainees and monitor their performance.
Simulation is available as Standalone (Single or Dual Monitor) and Instructor-Trainee versions.