EnVision
e-Learning & Universal Simulation

Diesel Hydrotreating Unit

A self-paced MultiMedia based Tutorial/CBT and real-time dynamic simulation of an Ultra-Low Sulfur Diesel Hydrotreating Unit.

Tutorial/CBT:

This interactive tutorial provides an Overview, Fundamental Principles, and Control and Operating Principles for an Ultra-Low Sulfur Diesel / Gas-Oil Hydrotreater Unit using Voice, Video, Animation and Graphics.

Overview
- Introduction
- Importance of Hydrotreating (HDS)
- Various Hydrotreating (HDS) Processes
- Diesel-HDS Unit Overview

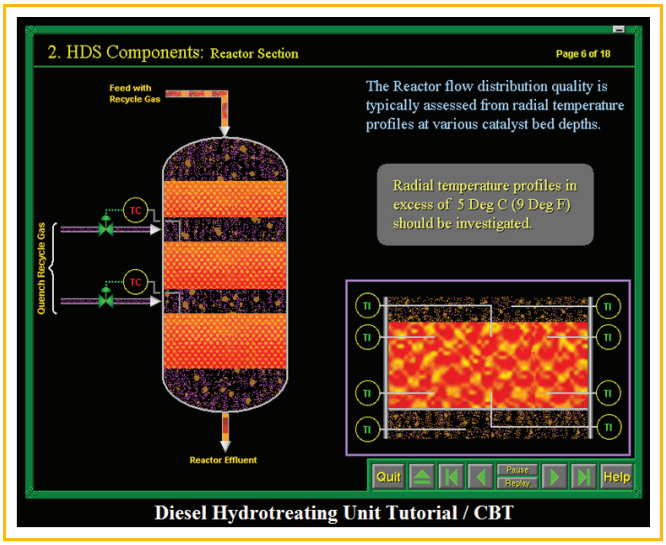
Key Process Variables
- Unit Pressure
- Reactor Temperature
- Quench Strategy
- Separator Temperatures
- Wash Water
- Treat Gas Rate and Hydrogen Purity
- Feed Vaporization
- Hydrogen Partial Pressure
- Hydrogen Consumption
- Product Stripper and Vacuum Drier

HDS Components
- Feed Preparation and Preheat Section
- Reactor Section
- Reactor Effluent Cooling and Separation Section
- Amine Absorber
- Recycle Gas Compressor
- Make-up Hydrogen
- Product Stripping Section

Principles of HDS
- Hydrotreating Reactions
- Reaction Kinetics
- Hydrotreating Catalyst
- Catalyst Deactivation and Regeneration

Startup Operation

Shutdown Operation



Safeguard System
- Introduction
- Unit Depressurization
- Reactor High Temperature Shutdown
- Reactor Feed Shutdown
- Feed Furnace Shutdown
- Recycle Gas Compressor Shutdown
- High Pressure Separator Safeguards
- Absorber Safeguards

Troubleshooting
- High Reactor Temperature
- Loss of Feed to Reactor
- Loss of Recycle Gas Compressor
- Loss of Make-up Hydrogen
- Loss of Stripping Steam
- Wet Diesel Product

- 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

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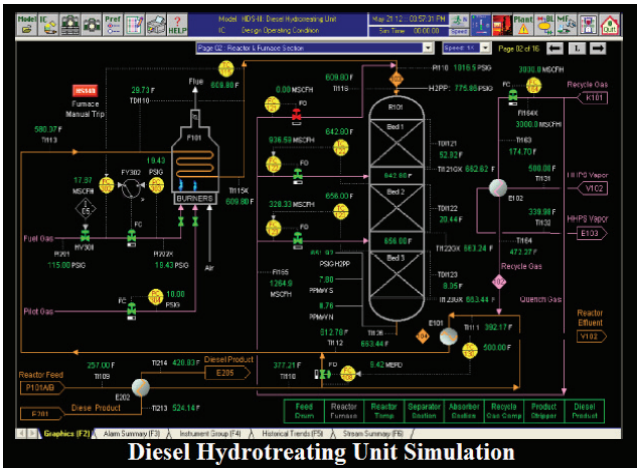
Simulation

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.

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

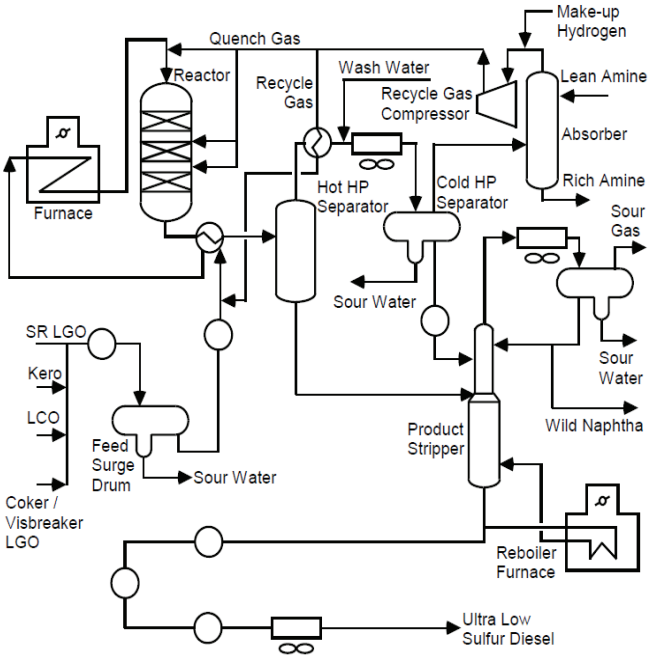

Diesel Hydrotreating Unit Simulation

Major Equipment:

- Feed Surge Drum
- Feed Furnace
- Reactor with Three Beds
- Hot & Cold High Pressure Separator
- High Pressure Amine Absorber
- Recycle Gas Compressor
- Product Stripper with Reboiler Furnace

Key Operating Variables:

• Reactor Feed Total:	331.0 M3/H	(50 MBPD)
• SR LGO:	165.5 M3/H	(25 MBPD)
• Kerosene:	66.2 M3/H	(10 MBPD)
• LCO:	66.2 M3/H	(10 MBPD)
• Coker / Visbreaker LGO:	33.1 M3/H	(5 MBPD)
• Make-up Hydrogen:	27.5 KNM3/H	(968 MSCFH)
• Diesel Product:	325.7 M3/H	(49.2 MBPD)
• Wild Naphtha:	10.2 M3/H	(1.55 MBPD)
• Off Gas Product:	4487 NM3/H	(159 MSCFH)
• Reactor Inlet Pressure:	70 BAR	(1015 PSIG)
• Reactor Inlet Temperature:	321.0 C	(609.8 F)
• Reactor WABT:	347.7 C	(658.0 F)
• Feed Sulfur:	0.92 Wt% S	
• Feed Nitrogen:	289.2 PPM N	
• Product Sulfur:	8.90 PPM S	
• Product Nitrogen:	0.87 PPM N	



- 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

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