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

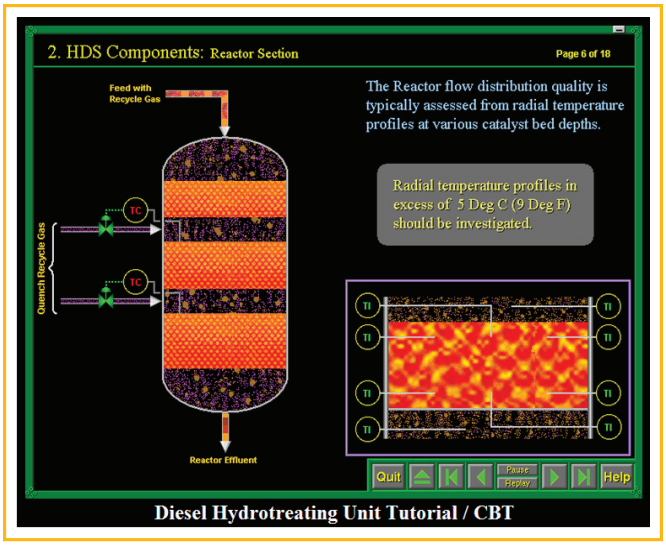
Key Process Variables
- Unit Pressure
- Reactor Temperature
- Quench Strategy
- Separator Temperatures
- Wash Water
- Treat Gas Rate and Hydrogen Purity
- Feed Vaporization
- Hydrogen Partial Pressure
- Hydrogen Consumption
- Product Stripper and Vacuum Drier

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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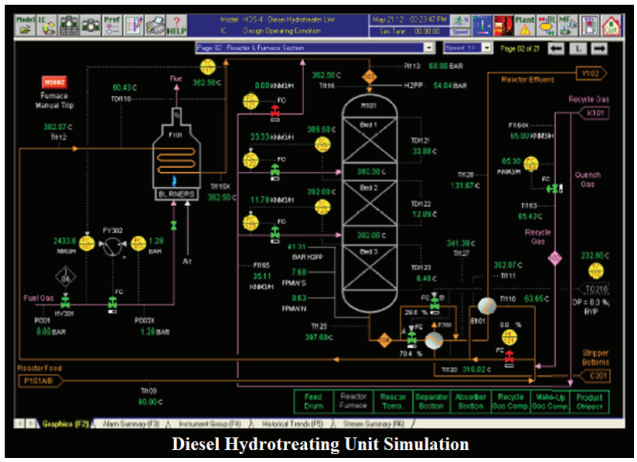
Simulation

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



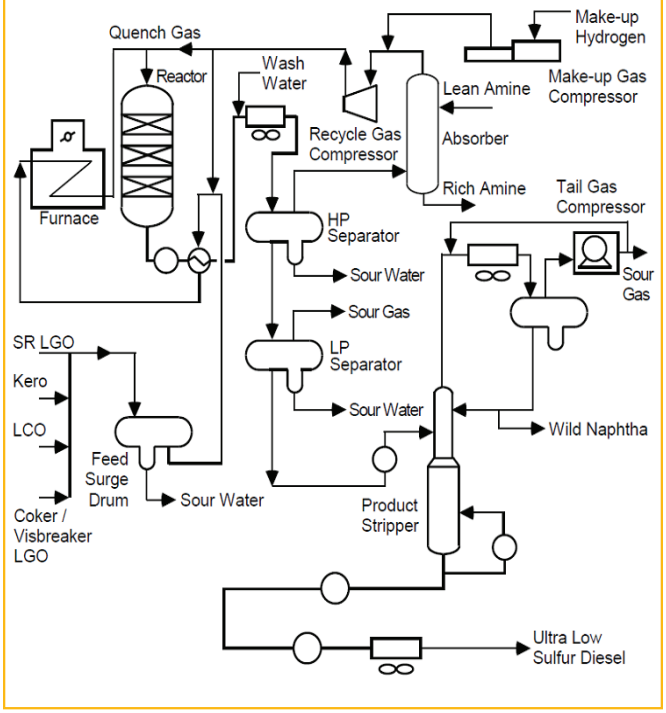
Diesel Hydrotreating Unit Simulation

Major Equipment:

- Feed Surge Drum
- Feed Furnace
- Reactor with Three Beds
- High & Low Pressure Separator
- High Pressure Amine Absorber
- Recycle Gas Compressor
- Make-Up Gas Compressor
- Product Stripper with Reboiler
- Tail Gas Compressor

Key Operating Variables:

• Reactor Feed Total:	400.0	M3/H	(60	MBPD	)
• SR LGO:	300.0	M3/H	(45	MBPD	)
• Kerosene:	40.0	M3/H	(6	MBPD	)
• LCO:	40.0	M3/H	(6	MBPD	)
• Coker / Visbreaker LGO:	20.0	M3/H	(3	MBPD	)
• Make-up Hydrogen:	31.5	KNM3/H	(1115	MSCFH	)
• Diesel Product:	393.4	M3/H	(59.4	MBPD	)
• Wild Naphtha:	10.6	M3/H	(1.6	MBPD	)
• Off Gas Product:	2934	NM3/H	(104	MSCFH	)
• Reactor Inlet Pressure:	70	BAR	(1015	PSIG	)
• Reactor Inlet Temperature:	362.5	C	(684.5	F	)
• Reactor WABT:	394.1	C	(741.5	F	)
• Feed Sulfur:	0.96	Wt% S			
• Feed Nitrogen:	207	PPM N			
• Product Sulfur:	8.4	PPM S			
• Product Nitrogen:	0.7	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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info@gses.com | www.gses.com