Petroleum Refining Processes and Economics for Technical Professionals

Introduction

The success of every company depends of each employee's understanding of the key business components. Employee training and development will unlock the companies' profitability and reliability. When people, processes and technology work together as a team developing practical solutions, companies can maximize profitability and assets in a sustainable manner. Training and development is an investment in future success - give yourself and your employees the keys to success

It is strategically important that your operations team understands the fundamentals of process unit operations concepts. This is the difference between being in the best quartile of operational ability and being in the last quartile. There is vast difference in the operational ability of operating companies and most benchmarking studies have confirmed this gap in operational abilities.

Whether you have a team of new or seasoned employees, an introduction or review of these concepts is very beneficial in closing the gap if you are not in the best quartile, or maintaining a leadership position. Most studies show that a continuous reinforcement of best practices in operational principles is the most effective way to obtain the desired results. Training and learning should be an on going continuous life long goal.

Course Objective

This course will guide the participates to develop key concepts and techniques for the refining of petroleum processes and economics. These key concepts can be utilized to make operating decisions that can improve your unit’s performance.

Many aspects of petroleum refining operations and management can be improved including, product recoveries, purities and energy utilization, and safety. This cannot be achieved without first an understanding of basic fundamental principles of design and operation. These principles need to be understood in advance of operating and trouble shooting a process unit operation for the manager or problem solving to be effective.

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This seminar focuses on the core building blocks of the refining process systems, equipment and economics. This program will emphasize refining process unit operation fundamentals, safe utilization of these fundamentals by operations and maintenance personnel, and equipment troubleshooting techniques. This program can be 3-5 days depending on the needs analysis of the participants.

Outline

Introduction

- Overview of the Chemical Processing Industry

Review of Process Incidents

- Safety for the Refining Groups

Fundamentals of Petroleum Chemistry

- Description of a Hydrocarbon Molecule
- Types of Hydrocarbon Molecules
- Definition and Function of a Catalyst

Characteristics of Crude Oil

- Sources of Crude
- Composition of Crude
- Description of Crude Oil Fractions
- Definition of Physical and Chemical Processes
- Crude Oil Testing
- Crude Assays

Crude Oil Distillation

- Description of the Distillation Process
- Cut Points of the Various Fractions
- Crude Tower Design

- Vacuum Tower Design

Introduction to Refinery Equipment

- Distillation
- Absorption
- Heat Exchange
- Reactors
- Pumps
- Compressors
- Furnaces

Introduction to the Refinery Flow Sheet

- Refinery Flow Sheet
- Gasoline Processing Options
- Bottoms Heavy Oil Processing Options
- Alkylation
- Hydrotreating
- Gas Sweeting
- Sulfur Recovery

Crude Oil Quality and Refinery Flow sheets

- Crude Oil Types for Different Refinery Configurations
- Light vs. Heavy
- Sweet vs. Sour
- Paraffinic vs. Naphthenic
- Crude Oil Selection Methods

Product Blending and Usage

- Gasoline Properties and Blending
- Distillate Fuels: Heating Oil, Diesel, Jet Fuel
- Residual Materials: Bunker Fuel
- Lube and Specialty Products

Petroleum Product Markets

- Major Petroleum Products
- Product Supply and Demand Overview
- Petroleum Products Markets

Gasoline Production Processes

- Catalytic Reforming
  - Process Chemistry and Catalyst
  - Process Variables and Economics
- Isomerization
  - Process Chemistry and Catalyst
  - Process Variables and Economics
- Fluid Catalytic Cracking
  - Process Chemistry and Catalyst
  - Process Variables and Economics
- Alkylation
  - Process Chemistry and Catalyst
  - Process Variables and Economics

Economics of Gasoline Production Processes

Fundamentals of Hydroprocessing

- Hydrotreating
  - Process Chemistry and Catalyst
  - Process Variables and Economics
- Hydrocracking
  - Process Chemistry and Catalyst
  - Process Variables and Economics

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Options for Heavy Oil Processing

- Delayed Coking
- Solvent Deasphalting
- Visbreaking
- Residual Oil Hydroprocessing
- Lube Oil Processing

Economics of Heavy Oil Production Processes

Refining Margins

- Refinery Operating Costs
- Refinery Profit Margins
- Conversion Unit Processing Costs
- Relative Value of Crude Oil versus Products
- Refining Process Capital Costs

Who Should Attend:

- People who are making day to day decisions regarding operation, design, and economics of processing plants;

    1. Operation Supervisors,
    2. Maintenance Supervisors,
    3. Senior Plant Supervisors,
    4. Operations Engineers
    5. Process Support Engineers,

- Ideal for veterans and those with only a few years of experience who want to review or broaden their understanding in Processing Plant Operations.

- Other professionals who desire a better understanding of subject matter

What you can expect to gain:

- An detailed overview of refinery operations, processes and economics
- Gain an understanding of the equipment of a refinery
- Gain an understanding of the refinery flow sheets
- Gain an understanding of refinery chemistry and catalyst
- Gain an understating of refinery margins

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