


<p style="text-align: center;"><b>KLM Technology Group</b></p> <p>Practical Engineering Guidelines for Processing Plant Solutions</p>		<p>Page 1 of 6</p> <p>Rev 1.0</p>
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## **Petroleum Refining Processes and Economics for Non 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.

## 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

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### 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 Sweetening
- 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

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#### Petroleum Product Markets

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

#### Gasoline Production Processes

- Catalytic Reforming
- Isomerization
- Fluid Catalytic Cracking
- Alkylation

#### Economics of Gasoline Production Processes

#### Fundamentals of Hydroprocessing

- Hydrotreating
- Hydrocracking

#### Economics of Hydroprocessing Production Processes

#### 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

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- Conversion Unit Processing Costs
- Relative Value of Crude Oil versus Products
- Refining Process Capital Costs

**Who Should Attend:**

- This program has been designed for non-technical professionals assigned to positions in petroleum refineries, corporate offices, suppliers and other interrelated companies.
- The content of the program is based upon the assumption that those in attendance do not have a formal education in engineering and chemistry and do not work in highly technical environments.
- Attendance at this course will be beneficial to support personnel such as
  1. Environmental professionals,
  2. Accountants,
  3. Business managers,
  4. Administrative and legal staff,
  5. Sales and marketing personnel
  6. Insurance representatives,
  7. Personnel managers,
  8. Financial professionals, and
  9. Government officials.
- The program should be used for newly-hired refinery plant personnel and may serve as a prerequisite for those who do not have a technical background but who want to attend the more detailed petroleum refining processing program for technical professionals.
- Ideal for veterans and those with only a few years of experience who want to review or broaden their understanding in Processing Plant Operations.
- People who have technical or refinery background should consider attending our alternated program - Introduction to Petroleum Refining Processes and Economics

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- Other professionals who desire a better understanding of subject matter

What you can expect to gain:

- An overview of refinery operations, safety, processes and economics
- Become familiar with the equipment of a refinery
- Become familiar with the refinery flow sheets
- Become familiar with refinery margins and economics

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