Training Title

NATURAL GAS PROCESSING, GAS SWEETENING & SULPHUR RECOVERY

Training Duration

5 days

Training Venue and Dates

| Natural Gas Processing, Gas Sweetening & Sulphur Recovery | 20 – 24 Oct | $3,750 | Dubai, UAE |

In any of the 5 star hotels. The exact venue will be intimated once finalized.

Training Fees

- 3,750 US$ per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch

WHO SHOULD ATTEND

This course is designed for project managers, plant managers, plant supervisors, technical staff, and contractor personnel involved in project planning, process selection and operation of Natural Gas Production. The greatest benefit arises from considering all the processes that will accomplish your process requirements to determine which one is the best for your particular application from a capital cost and operating cost perspective. You will also be able to see which processes are available to you to de-bottleneck or modify existing processes. The practical techniques and examples provide useful insights that are valuable at any stage of project execution and operation.

COURSE OBJECTIVES

The Gas and Liquid Contracts that exist (or are being negotiated) will determine the objectives of the processes that you will have to incorporate into any new facility and how you have to operate any existing facility. There exists a variety of processes that will condition your Natural Gas and Hydrocarbon Liquids to satisfy the Contract requirements. The objective of this course is to make you aware of the options available to you so that you can evaluate all the processes that will satisfy your objective to determine which particular process is the best from a capital cost and operating cost perspective.

COURSE DESCRIPTION

Upon completion of this course, you will gain knowledge of the processes available to process your Natural Gas and Hydrocarbon Liquid Products.

COURSE OUTLINE

Gas & Liquid Process Selection
Contract Terms
Basic Consideration

Gas Contracts
✦ Quantity
✦ Quality
  o Heating Value
  o Sulphur Content
  o Maximum Temperature
  o Water Content (H$_2$O Dewpoint)
  o Hydrocarbon Dewpoint (HCDP)
  o Other (N$_2$, He, Ar, CO$_2$, Hg, O$_2$)

Liquid Contracts
✦ Commercial Ethane
✦ Commercial Propane
✦ Commercial Butane
✦ Butane-Propane Mixes (LPG)
✦ Propane HD-5
✦ Natural Gasoline

Overall Production System
Solution Gas
Associated Gas
Non-Associated Gas

Gas Processing Module
Gas Conditioning Module
✦ H$_2$O Removal (Dehydration)
✦ H$_2$S & CO$_2$ Removal (Gas Sweetening)
✦ Nitrogen Removal
✦ Mercury Removal
✦ Oxygen Removal

NGL Extraction Module
✦ Products
✦ Absorption (Lean Oil)
✦ Adsorption (HRU)
✦ Condensation
  o Mechanical Refrigeration
  o Mixed Refrigerants
  o Turbo Expander
  o Twister
  o JT Refrigeration
• Stabilization Module
• Product Treating Module

Characterization of Natural Gas & it’s Products
Physical Properties of Pure Components
Ideal Gas Laws
- Boyle’s Law
- Charles’ Law
- Avogadro’s Principle
- Dalton’s Law
- Combined Ideal Gas Law

Physical Properties of Mixtures
Equations of State
- Van der Waals
- Redlich-Kwong (RK)
- Soave Redlich-Kwong (SRK)
- Peng Robinson (PR)
- Benedict-Webb-Rubin-Starling (BWRS)

Thermodynamic Properties
- Entropy
- Enthalpy

Equilibrium Ratio (K Value)

Separation
Types of Separators
- Horizontal
- Vertical
- Spherical
- Centrifugal
- Cyclone
  - Reverse Flow
  - Axial Flow
  - Recycling
- Filter
- Liquid Coalescer

Water Vapour Removal (H₂O Dewpoint Control)

Water Content
- HC Liquids
- Natural Gas
- Effect of H₂S & CO₂

Hydrate Formation Temperature
- Effect of Propane
- Effect of H₂S & CO₂

CaCl₂ Dehydrators
MeOH Injection
EG Injection
IFPEX-1
TEG Dehydration
Solid Desiccant Dehydration
HCDP Control
Adsorption (HRU’s)
  ✷ 2 TOC
  ✷ 2 TCC
  ✷ 3 TOC
  ✷ 3 TCC
  ✷ 3 TOC w/TGC
  ✷ 3 TCC w/TGC
  ✷ Purge Cycle
JT Refrigeration
  ✷ LTX
  ✷ LTS
Mechanical Refrigeration
  ✷ Variations
Twister
Refrigeration Compressors
  ✷ Compression Cycle
  ✷ Single Stage
  ✷ Single Stage w/Economizer
  ✷ Two Stage
  ✷ Types
  ✷ Drivers
Gas Sweetening
Terminology
Safety Precautions
Types of Contaminants
Process Selection
Chemical Reaction Processes
  ✷ Amines
    o Chemistry
    o Typical PFD
    o General Considerations
    o Amines Used (MEA, DEA, DGA, MDEA, TEA, DIPA, Formulated Solvents)
    o Control Variable
  ✷ Caustic Wash
    o Chemistry
NGL Extraction
Low Temperature Mechanical Refrigeration
JT Refrigeration
Refrigerated JT Expansion
Adsorption (Lean Oil)
Turbo Expander
- Typical PFD
- Solid CO₂ Formation
- Solid Desiccant Dehydrator
- Inlet Compression
- Gas/Gas Exchangers
- Expander
- Re-Compressor
- De-Methanizer

Gas to Liquids

Sulphur Recovery

Claus Plan

Modified Claus Plants
- Typical PFD – 3 Stage
- Process Considerations
- Mechanical Considerations
- Instrumentation

Tail Gas Clean-up
- Incineration
- Super Claus 99
- Super Claus 99.5
- SCOT

Liquid Redox

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