

**Training Title**

**REFINERY SRU, TAIL GAS TREATING, SOUR WATER, AMINE RECOVERY UNITS**

**Training Duration**

**5 days**

**Training Venue and Dates**

RT293	REFINERY SRU, TAIL GAS TREATING, SOUR WATER, AMINE RECOVERY UNITS	5	17 – 21 January, 2021	\$4,500	Dubai, UAE
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**In any of the 5 star hotels. The exact venue will be informed once finalized.**

**Training Fees**

- **US\$4,500 per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch.**

**Training Certificate**

**Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.**

**TRAINING DESCRIPTION**

This intensive course emphasizes process selection, practical operating issues, technical fundamentals, and integration of the Sulphur recovery block units into the overall scheme of a refinery. The key elements associated with the design, operation and control of refinery Sulphur recovery unit (SRU), tail gas treating unit (TGTU) , amine regeneration unit (ARU) and sour water stripping unit (SWS) will be thoroughly covered in this course.

**The course includes practical worked examples and case studies to reinforce the key learning.**

**TRAINING OBJECTIVES**

**Upon completion of this course, participants will learn:**

- The key elements associated with the design, operation and control of refinery sulfur recovery, tail gas treating , amine regeneration and sour water stripping units.
- The impact of feed quality, catalyst, operating conditions and unit design on the unit performance.
- How to optimize, debottleneck and troubleshoot the sulfur block units.
- The technical information on the operations and safety aspects of all units associated with sulfur recovery processes, and also to present how the operation can be optimized.
- The chemistry, technologies and environmental issues associated with the SRU facilities.

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- The composition of typical refinery sour gas and acid gas feeds and their characterization.
- The different types of amines: advantages and disadvantages
- How to select an amine from the various types available and calculate amine circulation rates required.
- How to select a sour water processing scheme.
- How to select sulfur recovery unit configuration.
- About the economics of tail gas treatment plant selection to meet legislation.
- Individual processes, engineering, materials, and construction challenges.
- How to handle the operation of units, interaction and challenges encountered.
- How to maximize reliability

### **WHO SHOULD ATTEND?**

The course will be highly valuable to all engineers and operation personnel involved in the operation and design of refinery Sulphur Recovery, TGTU, Amine Regeneration Unit and sour water stripping unit.

### **TRAINING METHODOLOGY:**

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

Very useful Course Materials will be given.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work& Practical Exercises
- 20% Videos& General Discussions

### **DAILY OUTLINE**

#### **DAY-1**

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#### **Course Introduction and Pre-Test**

#### **Sulphur Recovery and TGTU Fundamentals**

- Process Technology, block flow diagram, design basis, feed properties, battery limit conditions, product specification, Tail Gas Treatment

#### **Chemistry of Sulphur Recovery and TGTU**

- General main reactions of the process
- Reactions in the muffle furnace
- Hydrocarbons contained in the acid gas feed
- Effective little air on oxidation of hydrocarbons

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- Side reactions of carbon dioxide present in the Scot recycle gas

### **Equipment & Flow Description**

- Acid gas knock out drum
- Sour water stripper
- Claus air compressor
- Claus furnace design and controls
- Waste heat boilers
- Catalytic Converters
- Condensers, Reheaters
- Sulfur coalescer
- Tail Gas Clean-up (SCOT and Superclaus)
- Incinerator and its principal and control
- Sulphur liquid handling
- SRU steam generations and utility system
- Case Study
- Q&A Session for Day 1 Topics

### **DAY-2**

#### **SRU Process Variables & Process Control**

- Combustion air
- Air compressor anti-surge flow control
- Acid gas to furnace
- Muffle furnace temperature control
- Waste heat boiler
- Catalytic reactors temperatures control
- Condensers
- Hot gas by-pass & steam reheaters
- The heaters control
- Acid gas flares

#### **SRU Reactor and TGTU Reactor Catalysts and its Process Parameter**

- Catalyst description & regeneration
- Reversible catalyst deactivation
- Irreversible of catalyst deactivation
- Minimization of catalyst deactivation
- Case Study: Claus Process and TGTU Considerations and Modifications
- Q&A Session for Day 2 Topics

### **DAY-3**

#### **SRU Problems & Troubleshooting**

- Reactor Problems

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- Leaks of steam
- Plugged seal legs
- Pyrophoric iron
- Carryover of solvent
- Increased pressure drop
- Checklists
  - o Measuring conversion
  - o Finding last conversion
- Maximizing plant capacity
- Sulphur leg and degassing pit design, process, reactions and principle
- Safety Hazard

**Sulphur Recovery and TGTU Start Up, Shutdown and Normal Operations:  
Initial Start-up Procedures**

- Precautions
- Catalyst Loading
- Prevention of Explosions
- Prevention of sulfur fires
- Prevention of sulfur solidification
- Prevention of corrosion
- Prevention of catalyst fouling
- Prevention of refractory damage
- Initial refractory dry out
- Subsequent Startups
- Shutdowns
- Class Work Exercise - Sulphur recovery stages, efficiency and calculations
- Q&A Session for Day 3 Topics

**DAY-4**

**Amine Regeneration Unit (ARU)**

- Process principles and description
- Design considerations (lean / rich feed characteristic)
- Chemistry and type of amines
- Regenerator and other Equipment's review and design considerations
- Filtrations, activated carbon
- Feed sources and in present network
- Unit monitoring, major process parameter and its significances
- Process control loops principles
- Troubleshooting, impurities, limits foaming , corrosion , amine losses

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- Degreasing and other special procedures
- Chemicals
- Start up, shutdown and normal operations
- Case Study: ARU troubleshooting case studies
- Q&A Session for Day 4 Topics

## **DAY-5**

### **Sour Water Stripping Unit (SWS)**

- Process principles and description
- Design considerations
- Unit monitoring, major process parameter and its significances
- Process control loops principles
- Troubleshooting
- Start up, shutdown and normal operations
- Case Study: "Easier startups improve sulfur plant reliability"
- Q&A Session for Day 5 Topics
- Final test and course closing

#### **NOTE:**

**Pre & Post Tests will be conducted**

**Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.**

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