Advanced Gas Processing, Sweetening, and Sulfur Recovery Training Course

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Sharm El-Sheikh

4100 € (Per Person)

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Course Introduction / Overview:

This comprehensive training course provides an in-depth exploration of the critical processes involved in natural gas treatment, from initial processing to final sulfur recovery. In an industry driven by stringent product specifications and environmental regulations, mastering these integrated operations is paramount for efficiency, safety, and profitability. The curriculum delves into the fundamental principles and advanced applications of gas sweetening, dehydration, NGL recovery, and sulfur recovery technologies. Participants will gain a holistic understanding of the entire gas treatment train, focusing on the intricate relationship between amine treating units and the downstream Claus and tail gas treatment units. Referencing foundational knowledge from texts like "Gas Purification" by Arthur L. Kohl and Richard B. Nielsen, the course bridges theory with real-world application. BIG BEN Training Center has designed this program to equip professionals with the practical skills needed to optimize plant performance, troubleshoot operational challenges, and ensure compliance with environmental standards, making it an essential development opportunity for anyone involved in gas processing operations.

Target Audience / This training course is suitable for:

- Process Engineers.
- Chemical Engineers.
- Plant and Operations Managers.
- Facility Engineers.
- Production Engineers.
- Senior Plant Operators.
- Maintenance Supervisors.
- Technical and Project Managers.
- HSE Professionals and Environmental Engineers.
- Engineers from consulting and EPC companies.

Target Sectors and Industries:

- Oil and Gas Production (Upstream and Midstream).
- Petroleum Refining.
- Petrochemical and Chemical Processing.
- Natural Gas Treatment Plants.
- Engineering, Procurement, and Construction (EPC) Companies.
- Governmental bodies and environmental regulatory agencies.
- Consulting firms specializing in energy and process engineering.

Target Organizations Departments:

- Operations and Production.
- Process Engineering and Technical Services.
- Project Management and Engineering.
- Maintenance and Reliability.
- Health, Safety, and Environment (HSE).
- Asset Management and Integrity.
- Research and Development.

Course Offerings:

By the end of this course, the participants will have able to:

- Analyze the composition of natural gas and its impact on processing requirements.
- Select the most appropriate gas sweetening process based on feed gas conditions.
- Master the principles of amine treating for acid gas removal (H_2S and CO_2).
- Troubleshoot common operational problems in amine units like foaming and corrosion.
- Evaluate different gas dehydration and hydrocarbon dew point control technologies.
- Understand the fundamentals of NGL recovery processes, including cryogenic methods.
- Explain the chemistry and thermodynamics of the Claus process for sulfur recovery.
- Optimize the performance and efficiency of a Sulfur Recovery Unit (SRU).
- Assess various tail gas treatment technologies for enhanced sulfur recovery.
- Ensure process safety and environmental compliance in gas processing facilities.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to foster a dynamic and interactive learning environment that goes beyond traditional lectures. This course heavily emphasizes a participatory approach, blending expert-led instruction with practical, hands-on learning experiences. Participants will engage in detailed case studies based on real-world operational challenges in gas sweetening and sulfur recovery units, allowing them to apply theoretical knowledge to solve complex problems. Interactive sessions, group discussions, and collaborative workshops will encourage the sharing of experiences and best practices among peers. The curriculum incorporates the analysis of Process Flow Diagrams (PFDs) and Piping and Instrumentation Diagrams (P&IDs) to build practical skills in process interpretation and troubleshooting. Through a combination of video materials, practical exercises, and continuous feedback sessions, the program ensures that participants not only grasp the core concepts but also develop the confidence to implement them effectively in their own operational contexts, ensuring a lasting impact on their professional capabilities.

Course Agenda (Course Units):

Unit One: Fundamentals of Natural Gas Processing

- Introduction to the natural gas industry and value chain.
- Composition of raw natural gas and classification of contaminants.
- Properties of hydrocarbons and phase behavior.
- Gas specifications for sales, pipeline transport, and LNG.
- Overview of a typical gas processing plant configuration.
- Principles of gas conditioning and treatment objectives.
- Process safety management in gas plant operations.

Unit Two: Gas Sweetening and Acid Gas Removal

- The necessity of removing acid gases (H_2S, CO_2).
- Overview of gas sweetening processes.
- Detailed study of amine treating processes (MEA, DEA, MDEA).
- Process flow description of a typical amine unit.
- Key design parameters and solvent selection criteria.
- Operational issues: foaming, corrosion, and heat stable salts.
- Troubleshooting and optimizing amine sweetening units.

Unit Three: Gas Dehydration and NGL Recovery

- Water content in natural gas and hydrate formation.
- Glycol dehydration principles and TEG unit operation.
- Solid desiccant dehydration using molecular sieves.
- Hydrocarbon dew point control requirements.
- Principles of Natural Gas Liquids (NGL) recovery.
- Refrigeration systems and Joule-Thomson (JT) expansion.
- Introduction to cryogenic turbo-expander processes.

Unit Four: Sulfur Recovery Unit (SRU) Operations

- Introduction to sulfur recovery and environmental drivers.
- The chemistry and thermodynamics of the Claus process.
- Process description of a straight-through Claus unit.
- Key equipment: reaction furnace, waste heat boiler, condensers, and catalytic converters.
- Critical operating parameters and process control.
- Common operational problems and troubleshooting techniques.
- Sulfur storage, handling, and loading safety.

Unit Five: Tail Gas Treatment and Process Integration

- Sulfur recovery efficiency and emission regulations.
- Overview of tail gas treatment unit (TGTU) technologies.
- In-depth look at the SCOT process and other amine-based TGTUs.
- Acid gas enrichment and selective oxidation processes.
- Integration of sweetening, SRU, and TGTU for plant-wide optimization.
- Emerging technologies in gas processing and sulfur management.
- Final review, Q&A, and course wrap-up.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

Considering the increasing global focus on decarbonization, how might the integration of carbon capture technologies fundamentally reshape the design and economics of future gas sweetening and sulfur recovery units?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by providing a deeply integrated, holistic perspective on the entire gas treatment train, rather than addressing each unit in isolation. While many programs focus separately on either gas sweetening or sulfur recovery, this curriculum emphasizes the critical operational relationship between the amine unit, the Claus plant, and the tail gas treatment unit. It moves beyond pure theory to concentrate on the practical realities of plant operation, dedicating significant time to troubleshooting common and complex issues such as amine foaming, SRU catalyst deactivation, and process bottlenecks. The content is structured to build a comprehensive understanding of how decisions made in an upstream unit directly impact downstream performance and overall plant efficiency and compliance. By focusing on operational excellence, process optimization, and real-world case studies, the course equips participants with a cohesive skill set that is immediately applicable for enhancing safety, reliability, and profitability in their facilities.