Training Title

GAS DEHYDRATION & BOOSTER STATION UTILITIES RESPONSIBILIT

Training Duration

5 days

Training Venue and Dates

REF PE038	Gas Dehydration & Booster Station Utilities	5	07 – 11 July 2025	$6,500	Milan, Italy

In any of the 4 or 5-star hotels. The exact venue will be informed of soon.

Training Fees

- **$6,500 per participant for Public Training. Fees Includes Course Materials/ Handouts, Tea/Coffee, refreshments, Lunch.**

Training Certificate

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

TRAINING DESCRIPTION

Throughout this course, sessions will provide opportunities for the trainees to get familiar with the fundamentals and practical aspects of natural gas processing. Further, the course will acquaint the trainees intensely with the most recent technologies applied in the field of condensate recovery & fractionation through delivering real-life case studies to achieve marketable products that meet desired product specifications.

Emphasis is placed on offering plant operating personnel an improved understanding of the condensate recovery & fractionation techniques and equipment used. Typical equipment and facilities that are found in typical natural gas processing operations will also be discussed including compressors, vessels, and relief, flare and safety systems. This improved understanding of plant process operations and effective process plant surveillance techniques will lead to an increased ability to achieve optimum, economical operating performance.

TRAINING OBJECTIVES AND BENEFITS:

By the end of the training course, the participants should be able to:

- **Demonstrate knowledge and understanding of the principles of natural gas industry.**
- **Select and implement the most adequate techniques for condensate recovery & fractionation.**

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- **Relate the gained knowledge in the area of natural gas utilization to real-life cases.**
- **Apply troubleshooting to technical difficulties encountered in the field of specialization.**

WHO SHOULD ATTEND

The program is ideal for personnel involved in gas plant process operations, troubleshooting, process engineering, and technical services as well as others providing services to the gas industry, should also find this program beneficial.

TRAINING METHODOLOGY:

A highly interactive combination of lecture and discussion sessions will be managed to maximize the amount and quality of information, knowledge and experience transfer. The sessions will start by raising the most relevant questions and motivate everybody to find the right answers. The attendants will also be encouraged to raise more of their own questions and to share developing the right answers using their own analysis and experience.
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

Natural gas fundamentals

- **Introduction**
- **Natural gas history**
- **Natural gas origin and composition**
- **Gas sources**
- **Natural gas phase behavior & properties**
- **Quality and transportation**

Basic concepts of natural gas processing

- **Introduction**
- **Process modules**
- **Scope of natural gas processing**

- Processing objectives
- Effect of gas type in field processing

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- Location of the gas field

DAY-2

End uses and markets for natural gas.

- **Environmental advantages**
- **Physical behavior of natural gas systems**
- **Physical and thermal properties**
- **Phase behavior analysis**
- **Pure substances**
- **The phase rule**
- **Behavior of mixtures**
- **Vaporization by gas pressure**
- **Molecular theory of gases and liquids**
- **Natural gases**
- **Density of natural gas**
- **Density of liquids**
- **Dense phase**
- **Surface tension**
- **Viscosity**
- **Thermal conductivity of gases**
- **Thermodynamic properties**
- **Sampling and analysis**

DAY-3

- **Natural gas processing plant**
- **Flow sheet**
- **Equipment and components**
- **Heat exchange in gas processing**
- **Heat transfer theory**
- **Mechanisms of heat transfer**
- **Process heat duty**
- **Heat exchangers types**
- **Shell and tube**
- **Double-pipe**
- **Plate and frame**
- **Aerial coolers**
- **Fired heaters**
- **Heat recovery units**

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Natural gas liquids recovery

- **Introduction**
- **NGL recovery processes**
- **Refrigeration processes**
- **Lean oil absorption**
- **Solid bed absorption**
- **Membrane separation process**
- **Selection of NGL recovery processes**
- **basic gas laws; characterization of the flow stream.**

DAY 4

FUNDAMENTAL OF gas reservoirs.

- **Phase diagrams (Low/High Shrinkage, Retrograde Condensate,**
- **Wet/Dry Gas); Vapor-Liquid equilibrium; qualitative phase behavior; flash Calculations/Bubble Point/Dew Point; basic thermodynamic concepts.**
- **and characterization of natural gas and its components.**
- **Gas-Liquid Separation – Factor affecting separation; separator and scrubber technology (design and application); and maintenance and troubleshooting considerations.**

- **Absorption and Adsorption Processes –**
- **Mass transfer fundamentals; absorption process; adsorption process; and system considerations. Acid Gas Removal – overview of the process; effects of acid gas; sweetening processes (absorption, adsorption, direct conversion, distillation and membranes); process selection; acid gas components (H2S and CO2); process selection and design procedure ; and typical operating problems and troubleshooting**

- **Gas Dehydration and Hydrate Formation Inhibition –**
- **Process classification; dehydration theory and principles; moisture content of a saturated gas; calculation of moisture content of different gas compositions; consequences of hydrate formation; prediction of hydrate apparition; hydrate formation inhibitions (injection of inhibitors, molecular sieve adsorption); comparison inhibitors vs. desiccants; key operating parameters for and optimum operation; and most common operational problems and possible solutions.**

- **Gas Conditioning – Removes contaminants at inlet of plant; water removal processes (absorption, adsorption, condensation, and membranes) H2S and CO2 removal processes (chemical Absorption, physical absorption, solid bed, direct conversion, membranes, and extractive distillation); nitrogen removal (cryogenic fractionation) and mercury removal.**

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DAY 5

- **Gas Processing – Purpose of condition gas for sales and/or extract and recover NGL' s; hydrocarbon Dew-point Control (adsorption, Hydrocarbon Recovery Units (HRU' s), and Short-Cycle Units); absorption/lean oil process; Vapor Compression System; Natural Gas Liquid (NGL) Extraction; NGL products concerns of economic justification; NGL products concerns of extraction processes (absorption/Lean Oil Process, adsorption, condensation, mechanical refrigeration, Turbo-Expanders, and Valve Expanders (LTX, LTS, J-T (Joule Thompson))); Condensate Stabilization (refluxed distillation and non-refluxed distillation); product treatment (contaminants of interest (CO_2 , Sulfur, water and removal of CO_2 from NGL product and Sulfur compounds from LPG products.**

- **Natural Gas Liquids (NGL) extraction – Gas liquefaction objectives and method; NGL Process Flow Diagram (PFD); heat transfer and exchanger (heat and enthalpy concept and phase change and P-H diagram); external refrigeration loop; calculation of cryogenic loop used for hydrocarbon liquids extraction from natural gas; Joule-Thompson (JT) expansion; turbo expander; and optimization of the process performances.**
- **Design considerations**
- **Operational problems**
- **Equipment used in gas plant operations.**

Trouble shootings

- **Case Studies Discussions**

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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