COURSE OVERVIEW PE0300
Natural Gas Processing & Conditioning

Course Title
Natural Gas Processing & Conditioning

Course Date/Venue
February 23-27, 2025/Meeting Plus 6, City Centre Rotana, Doha, Qatar

Course Reference
PE0300

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a complete and up-to-date overview of gas conditioning and processing technology. It covers product specifications and the processes available to condition the gas in order to meet these requirements. Participants will understand the nature and purpose of key gas processing operations, and how the individual operations are integrated into plants to process diverse feed streams received from gas fields around the world.

This course will provide participants with a working knowledge of the major processes for Dehydration, Acid Gas Removal (Gas Sweetening), Hydrocarbon Dewpoint Control (HCDP Control), LPG Production, NGL Recovery and Separation (Fractionation), Sulphur Recovery and Tail Gas Clean-up. Participants will also learn the basic vocabulary unique to the industry and the key physical and chemical properties of natural gas constituents.

This course will also cover the important considerations of the design and selection of key process equipment including Separators.

Basic properties of hydrocarbon gases and the behaviour of water-hydrocarbon systems will be discussed. Participants will learn how to calculate system energy changes. This course will discuss the design and operational aspects of process control systems, separation equipment, absorption and fractionation facilities. Further, the methods used for dehydrating natural gas will be covered within the duration of this important course.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on natural gas conditioning, treatment and processing
- Identify the various types of separators and their sizing and become acquainted with slug catcher and twister supersonic separator
- Recognize the role & importance of water content & dew point applied in gas conditioning & processing technology
- Enumerate the formation, prediction and inhibition of hydrates and discuss the process of liquid desiccant dehydration
- Determine the operating variables of gas conditioning & processing technology and recognize enhanced glycol concentration and solid desiccant
- Analyze the process of hydrocarbon recovery (NGL) and discuss mechanical refrigeration
- Emphasize the thermodynamics of gas and employ the removal of acid gases such as H_2S, CO_2, CS_2, COS & RSH
- Discuss the pH diagram of propane and develop an understanding on liquid ethane recovery
- Review & improve the amine process, corrosion, process control, physical, combined & sulfinol processes
- Carryout the operation & control of natural gases as well as the sulphur recovery
- Describe the chemical reaction of natural gases and gain in-depth knowledge on claus process variations and claus combustion operation
- Identify the re-heating options and the mechanical considerations of natural gases
- Employ catalyst converter operation and distinguish the tail gas clean up options

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of gas conditioning, treatment & processing technology for those who are directly involved in supervising gas processing operations; managers and engineers involved in the planning and development of new gas processing facilities or modifying existing facilities; those who are involved in the negotiation of contracts for the sale of Natural Gas, LPG and NGL Products; and newly employed engineers and other technical staff in the oil and gas processing industry will find the course particularly relevant. Those employed in the activities that support the gas processing industry will also receive considerable benefit from the broad overview.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Fee

US$ 6,000 per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations:-

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. Hany Ghazal is a **Senior Process Engineer** with over **30 years** of experience within the **Oil & Gas**, **Hydrocarbon** and **Petrochemical** industries. His expertise widely covers in the areas of **Production** Operations, International Standards for Operation Supervision, Management of Change, **CPF Turnaround** Management, **CPF Equipment**, **Production & Test Separators**, **Dehydrators & Desalters**, **Heaters**, **Pumps**, **Compressors**, **Tanks**, **Valves**, Shut Down & Start Up Procedure & Stabilizer (Gas Boot) for Production Operation, **Relief & Flare System**, **Gas Processing**, **NGL & LPG**, **Mothballing & De-Mothballing** of Production Facilities, **Desalination & Mixed Bed**, **Absorption & Stripping Columns** Operation, **Mass** Transfer, **Gas** Absorption, **Tray Column & Packed Column Absorbers**, **Acid Gas** Removal Operation & Troubleshooting, **Ion Exchange**, **Demineralization**, **Resin** Testing, **Deaeration**, **Process Plant** Operations, **Process Plant** Troubleshooting & Engineering Problem Solving, **Wellheads & Christmas Trees**, Fields Services Facilities for Production Operation, **Surface Production** Facilities, **Pigging & Smart Pigging**, **Gas Wells** Production, **Reservoir** Management, **Emergency Shutdown** Philosophy, **Heating Medium** System, Personal Protection Equipment (**PPE**), **Fire Fighting**, **Fire & Gas Detection** System, **Permit to Work System**, **Emergency Response**, **Occupational Health**, Process Safety Integrity Management System (**PSIM**), **Natural Gas Processing**, **Crude Oil & Gas Export Specs**, **HAZOP** Analysis, Emergency Response Team Leader (**ERTL**), **Emergency Response**, Advanced **Safety Auditing**, **HAZOP**, **Process Measurement & Flow Metering**, **Process Control**, **Control Valves**, **API 510** Pressurized Vessel Inspection & Repair, **API 571** Deterioration Mechanism, **API 580** Risk-Based Inspection, **Corrosion** Monitoring & Corrosion Mitigation, **Infrastructure Integrity** Assurance, **Chemical Injection** in Water Treatment Plant, **Deaerator**, Fundamentals of **Water Treatment Plant** Operation, **Water Injection** and **Commercial** Awareness.

During his career life, Mr. Ghazal has gained his practical and field experience through his various significant positions and dedication as the **Training Instructor & Consultant, Chairman & Managing Director**, **Operation General Manager & Board Member**, **Field Operation General & Manager**, **Facilities Assistance General Manager**, **Environment & Corrosion Department Head** and **Operations Engineer** (Water Injection Plants) for Cairo University and Britch University, Joint ventures companies in the Egyptian oil & Gas sector, Natural gas production Company in The Egyptian Oil & Gas Sector Established and Ras Shukeir Oil Fields (GUPCO).

Mr. Hany has a **Bachelor's** degree of **Chemical Engineering**. Further, he is a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, workshops, conferences and seminars internationally.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Sunday, 23rd of February 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Introduction to Natural Gas Processing***
0900 – 0930	***Contract Terms*** *Gas Contracts • Liquid Contracts*
0930 – 0945	*Break*
0945 – 1045	***Separators*** *Types of Separators*
1045 – 1115	***Separator Sizing***
1115 – 1230	***Slug Catcher***
1230 – 1245	*Break*
1245 – 1320	***Twister Super Sonic Separator***
1320 – 1420	***Case Study***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: ***Monday, 24th of February 2025***

0730 – 0830	***Water Content & Dew Point*** *Sweet/Sour Gas • Calculation Charts*
0830 – 0930	***Hydrates*** *Formation, Prediction and Inhibition • Examples*
0930 – 0945	*Break*
0945 – 1045	***Liquid Desiccant Dehydration*** *TEG Process*
1045 – 1115	***Operating Variables***
1115 – 1230	***Enhanced Glycol Concentration***
1230 – 1245	*Break*
1245 – 1320	***Solid Desiccant***
1320 – 1420	***Case Study***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: ***Tuesday, 25th of February 2025***

0730 – 0900	***Hydrocarbon Recovery (NGL)*** *Solid Desiccant Short Cycle Units (HRU's) • Joule-Thompson (JT) Plants • Mechanical Refrigeration Plants*
0900 – 0930	***Mechanical Refrigeration***
0930 – 0945	*Break*
0945 – 1045	***Thermodynamics of Gas***
1045 – 1230	***Removal of Acid Gases (H_2S, CO_2, CS_2, COS & RSH)*** *Batch Processes • Amines • Physical Solvents*
1230 – 1245	*Break*

1245 – 1345	***pH Diagram of Propane***
1345 – 1420	***Case Study***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4: ***Wednesday, 26th of February 2025***

0730 – 0800	***Liquid Ethane Recovery***
0800 – 0900	***Gas Sweetening*** *Introduction • Batch Process • Mercury Removal*
0900 – 0930	***Amine Process***
0930 – 0945	*Break*
0945 – 1015	***Corrosion***
1015 – 1045	***Process Control***
1045 – 1115	***Physical Process***
1115 – 1230	***Combined Process***
1230 – 1245	*Break*
1245 – 1315	***Sulfinol Process***
1315 – 1345	***Operation & Control***
1345 – 1420	***Case Study***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5: ***Thursday, 27th of February 2025***

0730 – 0830	***Sulphur Recovery*** *Modified Claus Plants & Tail Gas Clean-up*
0830 – 0930	***Chemical Reaction***
0930 – 0945	*Break*
0945 – 1015	***Straight through Operation***
1015 - 1045	***Claus Process Variations***
1045 - 1115	***Claus Combustion Operation***
1115 - 1145	***Re-heating Options***
1145 - 1230	***Mechanical Considerations***
1230 - 1245	*Break*
1245 - 1315	***Catalyst Converter Operation***
1315 - 1345	***Tail Gas Clean Up Options***
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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