



## **COURSE OVERVIEW PE1063** **DCU Process Optimization & Troubleshooting**

### **Course Title**

DCU Process Optimization & Troubleshooting

### **Course Date/Venue**

September 20-24, 2026/Meeting Room A, Centro  
Corniche Al Khobar by Rotana, Al Khobar, KSA

### **Course Reference**

PE1063

### **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 detailed and up-to-date overview of Delayed Coker Unit (DCU) Troubleshooting. It covers the process flow and major equipment, key process parameters and safety and environmental consideration; the feedstock impact on unit performance and heater, furnace, fractionator and troubleshooting; the pump and compressor issues covering cavitation and vibration, mechanical seal failures, NPSH and suction/discharge problems; the overheating and lubrication failures; and faulty level/pressure/temperature readings, alarm and trip calibration control loop tuning issues and instrument impulse line blockages.

Further, the course will also discuss the coking drum troubleshooting, decoking operations and coke handling system failures; the valve and line plugging, steam and quenching systems, safety interlocks and emergency shutdowns; the delayed coking reaction deviations, temperature profile imbalance and pressure fluctuations and control failures; the hydraulic imbalance in piping network and product quality troubleshooting; the energy efficiency and fouling indicators; and the root cause analysis (RCA) framework, heater tube failure case and drum overpressure incident.



During this interactive course, participants will learn the product quality excursion, pump trip, seal damage and compressor surging case; the proactive maintenance techniques, startup and shutdown troubleshooting and corrosion and erosion mitigation; and the instrumentation and alarm management, operating procedures optimization, performance monitoring and continuous improvement.

### **Course Objectives/Outcomes & Benefits for the Participants**

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

- Apply and gain an in-depth knowledge on delayed coker unit (DCU) troubleshooting
- Identify process flow and major equipment, key process parameters and safety and environmental considerations
- Discuss feedstock impact on unit performance and carryout heater, furnace, fractionator and troubleshooting
- Recognize pump and compressor issues covering cavitation and vibration, mechanical seal failures, NPSH and suction/discharge problems as well as overheating and lubrication failures
- Discuss faulty level/pressure/temperature readings, alarm and trip calibration control loop tuning issues and instrument impulse line blockages
- Carryout coking drum troubleshooting and decoking operations and identify coke handling system failures
- Determine valve and line plugging, steam and quenching systems and safety interlocks and emergency shutdowns
- Illustrate delayed coking reaction deviations, temperature profile imbalance and pressure fluctuations and control failures
- Discuss hydraulic imbalance in piping network, apply product quality troubleshooting and identify energy efficiency and fouling indicators
- Explain root cause analysis (RCA) framework, heater tube failure case and drum overpressure incident
- Discuss product quality excursion, pump trip and seal damage and compressor surging case
- Apply proactive maintenance techniques, startup and shutdown troubleshooting and corrosion and erosion mitigation
- Carryout instrumentation and alarm management, operating procedures optimization and performance monitoring and continuous improvement

### **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 delayed coker unit (DCU) troubleshooting for operations personnel, process and chemical engineers, maintenance and inspection staff, health, safety, and environment (HSE) professionals, technical managers and supervisors and other technical staff.

### **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**

Haward's certificates are accredited by the following international accreditation organizations:

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British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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.

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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:



**Dr. Tony Dimitry**, PhD, MSc, BSc, is a **Senior Engineer** with over **30 years** of industrial experience within the **Petroleum, Oil & Gas, Petrochemical, Nuclear & Power** industries. His expertise covers **Delayed Coking Unit (DCU) Process Operations & Troubleshooting, DCU Process Optimization & Operational Troubleshooting, Delayed Coking Process Equipment & Systems, Process Optimization & Troubleshooting** of Refinery **Process Units, Process Equipment Performance Optimization, Process Plant Troubleshooting & Root Cause Analysis, Process Equipment Reliability & Performance Improvement, Heat Exchanger, Furnace & Fractionation System Troubleshooting, Pumps, Compressors & Rotating Equipment Troubleshooting, Process Plant Maintenance & Operational Reliability**. Further, he is also well versed in **Pipeline Operation & Maintenance, Pipeline System Operation, Pipeline System Maintenance, Piping Support, Piping Design, Pipeline Design & Construction, Process Equipment & Piping System, Combined Cycle Plant Operations, Piping & Mechanical Vibration Analysis, Preventive & Predictive Maintenance (PPM) Maintenance, Condition Based Monitoring (CBM), Risk Based Inspection (RBI), Risk Based Assessment (RBA), Root Cause Analysis (RCA), Reliability Centred Maintenance (RCM), Planning & Preventive Maintenance, Maintenance Management (Preventive, Predictive, Breakdown), Reliability Management, Rotating Equipment, Scheduling & Cost Control, Maximo Foundation, Maximo Managing Work, Asset Management Best Practices, Resource Management, Inventory Set-up & Management, Work Management, Automatic & Work Flows & Escalations, Vibration Analysis, HVAC, Heat Exchanger, Siemens, Gas & Steam Turbine Maintenance, Pumps & Compressors, Turbo-Expanders, Fractional Columns, Boilers, Cryogenic Pumps for LNG, Electromechanical Maintenance, Machinery Alignment, Lubrication Technology, Bearing & Rotary Machine, Blower & Fan, Shaft Repair, Safety Relief Valves, Pipelines, Piping, Pressure Vessels, Process Equipment, Diesel Engine & Crane Maintenance, Tanks & Tank Farms, Pneumatic System, Static Equipment, Failure Analysis, FMEA, Corrosion, Metallurgy, Thermal and Electrical Modelling of Battery Problems**. He is also well-versed in various simulators such as **i-Learn Vibration, AutoCAD, Word Access, Aspen One, Fortran, VB, C ANSYS, ABAQUS, DYNA3D, Ceasar, Caepipe, MS Project, Maximo, Automation Studio and SAP**. Currently, he is the **Maintenance Manager** of the **PPC Incorporation** wherein he is responsible for the maintenance and upgrading of all **Power Station** components.

During his career life, Dr. Dimitry held a significant position such as the **Operations Engineers, Technical Trainer, HSE Contracts Engineer, Boilers Section Engineer, Senior Engineer, Trainee Mechanical Engineer, Engineer, Turbines Section Head, Professor, Lecturer/Instructor and Teaching Assistant** from various multinational companies like **Chloride Silent Power Ltd., Technical University of Crete, National Nuclear Corporation, UMIST Aliveri Power Station and HFO Fired Power Station**.

Dr. Dimitry has **PhD, Master and Bachelor** degrees in **Mechanical Engineering** from the **Victory University of Manchester** and the **University of Newcastle, UK** respectively. Further, he is a **Certified Instructor/Trainer, a Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)** and an associate member of the **American Society of Mechanical Engineers (ASME)** and **Institution of Mechanical Engineers (IMechE)**.

### **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.

### **Learning Design & Customization**

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

### **Accommodation**

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

### **Course Fee**

**US\$ 5,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

### **Course Program**

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

#### **Day 1: Sunday, 20<sup>th</sup> of September 2026**

|             |                                                                                                                                                                                                    |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0730 – 0800 | Registration & Coffee                                                                                                                                                                              |
| 0800 – 0815 | Welcome & Introduction                                                                                                                                                                             |
| 0815 – 0830 | <b>PRE-TEST</b>                                                                                                                                                                                    |
| 0830 – 0930 | <b>Overview of DCU Operations</b><br>Process Flow & Major Equipment • Key Process Parameters • Cycle Overview (Coking, Decoking) • Safety & Environmental Considerations                           |
| 0930 – 0945 | Break                                                                                                                                                                                              |
| 0945 – 1030 | <b>Feedstock Impact on Unit Performance</b><br>Variability in Crude Quality • Effects on Coke Yield & Properties • Contaminants (Metals, Sulfur, Asphaltenes) • Feed Preheating & Desalting Issues |
| 1030 – 1130 | <b>Heater &amp; Furnace Troubleshooting</b><br>Coking in Heater Tubes • Flame Instability & Burner Issues • Tube Metal Overheating • Hot Spots & Fouling Problems                                  |
| 1130 – 1215 | <b>Fractionator Troubleshooting</b><br>Tower Flooding or Weeping • Improper Fractionation (Cut Overlap) • Pump-Around Problems • Fouling of Internals & Exchangers                                 |



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|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1215 – 1230 | Break                                                                                                                                                                                     |
| 1230 – 1330 | <b>Pump &amp; Compressor Issues</b><br>Cavitation & Vibration • Mechanical Seal Failures • NPSH & Suction/Discharge Problems • Overheating & Lubrication Failures                         |
| 1330 – 1420 | <b>Instrumentation &amp; Control Challenges</b><br>Faulty Level/Pressure/Temperature Readings • Alarm & Trip Calibration • Control Loop Tuning Issues • Instrument Impulse Line Blockages |
| 1420 – 1430 | <b>Recap</b><br>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow   |
| 1430        | Lunch & End of Day One                                                                                                                                                                    |

**Day 2: Monday, 21<sup>st</sup> of September 2026**

|             |                                                                                                                                                                                         |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0730 – 0830 | <b>Coking Drum Troubleshooting</b><br>Uneven Temperature Distribution • Overpressure in Drums • Foaming & Carryover • Drum Switching Delays & Interlocks                                |
| 0830 – 0930 | <b>Decoking Operations</b><br>Cutting Tool Malfunction • Water Jet Pump Problems • Drum Overhead Vapor Handling • Cutting Water Contamination & Disposal                                |
| 0930 – 0945 | Break                                                                                                                                                                                   |
| 0945 – 1100 | <b>Coke Handling System Failures</b><br>Conveyor System Malfunctions • Crusher & Vibrating Screen Issues • Blockage in Chute or Bins • Dust Control & Emissions                         |
| 1100 – 1215 | <b>Valve &amp; Line Plugging</b><br>Transfer Line Plugging • Switching Valve Failures • Valve Erosion & Sticking • Flushing System Malfunction                                          |
| 1215 – 1230 | Break                                                                                                                                                                                   |
| 1230 – 1330 | <b>Steam &amp; Quenching Systems</b><br>Steam Purging Failure • Quench Water Pump Issues • Thermal Shock & Drum Stress • Excessive Steam Carryover                                      |
| 1330 – 1420 | <b>Safety Interlocks &amp; Emergency Shutdowns</b><br>ESD & Trip Activation Causes • Manual versus Automated Switchovers • Safety Valve Lifting • Fire & Explosion Risks                |
| 1420 – 1430 | <b>Recap</b><br>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow |
| 1430        | Lunch & End of Day Two                                                                                                                                                                  |

**Day 3: Tuesday, 22<sup>nd</sup> of September 2026**

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|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0730 – 0830 | <b>Delayed Coking Reaction Deviations</b><br>Coke Morphology Changes • High Volatile Content in Coke • Hard versus Soft Coke Issues • Unreacted Feed Detection     |
| 0830 – 0930 | <b>Temperature Profile Imbalance</b><br>Non-Uniform Heating in Furnace • Temperature Drop During Switching • Thermocouple Malfunction • Feed Temperature Deviation |
| 0930 – 0945 | Break                                                                                                                                                              |
| 0945 – 1100 | <b>Pressure Fluctuations &amp; Control Failures</b><br>Drum Overpressure • Fractionator Pressure Swings • Vacuum Loss in Heater • Vapor Recovery Compressor Issues |



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|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1100 – 1215 | <b>Hydraulic Imbalance in Piping Network</b><br>Flow Maldistribution • Pressure Drop Across Lines • Line Erosion or Blockage • Piping Vibration & Resonance                             |
| 1215 – 1230 | Break                                                                                                                                                                                   |
| 1230 – 1330 | <b>Product Quality Troubleshooting</b><br>Unstable Naphtha or Gas Oil Quality • Off-Spec Petroleum Coke • Sulfur or Metals in Products • Water Contamination                            |
| 1330 – 1420 | <b>Energy Efficiency &amp; Fouling Indicators</b><br>Heat Exchanger Fouling • Furnace Efficiency Drop • Increased Fuel Consumption • CO Emission Monitoring                             |
| 1420 – 1430 | <b>Recap</b><br>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow |
| 1430        | Lunch & End of Day Three                                                                                                                                                                |

**Day 4: Wednesday, 23<sup>rd</sup> of September 2026**

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|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0730 – 0830 | <b>Root Cause Analysis (RCA) Framework</b><br>Steps of RCA in DCU • Common Data Collection Methods • Cause & Effect Diagrams • Using 5 Whys & Fishbone Tools                            |
| 0830 – 0930 | <b>Heater Tube Failure Case</b><br>Metallurgy & Inspection Findings • Process Condition History • Burner Flame Pattern Analysis • Preventive Actions Implemented                        |
| 0930 – 0945 | Break                                                                                                                                                                                   |
| 0945 – 1100 | <b>Drum Overpressure Incident</b><br>Sequence of Events Analysis • Instrumentation Fault Tracing • Safety Relief Operation • Recommendations & MOC                                      |
| 1100 – 1215 | <b>Product Quality Excursion</b><br>Fractionator Tray Performance • Change in Feed Quality • Heat Balance Check • Blending or Rerun Strategies                                          |
| 1215 – 1230 | Break                                                                                                                                                                                   |
| 1230 – 1330 | <b>Pump Trip &amp; Seal Damage</b><br>Vibration Data Evaluation • Lube Oil Analysis • Suction Pressure Trends • Mechanical Overhaul Outcome                                             |
| 1330 – 1420 | <b>Compressor Surging Case</b><br>Surge Protection System Review • Performance Curve Plotting • Anti-Surge Control Tuning • Lessons Learned                                             |
| 1420 – 1430 | <b>Recap</b><br>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow |
| 1430        | Lunch & End of Day Four                                                                                                                                                                 |

**Day 5: Thursday, 24<sup>th</sup> of September 2026**

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|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0730 – 0830 | <b>Proactive Maintenance Techniques</b><br>Predictive Diagnostics (Vibration, IR) • Routine Inspection Checklists • Spare Parts & PM Planning • Lubrication & Alignment Practices |
| 0830 – 0930 | <b>Startup &amp; Shutdown Troubleshooting</b><br>Pre-Startup Checklist Validation • Warm-up & Cool-Down Sequences • Common Startup Errors • Safe & Optimized Shutdown Steps       |



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|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0930 – 0945 | Break                                                                                                                                                                                                     |
| 0945 – 1100 | <b>Corrosion &amp; Erosion Mitigation</b><br>Corrosion Mapping & Inspection • Erosion-Prone Areas & Material Selection • Anti-Fouling & Coating Strategies • Injection Points & Chemical Treatment        |
| 1100 – 1215 | <b>Instrumentation &amp; Alarm Management</b><br>Critical Loop Checks & Calibrations • HART/Fieldbus Diagnostics • Alarm Prioritization • DCS/PLC Logic Troubleshooting                                   |
| 1215 – 1230 | Break                                                                                                                                                                                                     |
| 1230 – 1300 | <b>Operating Procedures Optimization</b><br>SOP Review & Updates • Communication During Drum Switching • Emergency Handling Drills • Operator Feedback Incorporation                                      |
| 1300 - 1345 | <b>Performance Monitoring &amp; Continuous Improvement</b><br>KPI Tracking (Yield, Coke Quality, OEE) • Benchmarking with Industry Data • Troubleshooting Logbooks • Digital Tools & Troubleshooting Aids |
| 1345 – 1400 | <b>Course Conclusion</b><br>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course                                             |
| 1400 – 1415 | <b>POST-TEST</b>                                                                                                                                                                                          |
| 1415 – 1430 | Presentation of Course Certificates                                                                                                                                                                       |
| 1430        | Lunch & End of Course                                                                                                                                                                                     |

### **Practical Sessions**

This practical highly-interactive course includes the following real-life case studies:-



### **Course Coordinator**

Mari Nakintu, Tel: +971 2 30 91 714, Email: [mari1@haward.org](mailto:mari1@haward.org)