ICTD

المركز العالمي للتدريب والتطوير

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Process Reactors, Operation, Troubleshooting, Start-up & Shutdown

Course Introduction:

There is an alarming trend in industry to discount the potential contribution of the Technical/Operations function to productivity improvement, product quality and gains in market share. Principles taught in this training session will help you to understand the true nature and different techniques of problem solving and problem prevention in the operational/process environment.

Excellent Troubleshooting skills are considered a core competency for 'Best-in-Class' industrial companies. If your company's goals include minimizing downtime then this workshop is a must because it delivers rapid, safe Troubleshooting.

Course Objectives:

Upon successful completion of this course, the delegates will be able to:

- ✓ Provide an appreciation of the technical, financial, operational and organisational aspects of process plant start up and shutdown
- ✓ Examine the planning systems and procedures adopted for process plant start up and shutdown
- ✓ Explain theory behind measurement and control skills
- ✓ Describe the common control loop: elements, types of signals, response time, etc
- ✓ Discuss logic in DCS operation, alarm and shutdown signals
- ✓ Review the operational systems and procedures adopted for process plant start up and shutdown
- ✓ Discuss the risks associated with process plant start up and shutdown and the applicable safety procedures to be followed
- ✓ Perform and execute the commissioning and start up activities
- ✓ Describe the general characteristics of plant start-up and commissioning and the role of the team members
- ✓ Describe the commissioning and start up work process as an integral part of operations implementation preparation identify the critical success factors and define the roadmap to a successful plant start-up and commissioning
- ✓ Develop the Risk Management structure techniques so that the participant can predict what go wrong during plant start-up and commissioning, and identify and plan effective mitigation measures
- ✓ Describe the importance of tightness management during construction and a detailed look at best practices for assuring internal and external tightness
- ✓ Describe the importance of preservation and cleanliness during construction and how it should be managed
- ✓ Discuss key points in start-up, normal and emergency shutdown of equipment

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- ✓ Identify Common process abnormalities
- ✓ Diagnose problems
- ✓ Troubleshoot problems
- ✓ Develop a structured approach to Troubleshooting and Problem Solving which uses a common terminology and shared understanding

Who Should Attend?

This course is intended to highlight the basics and the state of the art in Operation Management including operation Procedures, Problems Diagnoses and Troubleshooting for team leaders, plant managers, section heads, plant supervisors process engineers, plant controllers, process technicians, maintenance staff and other personnel involved in plant start-up in Process Industry, Junior Process Engineers, Senior Operators, Controller Operators and Field Operators.

Course Outline:

Day 1:

Welcome & Introduction

Pre-Test

1. **Initial Operating Plan**
   - **Introduction**
   - **Refinery Mission and Objectives**
     - Budget Control
     - Refinery Availability
     - Hydrocarbon Loss
     - Product Yield
     - Product Quality
     - Utilities Consumption
     - Safety
     - Environment
   - **Reporting**
   - **General Objectives**
   - **Core Values, Policies and Strategies**
     - People
     - Safety
     - Environment
     - Throughput (Refinery Availability)
     - Costs
     - Improvement
     - Energy Management

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- Management Systems

2. **Start-Up Manpower and Management**
   - **Start-Up Leadership**
     - What is leadership?
     - The Definition of Leadership
     - What are important Leadership personality traits?
     - Secrets of Leadership Success
     - What is the Relationship between Power and Leadership?
   - **Start-Up Management**
     - Risk Management
     - Safety Management Systems
     - Emergency Planning and Response

Day 2:

3. **Commissioning**
   - **Plant Inspection**
     - Vessels
     - Pumps
     - Air Cooler/Condenser Fans
     - Fired Heaters
     - Piping Inspection
     - Electrical Equipment Inspection
     - Instrumentation Commissioning
     - Heating, ventilation air conditioning (HVAC) equipment
     - Telecommunications
   - **Cleaning of Piping and Equipment**
     - General
     - Water Flushing
     - Air Blowing
     - Steam Blowing
     - Chemical Cleaning
     - Lubrication System Flushing
     - Cleaning (or Degreasing) Procedure
     - Pickling Procedure
     - Blinds list
   - **Tightness Testing**
     - General Procedure

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    - Pressure Test
    - Leak Repair/Tightening
    - Vacuum Test
- **Heaters Dry-Out Procedure**
- **Electrical Equipment Inspection**
- **Electrical and Instrumentation Loop Check**
    - Scope
    - Order of Loop Check and Cold Commissioning in the Project Schedule
    - Loop Check Content
- **Loop Check Procedures**
- **Documents and Test Sheets**
- **Quality Assurances**
- **Safety Aspects**
- **Method Statement for Instrumentation Loop Test**
    - Scope
    - Purpose
    - Safety
    - Responsibilities
    - Loop Test Procedure

Day 3:

4. **Start –Up Safety and Environmental Issue**
    - **Pre-Start-Up Safety Review**
        - Introduction
        - Requirement for Pre-Start-Up Review
        - Pre-Start-Up Safety Review Execution
    - **Hazard and Operability Studies (HAZOP)**

5. **Equipment Start-Up and Troubleshooting**
    - **Desalter**
        - Desalter Preparation for Start-up
        - Desalter Normal Start-Up procedure
        - Desalter Start-Up Troubleshooting
        - Desalter Problems and Corrective Actions
    - **Frequent Problems with Separators and Vessels**
    - **Heat Exchanger Operation and Troubleshooting**
        - Heat Exchanger Operation and Troubleshooting
        - Heat Exchanger Problems and Corrective Actions

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- **Fired Heaters**
  - Ignition Procedure for the Fired Heater
  - Fired Heaters Troubleshooting
  - Fired Heaters Problems and Corrective Actions
- **Boilers**
  - 5.5.1 Start-Up Procedures
  - 5.5.2 Boiler Shut-Down Procedures
  - 5.5.3 Boilers Problems and Corrective Actions
- **Fractionation Towers**
  - Variables that can Controlling a Tower
  - Operating Difficulties Inside Towers
  - Towers Troubleshooting
  - Trays Problems and Corrective Actions
- **Pumps & Compressors**
  - Pump Operation
  - Start-up and Shutdown Procedure
  - Pump Troubleshooting
  - Centrifugal Compressors

Day 4:

6. **Process Start-Up**
   - **Startup Procedure**
     - Air Purge from Unit
     - Fuel Gas Introduction
     - Cold Circulation
     - Warm-Up and Establish Normal Operating Conditions
   - **Process Normal Operation**
     - Desalter
     - Heaters
   - **Specific Routine Operations**
     - Heater Decoking Procedure

Day 5:

7. **Process Shutdowns (PSD) and Emergency Shutdown (ESD)**
   - **Normal Shutdown Procedures**
     - Desalter
     - Separators and Vessels
     - Heat Exchanger

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    - Fired Heaters
    - Boilers
    - Fractionation Towers
- **Pumps & Compressors**
- **Process Shutdown-PSD (Cause and Effect)**
    - Process Failures
    - Utility Failures
- **Emergency Shutdown (ESD)**
    - Fire
    - Power Failure
    - Instrument Air Failure
    - Cooling Water Failure

Post Test

Presentation of Certificates

Course Methodology:

A variety of methodologies will be used during the course that includes:

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionaires
- Group Work
- Discussion
- Presentation

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Course Certificate:

International Center for Training & Development (**ICTD**) will award an internationally recognized certificate(s) for each delegate on completion of training.

Course Fees:

US$ 3,300 per Delegate. This rate includes participant's manual, and-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Timings:

Daily Course Timings:

08:00 - 08:20	Morning Coffee / Tea
08:20 - 10:00	First Session
10:00 - 10:20	Coffee / Tea / Snacks
10:20 - 12:20	Second Session
12:20 - 13:30	Lunch Break & Prayer Break
13:30 - 15:00	Last Session

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