CORE CONCEPT

Process Plant Commissioning and Start-up: Mechanical Completion, PSSR and Handover

13 – 17 June 2027
Riyadh - KAFD district five-star

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Introduction:

Process plant commissioning is where a finished construction site becomes a producing unit, and where schedule slippage, damaged equipment and unsafe first starts most often originate. Late systemisation, incomplete pre-commissioning, open punch items and unclear owner and contractor roles push risk into the start-up window. This Core Concept course equips commissioning and operations leads to plan and execute commissioning and start-up of oil, gas and petrochemical units system by system, from mechanical completion through first fill and performance testing. Participants produce a Commissioning Execution and Start-up Readiness Plan for a real or planned unit.

Course Objectives:

- Build a commissioning philosophy, organisation and systemisation that drive construction completion and turnover sequence
- Control mechanical completion, pre-commissioning activities and punch list closure through a completions management database
- Prepare commissioning procedures, check sheets and handover dossiers that operations will accept
- Lead a pre-start-up safety review and confirm ready-for-start-up status before hydrocarbons are introduced
- Execute start-up sequences, inerting, first fill and performance testing while managing commissioning risks and contractor interfaces
- Produce a Commissioning Execution and Start-up Readiness Plan for a real or planned process unit

Target Audience:

- Managers responsible for planning and leading commissioning and start-up of new or revamped process units
- Operations and production leads who accept systems from construction and run the first start
- Process and technology engineers responsible for start-up procedures, catalysts and performance tests
- Completions and turnover leads who manage systemisation, check sheets, punch lists and certificates
- Owner's project and interface leads coordinating EPC contractor, vendor and licensor activities
- Maintenance, instrumentation and electrical leads responsible for pre-commissioning and equipment run-in

Course Outline:

Day 1: Commissioning Foundations and Readiness Baseline

- Construction Completion, Pre-Commissioning, Commissioning and Start-up Phase Definitions
- Commissioning Philosophy Document and Execution Strategy
- Commissioning Organisation Chart and Owner, Contractor and Vendor Roles
- CII Implementation Resource 312-2 Commissioning Best Practices
- Commissioning Readiness Self-Assessment for a Current Project

Day 2: Systemisation, Completions Management and Mechanical Completion

- Systemisation Guidelines: System and Subsystem Boundary Marking on P&IDs
- Completions Management Database: Tag Registers and Check Sheet Libraries
- Mechanical Completion Certificate and Ready-for-Commissioning Criteria
- Punch List Categories A, B and C and Clearance Rules
- Construction-to-Commissioning Turnover Package Content

Day 3: Pre-Commissioning Activities and Commissioning Procedures

- Line Flushing, Air Blowing and Steam Blowing Procedures
- Hydrotest Reinstatement, Leak Testing and Tightness Testing Plans
- Drying, Chemical Cleaning and Equipment Preservation Removal
- Instrument Loop Checks, Function Tests and Cause-and-Effect Verification
- Rotating Equipment Solo Run and Mechanical Run-In Check Sheets

Day 4: PSSR, Start-up Sequence and Commissioning Risk

- Pre-Start-up Safety Review Team, Checklist and Ready-for-Start-up Sign-Off
- Nitrogen Inerting, Oxygen Freeing and Leak-Before-Introduction Checks
- First Fill of Feedstock, Utilities, Chemicals and Catalyst Loading
- Start-up Sequence Logic and Simultaneous Operations Controls
- Commissioning Risk Register and EPC Contractor-Owner Interface Matrix

Day 5: Case Work and the Commissioning Execution and Start-up Readiness Plan

- Gas Processing Case Study: Delayed Systemisation and Turnover Backlog
- Petrochemical Unit Case Study: Failed Performance and Reliability Test Run
- Handover Dossier and Care, Custody and Control Transfer Review
- Commissioning Execution and Start-up Readiness Plan Drafting
- Lessons Learned Register and Peer Review Panel

Skills You Will Gain:

- Commissioning Planning
- Systemisation
- Completions Management
- Pre-Commissioning Supervision
- Punch List Control
- Pre-Start-up Safety Review
- Start-up Sequencing
- Performance Test Management

Why Attend This Course:

- Take back a Commissioning Execution and Start-up Readiness Plan tested against peer review
- Recognise the completion gaps and open punch items that delay first start before they reach the critical path
- Run a pre-start-up safety review that operations and contractors both trust
- Compare commissioning practice with owner and contractor teams from gas processing, refining, petrochemicals and utilities

Conclusion:

Plants that start safely and on time are commissioned by systems, with clear completion criteria, disciplined pre-commissioning and a verified readiness review before hydrocarbons are introduced. This course moves from commissioning philosophy and organisation, through systemisation, completions management and mechanical completion, to pre-commissioning, procedures, PSSR, first fill and performance testing. The final day applies that material to case units and produces a Commissioning Execution and Start-up Readiness Plan that participants can use on their next project or turnaround.