4-Day Training Course: Production and Processing Facilities in the Oil and Gas Industry

Day 1: Introduction and Fundamentals

1.1 Welcome and Introduction

• Trainer and participant introductions

• Objectives and expectations of the course

1.2 Overview of the Oil and Gas Industry

• Lifecycle of oil and gas: Exploration, production, and refining

• Global market trends and challenges

• Role of production and processing facilities in the value chain

1.3 Production Facilities: Components and Processes

• Key elements of production facilities:

- Wellheads and flowlines

- Separation processes (oil, gas, water separation)

- Produced water treatment

• Interactive Activity: Diagram analysis of a production facility

1.4 Processing Facilities: Components and Processes

• Natural gas processing: Dehydration, sweetening, fractionation

• Oil processing: Crude distillation and stabilization

• Common equipment used: Heat exchangers, separators, compressors

• Case Study: Tour of a typical gas processing plant (via video or images)

1.5 Health, Safety, and Environmental Considerations

• Regulatory requirements (OSHA, ISO 14001)

• Managing emissions and effluents

• HSE best practices and safety culture

• Group Discussion: Key safety challenges faced in production facilities

1.6 Quiz and Wrap-Up

• Quiz: Key takeaways from Day 1

• Q&A and open forum

Day 2: Facility Design and Equipment

2.1 Production Facility Design

• Design principles for wellheads, pipelines, and flowlines

• Layout considerations for safety and efficiency

• Interactive Activity: Design a simple production site layout

2.2 Processing Facility Design

• Process flow diagrams (PFDs) and piping and instrumentation diagrams (P&IDs)

• Safety systems: Fire protection, gas detection, and emergency shutdown systems

• Equipment layout for processing facilities

• Case Study: Reviewing a real-world processing plant layout

2.3 Key Equipment and Their Functions

• Equipment overview: Separators, scrubbers, pumps, compressors, and furnaces

• How each equipment contributes to production and processing

• Hands-on Exercise: Identifying equipment in a provided schematic

2.4 Industry Standards and Best Practices

• ISO 29001 and API standards for production and processing facilities

• Importance of standards for safety, quality, and efficiency

• Case Study: Lessons from an industry compliance failure

2.5 Recap and Open Discussion

• Open discussion: Challenges in facility design and equipment

• Q&A on real-world scenarios

Day 3: Operations and Maintenance

3.1 Production Facility Operations

• Monitoring and controlling production rates

• Analyzing well performance and optimizing production

• Common operational issues and quick fixes

• Role-play: Troubleshooting a production bottleneck scenario

3.2 Processing Facility Operations

• Managing system pressures, flows, and temperatures

• Maximizing processing efficiency

• Interactive Simulation: Walkthrough of a processing facility (virtual or hypothetical)

3.3 Maintenance Strategies

• Preventive vs. predictive maintenance

• Introduction to Reliability-Centered Maintenance (RCM) principles

• Activity: Creating a basic maintenance plan for a facility

3.4 Troubleshooting and Problem Solving

• Common equipment and process issues

• Techniques for root cause analysis (RCA)

• Case Study: Incident investigation and resolution in a processing plant

Day 4: Risk Management, Innovations, and Wrap-Up

4.1 Risk Management and Safety

• Identifying operational risks in production and processing facilities

• Emergency response planning and drills

• Group Activity: Developing a risk mitigation plan for a facility

4.2 Emerging Technologies in Oil and Gas

• Digital twins for monitoring and optimization

• Automation and AI applications in production and processing

• Renewable energy integration in the oil and gas sector

• Case Study: Implementation of digital tools in a facility

4.3 Regulatory Compliance and Standards

• Overview of ISO 29001, ISO 14224, and other key standards

• Strategies for aligning operations with regulatory requirements

• Activity: Performing a gap analysis for compliance readiness

4.4 Final Assessment and Review

• Final Quiz: Testing knowledge from the course

• Case Study Presentation: Participants analyze and present solutions to a real-world facility issue

• Feedback and course wrap-up