ETBE production

AXENS ETBE PROCESS

OPERATIONS TRAINING

Objective: To provide an in-depth knowledge of the **ETBE** process and particularly the client's unit. By the end of the course, the participants will have:

- A general understanding of the significance of the unit within the refinery scheme
- A broad technical understanding of the catalyst and the chemical reactions involved in the process
- A solid knowledge of the Process Flow Diagram and equipment
- A thorough knowledge of operating conditions and their impact on performance
- A good overview of the start-up and shutdown activities
  (NB: a detailed review of procedures is not included in the course).
- A sound knowledge of the main troubleshooting actions

Duration: The training course lasts 5 days. The duration can be tailored to the participants' level of understanding.

Attendance: This course is targeted to unit process engineers, unit technical managers, shift leaders, and board men. Suitably qualified or experienced outside operators may attend to enhance their process knowledge.

Program: The program below may be modified due to specific customer requirements, subject to an agreement between the customer and AXENS.

AXENS' OPERATIONS TRAINING PROGRAM

ETBE production

Day 1

1. Introduction

- Supply/demand situation
- Market trends
- Environmental regulation
- Focus on the unit in its context

2. Process Objectives

- General information
- Feed characteristics
- Unit duty
- Products' specifications
- Material Balance

3. Chemical Reactions

- Chemistry and catalysis basics
- Feed chemical composition
- Chemical reactions
- Catalysts
- Catalysts contaminants

Day 2

4. Process Description

- Process Flow Diagrams
- Piping & Instrumentation Diagrams
- Main equipment (Drawings, pictures and functions)
- Focus on Catacol technology

5. Start-up Preparation

- Pre-commisionning operations
- Commisionning operation:
  - Leak tests,
  - ETBE unit equipment washing
  - Reactors loading
  - Catalytic column loading

Day 3

6. Main Start Up Operations

- Exhaustive Descriptive Steps leading to fresh feed-in:
  - Resins drying by Ethanol circulation
  - Ethanol/water column start-up
  - Drying of main and finishing reactor
  - Drying of Catalytic column
  - Water inventory
  - Filling up the system with unreactive C_4
  - Reactive feed injection
  - Ethanol adjustment

Day 4

7. Normal Operation and Operating Parameters

- Summary of main operating conditions
- Operating variables
- Adjusting operating conditions
- Analytical control

8. Shutdown and Restart

- Planned shut-down
- Normal restart

Day 5

9. Troubleshooting

- Typical causes and product quality decrease resolution
- Operational disturbances

10. Resins special procedures

- Resins Unloading/replacement
- Backwashing resins traps

11. Health, Safety and Environment

12. Quiz