TROUBLESHOOTING IN OIL REFINERIES (REF:OTSTOR001)

INTRODUCTION

A process unit resembles man in that to function it must be able to respond properly to a variety of circumstances that the designer never quite anticipated.

Plant trouble shooting does not suffer changes with technology. The principles of distillation, hydraulics, phase separation and heat transfer, as they apply to process applications, have been well known and understood for a considerable time.

The challenge in troubleshooting consists of untangling the influence that human error, mechanical failure and corrosion have on these well known principles.

The aspect of the job that makes it so difficult, is that most process problems are initiated by human error – a never ending source of surprise!! A greater understanding of the process and equipment can improve the performance of the operator and of course it will serve to enhance the operation of the plant equipment. It is essential that the operator fully understands the theory of the processes involved in the day to day running of a modern refinery, but he must also be aware of the problems that can occur in each of the processes themselves.

If an operator can recognize symptoms at an early stage and correct the situation, then the process will run smoothly and at an optimum.

The Course

- Is suitable for operators in the oil, gas, chemical and water industries.
- It describes all the various possible problems, plant upsets etc, that may occur in the different processes within the refinery complex.
- It will give the operator an insight into the way troubleshooting should be performed, enabling him to more easily identify potential problems.
- The course will also be of benefit to plant and laboratory personnel who are required to work closely with plant personnel and therefore should have an understanding of the types of process equipment, and the processes and products involved.

Course Outline

1. INTRODUCTION TO TROUBLESHOOTING.
   - Basic understanding of troubleshooting.
   - Understanding the types of problems that could occur.
   - First steps to be taken in the event of a problem occurring.
   - Unusual noises and vibrations, rotating equipment, cavitating pumps,
   - Oversized pumps, harmonic vibrations, thumping furnaces, hydrocarbon leaks, water hammer etc.

2. CRUDE DISTILLATION.
   - Atmospheric and Vacuum.
   - Distillation columns
   - Stripping columns
   - Tray fouling
   - Reflux changes (flooding)
   - Common reflux problems
   - Reflux rates
   - Operating parameters
   - Flooding
   - Foaming
   - Identifying causes
   - Reboiler induced foaming and flooding
3. AMINE REGENERATION AND SCRUBBING.

- Dirty Amine
- Reboiler corrosion
- Reclaimer operation
- Foaming in Scrubbers
- Loss in Amine strength
- Poor Sweetening
- H2S and Sulphur recovery
- Finding lost conversion
- Start-up tips
- Increased pressure drop
- Maximising plant capacity

4. REFRIGERATION SYSTEMS

- Compressor problems
- Refrigeration compressor adjustments
- Evaporator Accumulator Drum
- Condenser

5. CENTRIFUGAL PUMPS

- Rough running
- Pump motors
- Cavitation
- Capacity decrease

6. ALARMS AND TRIPS

- Steam Turbines
- Liquid levels
- Pressure
- Temperature shutdowns
- High and low flow trips
- Elimination of unnecessary trips

7. VAPOUR/LIQUID SEPARATION

- Detection of Foaming
- High liquid levels
- Entrainment
- Rapid depressurization
- Demisters

8. WATER COOLERS

- Plugged tubes
- Hydrocarbon leaks
- High exchanger water outlet temperatures
- Water side fouling
9. UNDERSTANDING THE UNIT PROCESS CONTROL SYSTEMS

Set points
Auto/manual
Cascade control
Master and slave controls
Instrument Air Systems

10. PROCESS HEATERS

Insufficient draught
Excessive draught
Controlling Air Supply
Energy saving ideas
Hot Tubes