3. Sasol Advanced Synthol Reactor (SASR) Replacement

Start date: 10/1995
End date: 03/1999
Total new inputs / outputs (I/O): 3000

Summary

The increased pressure in environmental issues, need to reduce maintenance costs, and increased required throughput paired with the Sasol Technology strategy for future world market expansion resulted in a decision to upgrade their circulating fluidised bed reactors. Proconics was tasked with completing control systems detail engineering and design for the installation of the new SASR project.

The challenge: This already complex project was further challenged by the co-ordination of 21 subsections, a live plant during construction and an exceptionally limited shut-down window of 14 days for conversion.

Key to success: The thorough investigative phase prior to commencing the project enabled Proconics to provide the optimum solution for implementing the instrumentation detail engineering and design and provided valuable information for the basic engineering phase. In addition our decision to inspect all equipment at vendors prior to delivery proved to be both cost and time saving, resulting in the correct delivery taking place on schedule.

Proconics' input to the overall execution philosophy was invaluable.

Primary responsibilities:

Engineering Management:

- expert engineering support and project lead engineer
- specifications and design criteria
- specification and purchase of all tagged equipment
- investigations of existing infrastructure for suitability to accommodate project
- allocation of responsibilities to resources
- quality control of design and engineering deliverables
- interfacing with other engineering disciplines

Project Management:

- generation of project schedule for 21 subunits
- management of engineering and design for subunits to budget and timeline, including ongoing monitoring

Highlights: The specifications for the instrumentation for this project were a major challenge due to the great diversity of harsh process conditions associated with this type of plant. Our greatest achievement was providing all 21 subunits detail engineering and design packages on schedule and within budget.

Project Deliverables

PRIMARY ENGINEERING AND DESIGN TASKS

Flow sizing calculations; existing and new

Control valve sizing calculations; existing and new

Hydrostatic level calculations; existing and new

Specification and purchase of Honeywell DCS systems

Specification and purchase of Honeywell Safety Manager systems

Instrument specification, selection and purchase of all tagged equipment

Process control system detail engineering

Detail design of electronic instrument loops

Detail design for the instrument field installation including construction scope of works for sub sections, evaluation of construction bids and adjudication

Interface with mechanical, piping, electrical and civil disciplines

Interface with equipment licensors

Co-ordinating with the software engineers

Construction management

Commissioning assistance

CONTROL SYSTEMS DESCRIPTIONS

The instrumentation provides for:

Addition and withdrawal of catalyst to and from a reactor via nitrogen transfer

Reactor temperature control (special design required for thermocouples inside reactor)

Reactor temperature shutdown and interlocks

Steam drum level control

Steam drum level shutdown and interlocks

Aeration gas control to cyclones in reactor

Reactor temperature monitoring

Reactor catalyst level monitoring

Cooling train pressure and temperature control

Cooling train pressure and temperature shut down and interlocks

New electronic anti-surge control on existing feed compressors

Deaerator level control

Boiler feed water flow control to steam drums

Steam export control from steam drums

Reactor pressure control

Reactor pressure shutdown and interlocks

Feed compressor shutdown interlocks

INSTRUMENT EQUIPMENT

Add hardware to 15 existing Honeywell TDC 3000 systems, input output processor cards, field termination assemblies and barriers

Install 7 new Honeywell FSC shutdown systems to replace the relay logics

Purchase 235 new valves, 1 "up to 24"

Purchase 1100 new electronic transmitters, pressure, flow, temperature and level

Flow instrument (annubars, orifice plates and integral orifices)

Local control panels at reactors

Re-calculate 169 valves

Replace 18 control valves

Re-calculate 132 flow elements

Replace 40 flow elements

Transfer 127 I/O from existing Honeywell TDC 2000 to TDC 3000

De-commission 1800 I/O

Design 1500 new DCS I/O

Design 1200 new ESD I/O