Training Program:

Electric Submersible Pumps (ESPs) Selection, Installation, Operation & Maintenance

Introduction:

This course is designed to provide the participants with the skills to understand the principals of Electric Submersible Pumps (ESPs), how they are selected, installed, operated and maintained in both onshore and offshore oil production installations. This course is interactive and encourages delegates to participate through questions and answers, along with opportunities to discuss with the presenter specific issues which may result in appropriate solutions.

Participants will learn:

- Mainstream ESP system configurations
- Alternative ESP system configurations
- Installing ESPs in difficult and harsh environments
- How ESPs and their associated drives are selected
- Installing, operating and monitoring ESP systems
- Maintaining and troubleshooting ESP systems

Who Should Attend?

Electrical Engineers, Electrical Technicians, Electrical Inspectors, Electrical Professionals & Supervisors, Instrumentation and Design Engineers, Maintenance Engineers, Supervisors & Technicians, Energy Management Consultants, Control Engineers & Technicians, Automation & Process Engineers, Chemical & Mechanical Engineers, Consulting Engineers, Field Technicians, Graduate Engineers, Project and Production Managers, Project Engineers, Electronic Technicians, Plant Managers, Process Control Engineers, System Engineers, System Integrators, Testing Engineers &

Technicians, Power System Engineers, Power System Technicians, Utility Engineers, Managers & Team Leaders of Engineering Departments, Safety Professionals, Plant Electricians, Facilities Engineers, Operations & Maintenance Engineers, Supervisors & Technicians, Project Engineers, Commissioning & Testing Engineers, Consulting Engineers, Electrical Technologists, Facility & Plant Managers

Course Objectives:

By the end of this course delegates will be able to:

- Learn about the different types of ESP Systems and where they are used
- Understand the components and equipment used in ESP systems
- Learn about ESP pump technology
- Learn about ESP Selection and Performance Calculations
- Understand the Advantages and Limitations of various ESP Drive Systems
- Understand the Power Supply Requirements of ESP Installations
- Learn about installing, maintaining and troubleshooting ESP systems

Accreditation:

BTS attendance certificate will be issued to all attendees completing a minimum of 80% of the total course duration.

Course Outline

Fundamentals of Electric Submersible Pumps

- Introduction to ESPs and ESP Systems
- A Brief History of ESPs
- Design Requirements for Typical Mainstream ESPs
- ESP Pump Designs
- ESP Motor Designs
- Cabling Requirements
- Motor Control
- Miscellaneous Accessories
- Alternative ESP Configurations
- Inverted/Bottom Intake
- Dual and Triple ESPs in same well
- Boosters for ESPs

Application of ESPs in Difficult or Harsh Environments

- On-Shore and Off-Shore
- Multiphase Fluids
- Abrasive Contaminants
- High Temperature and Corrosive Substances
- Viscous Fluids, Emulsions, Scaling and Asphaltenes
- Off-Shore

- Modular Requirements
- Platform Cable Connections
- FPSO Disconnectable Turret Swivel and Mooring System
- Subsea Cabling and Electrical Connections
- Subsea Located Equipment

ESP System Selection, Performance Calculations and Equipment Sizing

- Establishing basic requirements
- Determining well production capacity
- Determining fluid composition and volume, including volume of free gas
- Calculation of total dynamic head
- Determination of optimum pump and motor type and size
- Determination of downhole cable configuration and sizing
- Identifying optimum drive systems, power supplies and accessories
- Variable speed drive requirements

ESP Monitoring, Control and Protection, Installation

- Downhole monitoring and sensors
- Embedded fiber optic cable for downhole monitoring and sensors
- Earthed (grounded) and unearthed (ungrounded) ESP motors
- Earthing and lightning propagation in ESP circuits
- Electrical protection equipment for ESPs
- SCADA/EMS (ESP Management System) for local and remote installations

- Safety and shut-down systems

Commissioning, Operation and Maintenance

- Commissioning requirements and procedures
- Pre-production optimization
- Regular operation and monitoring
- Maintenance management, monitoring and detecting abnormal conditions
- Troubleshooting guidelines
- Case studies and examples of ESP problems and failures
- Servicing equipment
- Well workover rigs
- Cable reels, reel supports, and cable guides
- Shipping cases
- Transport for long shipping cases
- Factory repair and reconditioning