Roxar Flow Measurement is a leading international technology solutions provider covering the entire reservoir optimization value chain. Roxar's objectives are to help oil and gas operators increase oil and gas recovery from their reservoirs, reduce uncertainty, and make improved field management decisions. The need for training is more critical than ever to achieve and maintain cost-effective operations. Roxar supports all the delivered instrumentation with a range of highly practical training programs. All courses are run by certified instructors who combine their understanding of theory with their unrivalled, on-site practical experience. The result is a complete service-focused solution defined by partnership and collaboration. Our global organization is available to work with you to define the appropriate subject matter and the right approach to satisfy your training need. Understanding the data is the key in order to make the right decisions for reservoir management.

Roxar Multiphase Meter 1900VI

Course ROX001 NEW CEUs: 2.1

Overview

The Roxar topside/surface Multiphase meter measures accurately the flow rates of oil, gas and water without separation, mixing or moving parts. Field experience shows long-term stability, high accuracy and very good repeatability. The objective of the 3-day Roxar MPFM 1900VI course is to provide the participant with an understanding of the multiphase flow, components and measurement principles of the instrument. The course focuses on providing the participants with detailed understanding of the set-up and configuration; calibration data, reference fluid parameter set-up and operation of the meter. The course will cover interpretation and correlation of MPFM parameters versus influences of process conditions.

Topics

- Introduction to Multiphase
  - Metering of Oil and Gas Production
  - Purpose of the Roxar Multiphase Meter
  - Multiphase Flow and Terminology
  - Roxar Multiphase Sensors and Electronics
- Measurement Technology
  - Overview of the Measurement System
  - Measurement Principles used in Roxar MPFM 1900VI
  - Determination of Flow Rates
  - Velocity Measurements: Pressure, Temperature and Volume
  - Verification of the Measurements - which Factors have Vital Importance for Design and Process Calculation
- Operations
  - Overview of the Roxar MPFM 1900VI
- Operation System
  - Service Console Software Installation and Main Screen Presentations
  - Communication Set-Up
  - Calibration and Reference Fluid Parameter Set-Up
  - Purpose of the Service Console Program (SCP)
  - Interpretation of the SCP screen – Diagnostics
  - SCP Screen Alarm Indication, Configuration of the Multiphase Meter
  - Practical Information on How to Access and Save Parameter Files; Practical Information on How to Log and Retrieve Data; Well Test Options
- Maintenance
  - Test Equipment and Recommended Spare Parts
  - Main Checks and Intervals
  - Radiological survey (Topside)
  - Reference Fluid Density Parameter Set-Up
  - Reference Permittivity and Conductivity
  - Temperature, Pressure and Differential Pressure Function Check
  - Capacitance Unit Function Check
  - Inductive Unit Function Check
  - Densitometer Unit Function Check
  - Parameter Save and Download; Diagnostics; Troubleshooting

Roxar Multiphase Meter 2600

Course ROX002 NEW CEUs: 2.1

Overview

The Roxar Zector technology provides accurate and real-time characterization of flow patterns. The voxel-based signal processing and electrode geometry provides information, including multiple flow velocity data and near wall measurements. The objective of the Roxar MPFM2600 3-day course is to provide the participant with an understanding of the multiphase flow, components and measurement principles of the instrument. The course focuses on providing the participants with detailed understanding of the set up and configuration; calibration data, reference fluid parameter set up and operation of the meter. The course will cover interpretation and correlation of MPFM parameters versus influences of process conditions. Understanding the data is the key in order to make the right decisions for reservoir management.

Topics

- Introduction to Multiphase Metering
  - Single Phase Metering/Multiphase Metering
  - Flow Regimes
  - Roxar's Experience in Multiphase Metering
  - Roxar MPFM2600
  - Mechanical Design
- Mechanical Specifications
  - Installation and Commissioning Instructions
- Measurement Technology
  - Overview of the Measurement System
  - The Principle of Operation (Phase Fraction Measurement, the Gamma Densitometer, Velocity Measurement, PVT Tables, Phase Slip, Static Properties)
- Software Operations
  - Overview of Roxar MPFM Operation System
  - Installation and Start Up of the Service Console
  - Software Operations: Practical Information on How to Access and Save Parameter Files, Logging and Retrieving data, Well Test Options
- Maintenance
  - Overview of the Mechanical System Maintenance
  - Gamma System
  - Electrical System
  - Calibration
  - Replacement of Parts
- PVT
  - What is PVTx
  - Fluid Analysis: Sampling, Compositional Data
  - Tempest PVTx
  - Import Tables

Roxar Subsea Multiphase Meter

Course ROX003 NEW CEUs: 2.1

Overview

The Roxar subsea Multiphase meter provides flow rates for oil, gas and water; vital information for managing reservoirs and processes. The objective of the Roxar SMPFM 3-day course is to provide the participant with an understanding of the multiphase flow, components and measurement principles of the instrument. The objective of the Roxar MPFM2600 course is to provide the participant with an understanding of the multiphase flow, components and measurement principles of the instrument. The course focuses on providing the participants with detailed understanding of the set up and configuration; calibration data, reference fluid parameter set up and operation of the meter. The course will cover interpretation and correlation of SMPFM parameters versus influences of process conditions. Understanding the data is the key in order to make the right decisions for reservoir management.

Topics

- Introduction to multiphase metering
  - Single Phase Metering/Multiphase Metering
  - Flow Regimes
  - Roxar's Experience in Multiphase Metering
  - Roxar SMPFM
  - Well Testing, Monitoring and Allocation
- Mechanical Specifications
  - Roxar SMPFM Components
  - Versions of the Meter
- Measurement Technology
  - Overview of the Measurement System
  - The Principle of Operation (Phase Fraction Measurement, the Gamma Densitometer, Velocity Measurement, PVT Tables, Phase Slip, Static Properties)
- Software Operations
  - Overview of Roxar SMPFM operation system
  - Installation and Start-Up of the Service Console
  - Software Operations: Practical Information on How to Access and Save Parameter Files, Logging and Retrieving Data, Well Test Options
  - Well Test
  - Creating Diagnostic Files
  - Setting Up Fluid Parameters
- Maintenance
  - Gamma System
  - Electrical System
  - Calibration
  - Software Updates
  - Sensor Geometry
- PVT
  - What is PVTx
  - Fluid Analysis: Sampling, Compositional Data
  - Tempest PVTx
  - Import Tables

Roxar Wetgas Meter

Course ROX004 NEW CEUs: 1.4

Overview

The Roxar Wetgas Meter is a unique instrument allowing accurate measurement of hydrocarbon flow rates and water production, with a very compact mechanical solution. The aim of this 2-day training is to provide the participants with in-depth knowledge of instrument operation, which enables participants to take full advantage of the meter in real applications. Course participants will be taught the intricacies of the meter and measurement technology, understanding of the data and the measurement principles will allow better decision making when it comes to reservoir management and optimizing the production process.

Topics

- Introduction to Wetgas
  - Introduction
  - Wet Gas
  - Why Measure Water?
  - Multiphase Flow
  - Flow Conditions
  - Ranges and Specifications
  - Installation Examples
- Mechanical Specifications
  - Material Overview
  - Design Standards
  - WGM Components
  - Cathodic Protection and HISC
  - Insulation and Coating
  - Testing
- Measurement Technology
  - Overview of the Measurement System
  - The Principle of Operation
  - Direct Measurement and Required Inputs
  - Fraction Calculations
  - Formation Water Detection
  - Calculation Modes
  - Redundancy
- Operations and Maintenance
  - Pre-Commissioning Phases
  - Commissioning and Start Up
  - Communication
  - Roxar WGM Console
  - Meter Operation
  - Alarms and Warnings
  - Calibration (Describe All Alternatives)
  - Maintenance

Roxar Subsea Wetgas Meter

Course ROX005 NEW CEUs: 1.4

Overview

The Roxar Subsea Wetgas meter is a unique instrument allowing accurate measurement of hydrocarbon flow rates and water production with a very compact mechanical solution. The aim of this 2-day training is to provide the participants with in-depth knowledge of instrument operations which enable participants to take full advantage of the meter in real applications. Course participants will be taught the intricacies of the meter and measurement technology, understanding of the data and the measurement principles will allow better decision making when it comes to reservoir management and optimizing the production process.

Topics

- Introduction to Wetgas
  - Introduction
  - Wet Gas
  - Why Measure Water?
  - Multiphase Flow
  - Flow Conditions
  - Ranges and Specifications
  - Installation Examples
- Mechanical Specifications
  - Material Overview
  - Design Standards
  - SWGM Components
  - Cathodic Protection and HISC
  - Insulation and Coating
  - Testing
- Measurement Technology
  - Overview of the Measurement System
  - The Principle of Operation
  - Direct Measurement and Required Inputs
  - Fraction Calculations
  - Formation Water Detection
  - Calculation Modes
  - Redundancy
- Operations and Maintenance
  - Pre-commissioning Phases
  - Commissioning and Start Up
  - Communication
  - Roxar SWGM Console
  - Meter Operation
  - Alarms and Warnings
  - Calibration (Describe All Alternatives)
  - Maintenance

Roxar Watercut Meter

Course ROX006 NEW CEUs: 1.4

Overview

The Roxar Watercut meter measures water in oil (0% to 100%) and is used in process control on test separators, fiscal metering, on- and offloading, export metering, desalting in refineries, two phase flow metering. The Roxar Watercut meter uses a unique and patented microwave resonance technology to measure the permittivity of an oil/water mixture with an extremely high level of accuracy and sensitivity. The aim of this 2-day course is to enable participants to take full advantage of the meter in real applications. Upon completion of the course participants should be able to efficiently run the instrument on their own, including delivering on-site quality reliable data, do normal routine maintenance, fault finding and troubleshooting.

Topics

- Introduction to Water Cut Metering and Technology
  - Why Measure Water Cut?
  - Water Cut Metering Challenges
  - Water Cut Metering Requirements
  - Technology for Water Cut Measurement
- Measurement Technology
  - How Do We Measure Water Cut
  - Installation
  - Microwave Signal Path
  - Entrapment of Microwaves in a Pipe
  - Microwave Resonance
  - Permittivity of Oil and Water
  - Water Continuous and Oil Continuous Phase
  - The Tables of Water Cut Made from the First Meter
  - The Production of the Meters to Fit the Model of the First Meter
  - The Production Sequence in a Meter
  - Measurement Uncertainty and Initial Explanation
- Operations
  - Connecting to the Meter
  - Software Operations: Entering the Meter, Configuration
  - Measurement
  - Inline Calibration of the Meter
  - Measurement Uncertainty
  - Practical Exercises on Meter Electronics
- Maintenance
  - Overview of Recommended Maintenance
  - Turning Diagnostics and Logging of Hyper Terminal
  - Taking a 50dB Plot of Microwave Electronics
  - Common Error Messages
  - Sending Diagnostic Data to Roxar for Analysis and Filing
  - Download New Code for a Meter
  - Erasing Battery Backed RAM in a Meter
  - Troubleshooting the Temperature Transmitter

To enroll in Roxar courses please call 281-879-2600 or meter.training@emerson.com.
For additional contact details refer to the contact information on pages 108-110. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Roxar Sand Monitor

Course ROX007 NEW CEUs: 1.4

Overview Optimizing production is becoming more and more important, as reservoirs are facing declining curves while the demand for oil and gas is increasing. One consequence of optimization can be increased sand production which can lead to serious damage to production equipment. The Roxar Sand Monitor is a non-intrusive acoustic sand monitoring system that identifies in real-time sand production in any water, oil, gas or multiphase flow lines for onshore and offshore locations. This 2-day training course focuses on teaching the participants what valid and non-valid data are; provides knowledge on how to create reports from data received by the instrument in order to provide input to integrity managers to enable better decision-making. The course is available in two versions: SAM Server and Fieldwatch, depending on the system software that your installation is using to operate the instrumentation.

Topics

- Introduction to Sand Metering
  - Causes of Sand Production
  - Why Do we Need Sand Detection System?
  - Roxar Sand and Pig Detection System
  - System Enclosure, History; Challenge, Integration with Other Products
- Measurement Technology
  - How Do We Measure Sand?; -Interface
  - Sand Rate Calculation; - Sand Detector
  - Product Optimization
- Operations
  - Software and General Set-Up; - System Overview
  - Configure Sensor Parameters
  - Process Data Interface: Flow Rate Input, Velocity Input, Choke Input, Well Test Data Interface
  - Alarm Settings Interface, Data Logging
  - Basic Interpretation: Basic Noise Estimation, Sand Production Estimation
  - Adv. Interpretation: Velocity in Signal Interpretation
  - Flow Regime Consideration
- Maintenance
  - Detector Installation: Locations on Pipe, Temperature Considerations; - Wiring
  - Communication Digital Output, Analogue Output, Volt Free Contact, Lamp Output
  - Calibration: Factory Calibration, Background Noise Calibration, Automatic Background Noise Curve (ABA), Sand Noise Calibration
  - Sand Transport Capability Indicator
  - Sand Mass Correction (L/X)
  - Choke Calibration
  - Filtering Settings: Alpha and Beta Filtering of Raw Data, K-Factor
  - Preventative Maintenance: Visual Inspection and Routine Testing
  - Calibration Adjustment: Background Noise Calibration (Zero Calibration)
  - Sand Calibration, Hardware Maintenance: Checking Sensor Connections, Reinstalling or Replacing the Detector

Roxar SandLog - Intrusive Sand Monitoring System

Course ROX009 NEW CEUs: 1.4

Overview

Optimizing production is becoming more and more important as reservoirs are facing declining curves while the demand for oil and gas is increasing. One consequence of optimization can be increased sand production which can lead to serious damage to production equipment. Our intrusive sand monitor 2-day training course will provide your personnel with the knowledge of the Roxar Sand Monitoring System, providing understanding of the different system infrastructures, components and measurement principles. The course focuses on teaching the participants what valid and non-valid data is; provides knowledge on how to create reports from data received by the instrument in order to provide input to integrity managers to enable better decision-making. The course is available in two versions: MultiTrend and Fieldwatch, depending on the system software that your installation is using for operations of the instrumentation.

Topics

- Introduction to Intrusive Sand Metering
  - Overview of Sand/Erosion Issues
  - Basic Principles for Selection Locations for Sand/Erosion Monitoring
  - Erosion Control – Integrity and Safety
  - Optimizing Flow Rates and Production
  - Overview of the Roxar Intrusive Sand/Erosion Monitoring System
    - Mechanical Accessories
    - Sand Erosion Probes
    - Combined Sand Erosion and Corrosion Probe
  - Electrical Resistance Probes
  - Instrumentation
  - System Software
  - Integrated Flow Assurance Monitoring Systems
- Measurement Principles
  - Electrical Resistance Probes
    - Sand Erosion Measurements
    - Correlations with Sand Production
    - Combined Sand Erosion and Corrosion Probe
- Software Operations
  - Verification of the Software
  - Configuration and Installation Architecture
  - Instrument Specific Parameters
  - Raw Data Verification
  - Engineer Values
    - Data Handling and Presentation
    - Data Interpretation
    - Reporting
  - Exporting Data
- Maintenance
  - Battery Replacement (Offline Systems Only)
  - System Health Check
  - Replacing Interface Cards

Roxar CorrLog - Instrusive Corrosion Monitoring System

Course ROX008 NEW CEUs: 1.4

Overview

Corrosion is a major cost in the oil and gas as well as other industries, and frequently the reason for accidents and unplanned interruptions in production plans. Corrosion monitoring is thus important for verification of the assets integrity. Our intrusive corrosion monitor 2-day training course will provide your personnel with the knowledge of the Roxar intrusive corrosion monitoring system, providing understanding of the different system infrastructures, components and measurement principles. The course focuses on teaching the participants what valid and non-valid data are; provides knowledge on how to create reports from data received by the instrument in order to provide input to integrity managers to enable better decision-making. The course is available in two versions: MultiTrend and Fieldwatch, depending on the system software that your installation is using for operations of the instrumentation.

Topics

- Introduction to Corrosion Monitoring
  - Overview of Corrosion Issues
  - Why Corrosion Monitoring?
    - Corrosion Control and Process Optimization
    - Integrity Management and Safety
  - Basic Principles for Selecting Locations for Corrosion Monitoring
  - Overview of the Roxar Intrusive Corrosion Monitoring System
    - Weight Loss Coupons, Electrical Resistance Probes, Linear Polarization Probes, Galvanic Probes
    - Mechanical Accessories
  - Instrumentation
  - System Software
  - Integrated Flow Assurance Monitoring Systems
- Measurement Principles
  - Weight Loss Coupons
  - Electrical Resistance Probes
  - Linear Polarization Probes
  - Galvanic Probes
- Software Operations
  - Verification of the Software
  - Configuration and Installation Architecture
  - Instrument Specific Parameters
  - Raw Data Verification
  - Engineer Values
    - Data Handling and Presentation
    - Data Interpretation
    - Reporting
  - Exporting Data
- Maintenance
  - Battery Replacement (Offline Systems Only)
  - System Health Check
  - Replacing Interface Cards

Roxar FSM

Course ROX010 NEW CEUs: 1.4

Overview

Corrosion is a major cost in the oil and gas as well as other industries, and frequently being the reason for accidents and unplanned interruptions in production plans. Corrosion monitoring is thus important for verification of the assets integrity. Roxar's FSM (Field Signature Method) system is a non-intrusive system for monitoring internal corrosion in pipes, pipelines or vessels directly in the pipe wall. Our Non-Intrusive Corrosion Monitor 2-day training course will provide your personnel with the knowledge of the Roxar non-intrusive corrosion monitoring system, understanding of the different system infrastructures, components and measurement principles. The course focuses on teaching the participants what valid and non-valid data are; provides knowledge on how to create reports from data received by the instrument in order to provide input to integrity managers to enable better decision making. The course is available in two versions: MultiTrend and Fieldwatch, depending on the system software that your installation is using for operations of the instrumentation.

Topics

- Introduction
  - Overview of Corrosion Issues
  - Why Corrosion Monitoring?
    - Corrosion Control and Process Optimization
    - Integrity Management and Safety
  - Basic Principles for Selecting Locations for Corrosion Monitoring
  - Overview of the Roxar FSM System
    - Mechanical Components
    - Buried System
  - Instrumentation
  - System Software
  - System Infrastructure
  - Integrated Flow Assurance Monitoring Systems
- Measurement Principles
  - Field Signature Method
- Software Operations
  - Verification of the Software
  - Configuration and Installation Architecture
  - Instrument Specific Parameters
  - Raw Data Verification
  - Signature
  - Engineer Values
    - Data Handling and Presentation
    - Data Interpretation
    - Reporting
  - Exporting Data
- Maintenance
  - Battery Replacement (EX Version)
  - System Health Checkss

Roxar Hydraulic Retrieval and Access Fitting System

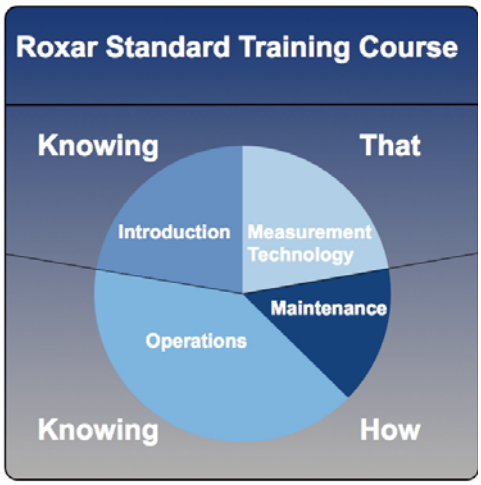
Course ROX011 NEW CEUs: 2.1

Overview

Hydraulic Retrieval System, the probe/coupon holder is connected to a hollow or solid plug, which is installed in a hydraulic access fitting. Installation and retrieval of the plug/probe assembly under pressure is done by pumping the plug in and out of the hydraulic access fitting using the double acting hydraulic retrieval tool. The objective of this course is to give the participant an overview of the Hydraulic Retrieval & Access Fitting System. The focus of this 3-day course is to bring awareness of working safely and efficiently with the tool and safe work practices. It will explain the design and operations of the tool and the fitting, and is recommended for anyone who will work with retrieval operations using our hydraulic retrieval system. Physical demonstrations with retrievers, service valves, and retractors on non-pressurized stands may be arranged by special request.

Topics

- Introduction
  - The Hydraulic Access Fitting and its Components
  - The Hydraulic Tool Retrieval and its Components
  - Different Variations of the Tool (PED/Non-PED)
- Theoretical Operation
  - Videos
  - Theoretical Run through the Operation
  - Understanding How the Tool Works
  - Safe Operation of the Tool
  - Troubleshooting and Maintenance
- Practical Operation
  - Get to Know the Tool and its Components
  - Safe Operation of the Tool
  - Do's and Don'ts
  - Practical Troubleshooting
  - Focus on Getting Comfortable using the Tool
  - Repeated Operations
  - Maintenance After Use
  - Practical Exam



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For additional contact details refer to the contact information on pages 108-110. Updated dates & locations are available on our website at www.emersonprocess.com/education.