Production technology and engineering

Module 1: Oil and gas well production operations

1-Geologic considerations in producing operations
   - Geology and engineering
   - Traps for oil and gas accumulations
   - Reservoir depositional environment
   - Geologic description
   - Geologic factors affecting reservoir properties

2-Reservoir considerations in well completions
   - Petroleum reservoir fluid composition
   - Phase behavior and reservoir fluid characterization
   - Black oil properties
   - Porosity, permeability, fluid distribution
   - Fluid flow in the reservoir
   - Effect of reservoir characteristics on well completions
   - Types of well tests
   - Periodic production tests
   - Productivity or deliverability test
   - Transient pressure tests
   - Drill stem test

3-Well completion tubular strings and packers
   - Methods of copitation
   - Tubing and casing strings
   - Packers and subsurface control equipment
   - Common subsurface completion equipment
   - Wellhead and surface control equipment

4-Problem well analysis
   - Introduction and problem well
   - Inflow restraints
   - Outflow restrictions
   - Water production problem
   - Paraffin and asphaltene deposition and removal
   - Scale deposition, prediction, removal and prevention

5-Formation damage and acidizing
   - Formation damage and causes
   - Acidizing objective and types
   - Well stimulation acids and additives
   - Quality control and hazards during acidizing
   - Carbonate acidizing
   - Sandstone acidizing

Module 2: Well performance and artificial lift

1-Inflow performance
   - Introduction
   - IPR concept and importance
   - Inflow equations
   - Future inflow

2-Vertical lift performance
   - Introduction
   - Variables affecting vertical flow
   - The use of pressure traverse curves
   - Vertical flow correlations

3-Flowing well performance and artificial lift
   - Types of well tests
   - Periodic production tests
   - Productivity or deliverability test
   - Transient pressure tests
   - Drill stem test

1-Production system nodal analysis
   - Introduction to nodal analysis
   - Tuning size selection
   - Flow line size effect
   - Effect of depletion

2-Computer applications on flowing well performance
   - Review of software prosper
   - Example exercises and computer runs

3-Artificial lift comparison
   - The need for artificial lift
   - Principles and comparison of lift methods
   - Screening and evaluation of applicability

4-Electric submersible pumping
   - Introduction
   - Pump and rotary gas separator
   - Electric motor, seal section, cable and controller
   - Example sizing of ESP installation

5-Gas lift
   - The process of gas lift
   - Advantages and limitations of gas lift
   - Gas lift valves
   - Predicting the effect of gas lift

6-Sucker rod pumping
   - The beam pumping system
   - Subsurface pumps rod and tuning effects

7-Hydraulic jet pumping
   - General description
   - How it work and facts in pump selection

Module 3: Surface production and process facilities

1-Introduction to production facilities
   - Introduction and making the equipment work facility

2-Tow phase oil gas separation
   - Horizontal separators, vertical separators
   - Horizontal vs. vertical vessel selection
   - Vessel internals and components
   - Multistage separation
   - Theory of design and example design problem

3-Three phase oil gas separation
   - Free water and emulsified water
   - Equipment description
   - Vessel internals and potential operating problem
   - Theory and equations

4-Utility system
   - Open and closed drains
   - Emergency shutdown, fire gas detection and fire fighting

5-Oil treatment systems
   - Theory of oil field emulsions
   - Emulsion treating methods
   - Treating equipment
   - Crude desalting
   - Electrostatic equipment

6-Gas processing
   - Gas separation and low temperature separation
   - Gas dew point and dehydration
   - Sour gas sweetening

7-Oil field pumps and compressors
   - Pump classification, power, selection and process considerations
   - Compressor classification, horsepower and stages

8-Production piping systems and design and design criteria
   - Introduction and fluid flow equations
   - Line size criteria, wall thickness, standards and requirements
   - Valves and fittings
   - Pressure rating classes

Objectives: To enhance participants knowledge and skills in the main aspects of oil and gas production operations.

Who Should Attend:

✓ Engineers and experienced technicians involved in oil and gas fields operation.

Duration: 3 Weeks

Venue: Amman, Beirut, Cairo, Istanbul, Malaysia, Dubai.

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Technology of Oil & Gas Processing Equipment

PP2

WHO SHOULD ATTEND?

• Graduate engineers involved in the operation or design of the Oil & Gas field processing facilities

WHY THIS PROGRAM?

• To provide knowledge of the technology and the operating principle of the static equipment used in the Oil & Gas field processing facilities

Module 1: Static Equipment

♦ Describe the technology, the operating principle and give the applications domain of the different piping, vessels, thermal equipment, storage equipment, and instrumentation & process control equipment
♦ list of the main equipment selection criteria with respect to the operating conditions and the different safety considerations
♦ Explain the fundamentals of metallurgy, corrosion and corrosion protection
♦ Identify the main origins of equipment operation trouble

Module 2: Rotating Machinery

• To list the different types of rotating machinery and their main applications
• To explain the working principle and main performances of these pieces of equipment
• To detail the technology of the rotating machinery and their main operating constraints

Interactive teaching by experienced lecturers, Several applications and illustrations (videos, samples, tools)... Practice of dynamic simulation

Duration: 2 Weeks
Venue: Amman, Beirut, Cairo, Istanbul, Malaysia, Dubit.

Tel: 00964 7270000003-00964 7270000002 -P.O Box :6037 Al-Tajiyat-Baghdad –Iraq- E.Mail : aptiapec@yahoo.com
Production Optimization
Using NODAL Analysis
تحديد الأنتاج الامثل باستخدام اسلوب تحليل نودال
Laboratory Tests for Oil and Gas

**Objectives:** To give the participants an idea on the application of NODAL analysis through an integrated view on the production system.

**Who Should Attend**
Petroleum engineers and specialists working in laboratories and in oil production.

**Contents**
- A general overview on the NODAL analysis (supply-demand relationships and stable balance concept).
- Reservoir performance, experimental model, well description, multilayer curves.
- Fundamentals of well completion, the optimum level of perforation intensity.
- Flow mechanics (pressure loss in vertical and horizontal well, production documentation, pressure effect in vertical, horizontal and inclined wells).
- Flow lines system, some example of pressure loss, gathering systems bottlenecks identification.
- Future performance.
- Reservoir performance integration with the development plan and market constraints.
- Artificial lifting.
- Developed gas lifting, submersible electric pumps and other types of pumps.

- **Duration**
  6 days

- **Venue**
  Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Crude Oil and Oil Products Evaluation
تقييم النفط الخام والمنتجات النفطية

**Objectives**: To acquaint participants with the techniques of the evaluation of crude oil and refined products.

**Who Should Attend**
Chemists, physicists and experienced technicians working in the field of quality control and research.

**Contents**
- Crude oils sources, classifications and constituents.
- Crude oils evaluation.
- Fundamental of crude oil refining.
- Laboratory tests of crude oils (practical applications).
- Light products evaluation (laboratory test, quality control).
- Lubrication oils (types, specification, tests, engine tests, and uses).
- Synthetic oil (types, specification, tests, and uses).
- Used oils treatment and reutilization.
  - Asphalt, greases and waxes (types, tests, and uses).

**Duration**
6 days

**Venue**
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Custody Transfer Metering System
(Technical Part)

Objective:

Develop The Scientific and Practical Knowledge of Participants and Enhance Their Efficiency and Performance in Custody Transfer Aspects.

Who Should Attend

- Instrument Engines
- Operation Engines
- Mechanized Engineers
- Project Engineers
- Oil Marketing Supervisors
- Technicians Working in Pumping Statues

Contents:

1. Metering Technologies in general.
2. Metering Specific application on : Pipe Lines, Ship Loading, main Terminals, Depots, Mobile
   Applications, Aviation, Refueling, LPG.
4. Terminal Loading Racks With Top and Bottom Loading Application.
7. Fuel Oil Blending and Bunkering.
8. Pumping Application.

Duration

6 days

Venue

Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client
INTEGRATED PRESSURE AND PRODUCTION DATA ANALYSIS

Objective: To acquaint participants with the concept of integration between production and pressure data analysis

Who should attend:
Reservoir engineers, production engineers, field development exploration staff

Contents:

- Introduction to well performance Analysis.
- Conventional (Empirical) Decline Curves.
- Production Analysis Using type curves (fetkovich).
- Modern production analysis methods (blasingame).
- Introduction to well testing.
- Wellbore and near-wellbore effects.
- Semi-log analysis flow regimes and diagnostic plot.
- Type curve matching for pressure data.
- Integrated well test interpretation methodology.
- Introduction to numerical well testing.
- Integration ideal between pressure and production data analysis.

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Production Problem Solving
 ومعالجة مشاكل الانتاج

PP7

Objective:
Diagnosis and solving of problems and production optimization to improve well performance

Who Should attend
Production engineers, Reservoir engineers, Drilling engineers

Contents:

- Geologic considerations in producing operation
- Reservoir considerations in well completions
- Surface facility troubleshooting
- Primary Cementing
- Well completion design
- Tubing strings, packers, subsurface control equipment
- Perforating oil and gas wells
- Completion and workover fluids
- Through-tubing production logging
- Problem well analysis
- Paraffin and Asphaltene
- Squeeze Cementing-Remedial cementing
- Sand control
- Formation damage
- Surfactants for well treatments
- Acidizing
- Hydraulic Fracturing
- Scale deposition, removal, and prevention
- Corrosion control
- Workover and completion rigs workover system
- Workover planning

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.

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LPG, NGL, LNG
Production and handling
عمليات انتاج ومداوله الغاز السائل والمكثفات النفطية والغاز المسال
PP8

Objective :- To acquaint participants with the fundamentals of natural gas handling and processing operations.

Who Should Attend
Process engineers, process supervisors, technicians working in gas processing experienced processing operations

Contents :-
• Definitions, physical properties and primary uses of LNG, NGLs and LPGs
• Sources (associated gas and gas wells)
• Gas separation
• Gas Compression
• Gas Conditioning
• Gas dehydration
• Amine sweetening plant
• Turbo expanders
• NGL recovery
• LNG production
• LPG storage and transportation

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Artificial Lift Technology

تكنولوجيا الرفع الاصطناعي

PP9

Objective:
Introduction the design and troubleshooting of artificial lift alternatives to increase the flow of crude oil

Who Should attend
Engineers, technicians, field supervisors, and others who select, design, install, evaluate, or operate artificial lift systems

Contents:

• Introduction to types of AL
  ✓ Progressing cavity Pumping systems
  ✓ Hydraulic lift systems
  ✓ Gas lift systems
  ✓ Plunger lift systems
  ✓ Electric Submersible pumping systems
• Well completion & profile
• Artificial lift screening
• Geographical & Environmental conditions
• Reservoir characteristics
• Reservoir pressure & Well productivity
• Characteristics of fluids
• Surface constraints
• Economic considerations
• Best practices for installation and maintenance
• AL maintenance operation

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.

Tel: 00964 7270000003-00964 7270000002 -P.O Box :6037 Al-Tajiyat-Baghdad –Iraq- E.Mail : aptiapec@yahoo.com
Production and Treatment of Natural Gas

**Objectives:** To Enhance the knowledge and understanding of participants in management and operation of natural gas production systems.

**Who Should Attend**

Engineers specialists experienced technicians working in the fields of production transport and marketing of natural gas.

**Contents**

- Introduction To the industry
- Natural gas sources (free gas, dome gas, associated gas).
- Natural gas constituents and specifications.
- Natural gas analyses (chemical, physical).
- Gas laws and their applications.
- Phase behavior of natural gas (gas, liquid, condensates).
- Gas / water regime (water vapor content).
- Hydrates (formation, nature, treatment).
- Gas reservoirs (size, reserve calculation, production rate, maintenance).
- Gas / oil separation (degassing stations, separators and supporting surface installations).
- Field treatment of gas.
- Compression stations.
- Pipeline transport of gas.
- Natural gas plants.
- Natural gas uses.
- Natural gas storage (rock cavities, salt cavities, water and Oil depleted reservoirs).
- Economical aspects.

**Duration**

6 days

**Venue**

Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Objectives: To enhance participants knowledge in the tests techniques of oil and gas.

Who Should Attend
- Chemist, physicists specialists and experienced
- Technicians working in quality control and research.

Contents

1. Crude oil
   - Chemical composition.
   - Chemical and physical properties.
   - Crude oils classification.
   - Crude oils compatibilities.
   - Heavy crude oils.
   - Tests and laboratory equipment (for reservoir and surface samples).
   - Physical analysis.
   - Chemical analysis (standard and special analysis).

2. Natural gas
   - Chemical composition.
   - Chemical and physical properties.
   - Test and laboratory equipment.
   - Physical analysis .. PVT relations.
   - Standard and special analysis.

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Fundamentals of Hydrocarbon Chemistry

**Objectives:** To acquaint participants with the Hydrocarbon compositions of crude oils and refined products and their importance in defining products properties.

**Who Should Attend**
specialists working in laboratories, quality control, and research as well as production engineers.

**Contents**
- The science of hydrocarbons.
- Introduction about crude oil.
- Crude oil classification and its basis.
- Crude oil compositions and the role of hydrocarbon types in defining properties.
- Methods of hydrocarbons separation and identification.
- Crude oil evaluation and the required tests.
- The required tests for refined products.

**Duration**
10 days

**Venue**
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Hydrochemistry of Oil Associated Underground Waters

Objectives: To enhance the knowledge and skills of participants in the processes of well completion.

Who Should Attend

Petroleum engineers specialists and experienced technicians working in laboratories and oil production.

Contents

- Introduction
  Hydrochemistry of oil associated underground waters.
- The relationship between the associated water and the formation, migration and accumulation of crude oils.
- Methods of sampling of associated waters and field preserving of samples.
- Statistical processing of results using computers.
- The significance of the chemical contents in the associated waters.

Duration
10 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Fundamentals of Process Material Balances

أساسيات موازنات المادة في العمليات النفطية

**Objective:** To enhance the capabilities of participants in carrying out material balance calculations necessary for the designs, studies, evaluations and operations of process plants.

**Who Should Attend**

Engineers, chemists and other technical degree holders involved in the designs, studies, evaluation and operations of process units in refineries, Gas plants and crude oil process plants.

**Contents:**

- Introduction
- Conservation of mass
- Units used to express compositions
- Stoichiometry of chemical reactions
- System boundary selection
- Basis of calculations appropriate units
- Selections (mass units, volume units, Mole units...etc)
- Number of independent components
  - (physical systems–no reaction),(chemical systems–with reaction)
- Steady and unsteady state definitions
- Recycle and by pass
- Typical material balance calculations

**Duration**

10 days

**Venue**

Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.

**Objectives**: Acquainting the participants with the properties of crude oils and refined products and the related laboratory tests as well as the influence of these properties on equipment performance and refinery configuration choice.

**Who Should Attend**

Engineers and Chemists involved in planning, studies, design operation and laboratory testing in refineries.

**Contents**

- Specifications of crude oils and their tests.
- Specifications of refined products and their tests:
  - Volatile products (LPG, Gasoline, Solvents)
  - Kerosene & A TK
  - Diesel fuel
  - Industrial fuel
  - Lubricating oil & Greases
  - Waxes & asphalts
- Refined products properties influence on equipment performance.
- Crude oils and refined products proper - ties influence on refinery design and configuration choice.

**Duration**

6 days

**Venue**

Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Objectives

To enhance the knowledge of the participants in crude oil refining and processing and refinery complexity calculation

Who should Attend

Engineers, chemicals and experienced technicians involved in planning, studies, design, operation and laboratory testing in refineries.

Contents

- Introduction on the history of the refining industry.
- Crude properties and their influence on refinery units selection.
  - Refining processes
  - Distillation processes (Atmospheric, Vacuum).
  - Quality improving processes (Hydro treating, Reforming, Isomerization, Sweetening...)
  - Cracking processes (Thermal cracking, Catalytic cracking, Hydro cracking...)
  - Other processes (Alkylation, polymerization, oxygenates production, solvent extraction...)
- Definition of refinery complexity and its calculation.
- Definition of Equivalent Distillation capacity E D R and its calculation.
- The significance of refinery complexity factor (relation to investment cost, operating cost, labor...)

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Refinery Equipment Safe Operation

التشغيل السليم لـ equipments المصابيح

**Objectives**
To enhance the knowledge of the participants in the safe and satisfactory operation of refinery equipment and how to deal with problems during operation.

**Who Should Attend**
Engineers and experienced technicians involved in operations of refineries

**contents**
- Introduction about the main refinery equipment.
- Routine start up, operation and shut down of refinery equipment.
- Rotating machinery.
- Piping and valves (block valves, relief valves, control valves…).
- Reactors, Drums, Pressure vessels and Storage Tanks.
- Furnaces, Boilers and heat exchangers.
- Distillation columns.
- Cooling Towers.
- Initial start up and test – run.
- Emergency shut down.

**Duration**
6 days

**Venue**
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Lubricating Oils Refineries

مصابيح إنتاج زيوت التزييت

PRE4

**Objectives**: To acquaint the participants with the processes employed in lubricating oils production.

**Who should Attend**: Engineers, chemists and experienced technicians involved in planning, studies, design, operation and testing of lubricants in refineries.

**Contents**:

- Type of lubricants (gas, liquid, semi solid)
- Type of liquid lubricants (natural, mineral, synthetic)
- Base oil production processes
  - Vacuum distillation
  - Propene deasphalting.
  - Furfural solvent extraction.
  - Solvent dewaxing.
  - Hydro-finishing (base oils & waxes).
  - Hydro treating alternative for solvent processes (furfural and dewing).
  - Lubricating oils additive.
  - Finished oils blending.
- Griezes production

**Duration**
6 days

**Venue**
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
The Petrochemical Refineries
المصافي البتروكيميائية

**PRE5**

**Objectives:** To acquaint the participants with the petrochemical industry and its integration with the fuel refinery.

**Who Should Attend:** Engineers, chemists and experienced technicians involved in crude oil refining and petrochemicals production.

**Contents:**
- Introduction on the petrochemical industry
- Raw material sources (natural gas, LPG, Naphtha …)
- Basic petrochemicals (synthesis gas, olefins, aromatics …)
- Intermediate petrochemicals
- Finished petrochemical products (plastics, resins, of Fibers … etc)
- Integrating the petrochemical refinery with the fuel refinery.

**Duration:**
6 days

**Venue:**
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Feasibility studies for Refinery projects

دعوات الجدوى الفنية والاقتصادية لمشاريع تكرير النفط الخام

PRE6

Objectives

To acquaint participants with the procedures of carrying out feasibility studies for refinery projects

Who Should Attend: Engineers economists, accountants involved in planning, studies, products marketing and operations of refineries

Contents

- Market analysis
  - Supplying markets of refinery input.
  - Consuming markets of refined products.
- Technical study
  - Choice of process units.
  - Site Selection.
  - Material and heat balance.
  - Materials and services requirements.
  - Working force requirement.
- Cash flows
  - Capital cost, working capital, contingency.
  - Operating costs, other costs
  - (taxes...etc)
  - Revenues.
- Economic evaluation
  - Pay back period.
  - Simple rate of return.
  - Net present value.
  - Internal rate of return.
  - Break even point.
  - Value added
- Sensitivity analysis

Duration

6 days

Venue

Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Optimization of Refinery Configuration and Operation Utilizing Linear Programming

**Objectives** To acquaint participants with the technique of linear programming and its use in selecting optimum refinery configuration and operation.

**Who Should Attend:** Engineers, economists, accountants working in the fields of planning studies, operation and marketing in refineries.

**Contents**

- Refinery process units alternatives.
- Refinery operating modes alternatives.
- The concept of linear programming.
- Optimization under limited resources conditions.
- New refinery optimization.
  - Site optimization.
  - Crude selection optimization.
  - Refinery operation optimization.
  - Refined products marketing optimization.
- Linear programming software.
- Upgrading existing refinery to optimize operations.

**Duration**

6 days

**Venue**

Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.

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The Technical and Commercial Phases of Preparing Refinery Projects Tender Documents

**Objectives:** To acquaint participants with the basic steps of preparing refinery projects tender document

**Who Should Attend**

Engineers, financing specialists, legal specialists, and commercial specialists involved in planning, project, management, purchasing and contracts drafting

**Contents**

- Basics of the tender documents.
- Technical conditions.
- Commercial conditions.
- Type of tender (turnkey, cost pulse, etc).
- Bids and bids analysis.
- Variations.
- Preparation of draft contract.
  - General Conditions.
  - Special Conditions.
- Award of contract.
- Signature of contract.

**Duration**

6 days

**Venue**

Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Utilities & Services in the Oil Industry
خدمات الصرف في الصناعة النفطية

PRE9

Objectives: To enhance the knowledge of the participants in the nature and operation of utility facilities in the oil industry.

Who Should Attend
Engineers supervisors, experienced technicians involved in utility facilities operations

Contents
- Type of utilities required (drilling, fields activities, pumping stations, refineries, storage and distribution…)
- Utility facilities operation and trouble-shooting
  - Water (raw water system, desalinated water, demineralized water, water laboratory tests)
  - Compressed air & nitrogen systems
  - Boilers & steam systems
  - Cooling towers and cooling water systems.
  - Fuel system
- Waste water treatment system

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Fundamentals of Process Energy Balances and Energy Utilization Systems

Objective: - To enhance the capabilities of participants in performing energy balance calculations necessary for the design, studies, evaluations and operations of process plants.

Who Should Attend

Engineers, chemists and other technical degree holders involved in the designs, studies, evaluation and operations of process units in refineries, gas plants and crude oil process plants.

Contents:

- Introduction
- Conservation of energy and forms of energy
- Mean heat capacity and effect of pressure
- Heat of (reaction, formation, combustion ....)
- Specific enthalpy and enthalpy of mixtures (Enthalpy, concentration diagrams)
- Steady state and unsteady state energy balance
- Compression & expansion of gases
- Typical energy balance calculations
- Energy recovery and pinch technology calculations for optimum energy conservation

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Flare system operation and design

ToObjective: :- To acquaint participants with the safe and economic flaring and its impact on flare system design on operation.

Who Should Attend:

Engineers, technicians and senior operators who are directly working in oil and gas fields, production units, gas processing facilities and refineries.

Contents :-

- Flare system characteristics
- Factors influencing flare design
- Flare design and equipment
- Flare combustion products
- Pressure relief and flaring requirement
- De-pressuring emergency relief and flare system
- Smokeless flare requirement
- Ground flare arrangement

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Planned shutdown and critical activities; startup and commissioning of refineries

Objective:- To acquaint participants with the skills of scheduling planned shutdown with efficient utilization of time and resources.

Who Should Attend: engineers, specialists and seniors technicians in the field of maintenance or operation whose work is related to shutdown activities.

Contents:-
- Introduction to maintenance strategies and shutdown philosophy
- Planning and scheduling importance in the organization
- Planning aspects
  - Concepts & basics
  - Planners' duties step by step
  - Planning principles
  - Planning performance & efficiency measuring
- Scheduling aspects
  - Basic & concepts
  - Practical scheduling principles
  - Scheduling performance & efficiency measuring
- Tools alternatives
  - Gantt
  - CPM
  - PERT & Crashes
- Precommissioning and commissioning

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Process operations of refineries
العمليات التشغيلية للمصانع

**PRE14**

**Objective** :-To acquaint participants with the safe operation of refineries and standard procedures for start/stop of equipment .

**Who Should Attend**
engineers , senior ,operators and experienced operation technicians

**Contents :-**

- Introduction to petroleum refining
- Industrial valves
- How to read process drawings
- Basics process instrumentation and control- monitoring and corrective actions
- Pump, fundamentals
- Compressors
- Heat exchangers
- Plant utilities (air ,water ,steam …)
- Basic safety
- Process plant startup/shutdown
- Emergency measures

**Duration**
6 days

**Venue**
Baghdad , Amman , Beirut , Cairo, Istanbul, or any place suitable for client .
Damage Mechanisms Affecting Fixed Equipment in the Refining Industry (API RP 571) (Advanced Program)

Contents

- Mechanical and Metallurgical Failure Mechanisms
- Graphitization
- Softening (Spheroidization)
- Temper Embrittlement
- Strain Aging
- BBSof Embrittlement
- Sigma Phase Embrittlement
- Brittle Fracture
- Creep / Stress Rupture
- Thermal Fatigue
- Short Term Overheating – Stress Rupture
- Steam Blanketing
- Dissimilar Metal Weld (DMW) Cracking
- Thermal Shock
- Erosion / Erosion-Corrosion
- Cavitation
- Mechanical Fatigue
- Vibration-Induced Fatigue
- Refractory Degradation
- Reheat Cracking
- Uniform or Localized Loss of Thickness
- Galvanic Corrosion
- Atmospheric Corrosion
- Atmospheric Corrosion
- Cooling Water Corrosion
- Boiler Water Condensate Corrosion
- CO2 Corrosion
- Flue Gas Dew Point Corrosion
- Microbiologically Induced Corrosion (MIC)
- Soil Corrosion
- Caustic Corrosion
- Delayed
- Graphite Corrosion
- High Temperature Corrosion [400°F (204°C)]
- Oxidation
- Sulphidation
- Carburization
- Decarburization
- Metal Druin
- Fuel Ash Corrosion
- Nitrating
- Environment – Assisted Cracking
- Chloride Stress Corrosion Cracking (CISCC)
- Corrosion Fatigue
- Caustic Stress Corrosion Cracking (CSCC)
- Ammonia Stress Corrosion Cracking
- Liquid Metal Embrittlement (LME)
- Hydrogen Embrittlement (HE)

Duration: 6 days

Venue: Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.

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SIZING AND SELECTION OF PRESSURE-RELIEVING DEVICES IN REFINERIES
API RP 520
حساب حجم واختيار أنواع صمامات الأمان في المصافي
PRE16

Objectives: To provide the participants with standard methods of sizing and selection of pressure / relieving devices in refineries

who should Attend
Inspection, maintenance, Safety and Design Engineers

Contents

1. PRESSURE RELIEF DEVICES
   1.1 General
   1.2 Pressure Relief valves
   1.3 Rupture Disk Devices
   1.4 Pin /Actuated Devices
   1.5 Other Types of Devices
2. PROCEDURES FOR SIZING
   2.1 Determination of Relief Requirements
   2.2 API Effective Area and Effective Coefficient of Discharge
   2.3 Back pressure
   2.4 Cold Differential test pressure (CDTP)
   2.5 Relieving pressure
   2.6 Sizing for Gas or Vapor Relief
   2.7 Sizing for Steam Relief
   2.8 Sizing for Liquid Relief :- pressure Relief Valves Requiring Capacity Certification
   2.9 Sizing for Liquid Relief :- pressure Relief Valves Not Requiring Capacity Certification
   2.10 Sizing for two – phase Liquid-Vapor Relief
   2.11 Sizing for Rupture Disk Devices

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Emergency shutdown and safety instruments systems

منظمات التوقف الاضطراري وواجهة السيطرة المتعلقة بالسلامة

PRE17

Objective:- To provide the participants with basic understanding of emergency shutdown and safety related systems focusing on the recent development taking into consideration the ISA/IEC new standards ISA s84.01, IEC 1508/61511 .

Who Should Attend
Engineers and technicians who install/service or operate these safety related systems

Contents :-

• Emergency shutdown, (ESD) System design
• Hydrocarbon disposal systems
• Emergency power systems
• Emergency shutdown (ESD) vs. planned shutdown ( PSD) practical consideration
• Fuel gas system & furnace firing system
• Testing ESD.
• Guidelines and standards :PES-ISA-IEC
• General ESD design considerations: programmable electronic systems (PES) separation of control and protection –life cycle
• System technologies (pros and cons):ESD safety requirements –SIS logic Box Goals Pneumatic shutdown systems PLC/TMR-systems-field devices
• Operation and maintenance :Bypassing-installation considerations

Duration
6 days

Venue
Baghdad , Amman , Beirut , Cairo, Istanbul, or any place suitable for client .