



# **R&E Petroleum Co.**

## **Plants Commissioning and Starting Up**

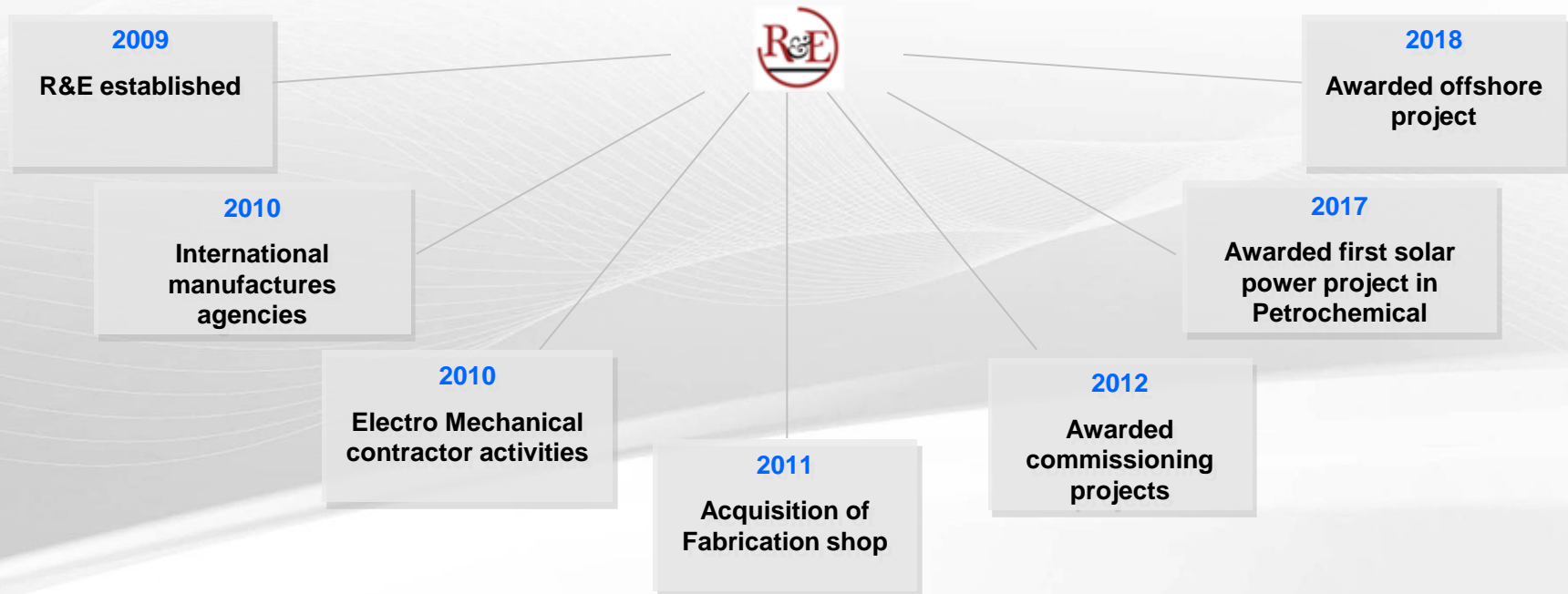
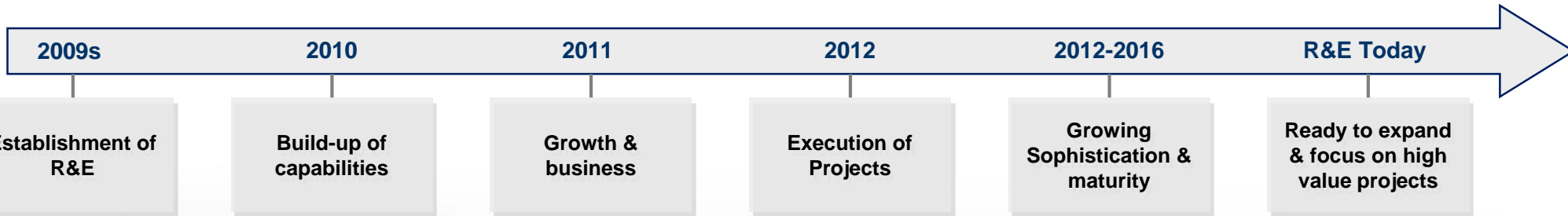
**Your Partner In Success**

# Introduction

## Contents

- 
- R&E Evolution
  - Business Lines
  - Business Sectors
  - In house Support Services
  - Clint's
  - Location
-

# R&E Evolution





# Business Lines

## 1 Engineering Procurement Construction (EPC)

- Design, procure, construct & commission infrastructure projects.
- Contractor for the construction of heavy industrial plants in oil & gas & petrochemical sectors
- PC capabilities in water, wastewater, power, oil & gas, solid waste & other sectors

2

## Trading

- R&E is the agent of many international companies
- Mechanical supplies
- Electrical Supplies
- Heavy Trucks
- Oil and Gas Services

3

## Construction

- Contractors in the oil & gas sector
- Ability to adapt to multiple size of project
- Increasing international scope of activity

4

## Facilities Management

- Provides comprehensive & integrated services for institutional, commercial & industrial facilities
- Expertise & capabilities in operation, maintenance & engineering services
- Practice procedures & systems

6

## Industrial Support Services

- **R&E Fabrication:** fabrication of carbon structure products
- **Scaffolding :** Leading business for sale & rental of infrastructure related equipment
- **Procurement:** Supplier of high-quality materials, equipment & systems to major clients
- R&E Warehouse
- R&E Camps

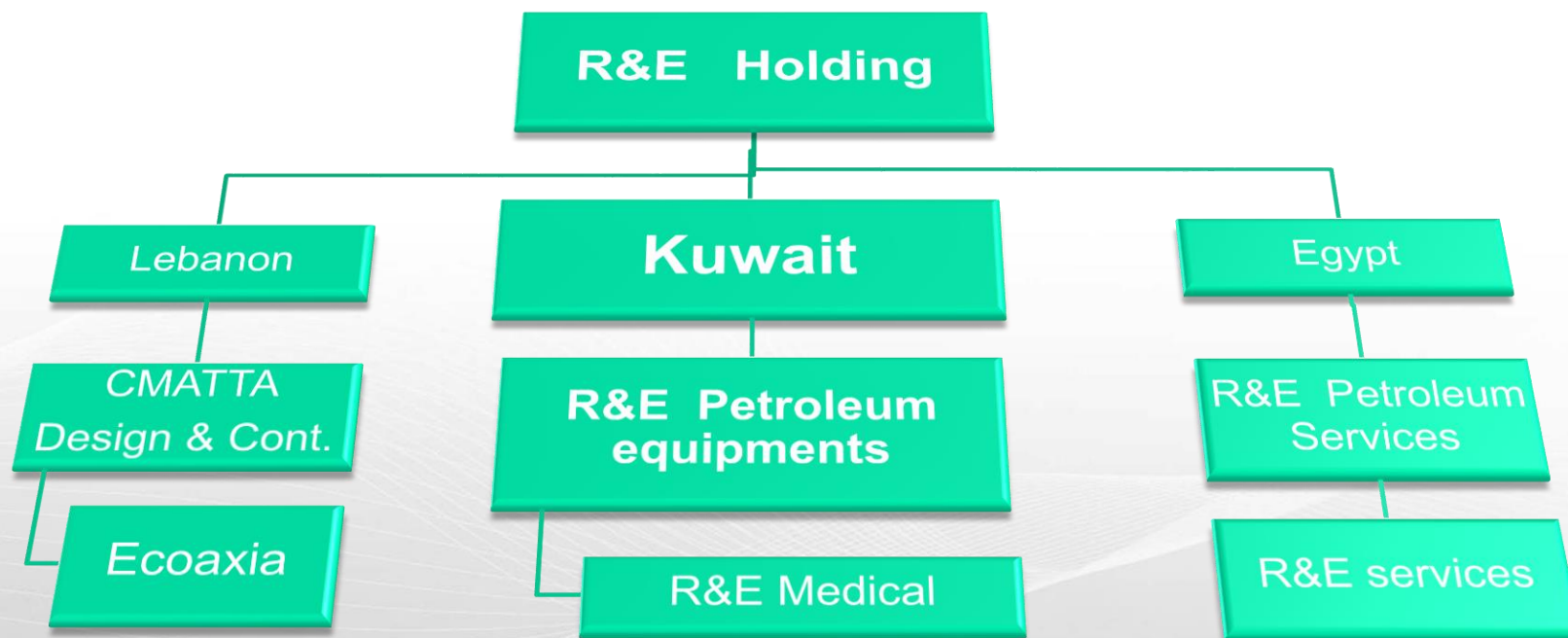
5

## Operation and Maintenance Services

- Management operations providing customised solutions for multi-disciplined operations & projects.
- Expertise & capabilities operating and maintenance



# R&E – Organization Chart





# Business Sectors

Engineering, Procurement & Construction	Construction	Commissioning & starting up	Facilities Management	Fabrication Services
<ul style="list-style-type: none"><li>▪ Renewable Energy</li><li>▪ Water</li><li>▪ Wastewater</li><li>▪ Renewable Energy</li><li>▪ Mixed-use Development</li><li>▪ Solid Waste Management</li><li>▪ Enhanced Oil Recovery</li></ul>	<ul style="list-style-type: none"><li>▪ Power</li><li>▪ Water</li><li>▪ Infrastructure &amp; Environment</li><li>▪ Internal Installation</li></ul>	<ul style="list-style-type: none"><li>▪ Hydro-Test</li><li>▪ Chemical cleaning</li><li>▪ Flushing , Lube oil system flushing</li><li>▪ Pigging</li><li>▪ Steam &amp; Air Blowing</li><li>▪ Leak &amp; vacuum Test</li><li>▪ Bolt torqueing , flange management</li><li>▪ Test run for mechanical equipment</li></ul>	<ul style="list-style-type: none"><li>▪ Power</li><li>▪ Refineries &amp; Petrochemical Plants</li><li>▪ Water Distribution</li><li>▪ Sewage Treatment Plants</li><li>▪ Pumping &amp; Lifting Stations</li><li>▪ Industrial Complexes</li></ul>	<ul style="list-style-type: none"><li>▪ Process Equipment</li><li>▪ Pressure Vessels</li><li>▪ Evaporators</li><li>▪ Separators</li><li>▪ Columns</li><li>▪ Pressure Piping</li><li>▪ Modules &amp; Skids</li></ul>



# In House Support Services



## EQUIPMENT

- Owned & maintained by R&E
- Pieces of equipment for EPC & FM activities



## CAMPS

- Provides accommodation for R&E workers
- High quality standards in F&B, medical, laundry, sports, & entertainment facilities



## SCAFFOLDING

- Scaffolding systems is a JV between R&E and RESA
- Support projects realized by R&E
- Allows maneuverability & flexibility, rosette system
- Provides cost advantage, effectiveness, productivity



## WAREHOUSING

- Integrated material management system
- 15,000m<sup>2</sup> + open & closed storage space
- Cold Storing for chemicals
- Internal & external warehousing
- Material control services
- Record management



## INSULATION

- Insulation Systems is a JV between R&E & INECO
- Contractor for insulation works
- Fire proofing, refractory, painting



## Gas Generation

- Nitrogen generation unit
- Booster station



# Pre-commissioning Services

R&E has added Process and Pipeline Services to our legacy Joint Integrity Assurance offering to deliver industry leading process and pipeline cleaning, testing, verification, and integrity management services. In addition, we have standardised these services to ensure the delivery of the same highest standards to our customers irrespective of their global location.

We offer a comprehensive range of offerings to ensure the successful completion of a pre-commissioning project:

<b>Oil Flushing</b>	<b>Chemical Cleaning</b>	<b>Leak test</b>
<b>Air Blowing</b>	<b>Steam Blowing</b>	<b>Pigging and Testing</b>
<b>Upstream</b>	<b>Engineering</b>	<b>Catalyst loading</b>
<b>Flange Management</b>		<b>Hydro-Test</b>

The integrated services platform coupled with a thorough understanding of a client's facilities and their needs enables R&E to deliver safe and efficient plant start-ups, maintenance and shutdown programs every time, no matter how complex the process. This expertise, know-how and problem solving ability puts R&E at the forefront of providing cleaning, testing, and integrity solutions for our clients in the pre-commissioning and turnaround sector.



# Commissioning and starting up HYDROTEST



## EQUIPMENT

- High pressure water pump
- High pressure rated hoses and connections
- Pressure digital chart record.
- Water tanks .
- Sealing equipment .
- External and internal plugs .

## Scope of work

- Strength test.
- Leak test .
- Qualifying new manufactured pieces and wildings .

## Process description

- Hydrostatic testing requires that a component be completely filled with a test medium such as water.
- Pressure is slowly applied to the test medium until the required test pressure is reached.
- This pressure is held for the required time at which point the component is inspected visually to locate leaks.
- Conventional methods of testing involves welding a cap on the pipe end and later cutting off the cap and re-bevelling the pipe end, while newer & advanced methods use external or internal gripping plugs.





# Commissioning and starting up STEAM BLOWING

## EQUIPMENT

- High pressure rated hoses and connections
- External and internal plugs .
- Steam boiler
- Blind spades
- Chemicals

## Scope of work

- Removal of residual construction debris.
  - Unseating mill-scale magnetite layer deposits and welding slag .
  - Cleaning of critical system piping leading to crucial components, such as steam turbine generators on cogeneration units

## Process description

- a continuous low-pressure steam blow technique has become standard practice for cleaning most steam system circuits.
- During a blow, the steam piping is blown with sufficient boiler pressure to ensure that enough dynamic pressure will be experienced in the pipe to provide adequate cleaning.
- boiler pressures used in steam blowing provide a dynamic pressure throughout the piping that is at least 20% higher than would be experienced in normal operating conditions ( $CFR \geq 1.2$ ).
- Any potentially damaging particles will be blown out of the piping prior to plant operation ensuring a flawless start-up.





# Commissioning and starting up

## CHEMICAL CLEANING



### EQUIPMENT

### Scope of work

### Process description

- R&E in house SS Chemical cleaning skid full set 400 m<sup>3</sup>/hour with electrical heater up to 85 degree

- Degreasing
- Washing
- Acid pickling
- Neutralization and passivation
- Inspection
- Reinstatement and assembly

- Chemical cleaning process to be applied according to specific procedure for each circuit individually
- Generally the circuit to be under chemical cleaning to be flushed/washed by water to remove any dirt
- Chemical cleaning skid pumping the chemical using in cleaning to make a closed circuit



# Commissioning and starting up OIL FLUSHING

## EQUIPMENT

R&E flushing skid units that include an on-board pump, heater, mixing tank, reverse flow manifold, and filtration system to capture insoluble matter.

Online and offline laser particle counter

Filter elemmetns

## SCOPE OF WORK

- Cleaning of hydraulic control systems (e.g., systems controlling large isolation valves on Coker drums and jacking systems for offshore equipment)
- Rotating equipment lubrication oil system cleaning (e.g., steam turbines, compressors, large pumps, and gas turbine systems)

## Process description

- Flushing of hydraulic and lubrication oil systems is used to ensure that new rotating and hydraulic equipment will start up and operate as designed, significantly reducing the potential for premature failure.







# Commissioning and starting up PIGGING



## Tools

- Metal Bodied Pigging Tools
- Foam Pigging Tools
- Solid Cast Pigging Tools
- Spheres

## Applications

- Pipeline pre-commissioning
- Pipeline maintenance
- Boiler maintenance
- Line dewatering
- Line drying
- Product batching

## Process description

- Pigging is completed to increase efficiency and avoid potential problems on existing pipelines,
- Pigging importance to remove new construction debris and assist during hydrostatic testing.





# Commissioning and starting up

## AIR BLOWING



### EQUIPMENT

- Air compressor
- High pressure rated hoses .
- High pressure rated connections .
- Plastic sheets .
- Manifold .

### applications

- Removal of construction debris and velocity cleaning
- Pre-heating, heating, and cooling of process vessels, reactors, and systems
- De-watering and drying
- Pigging and drying pipelines
- Pipeline pre-packing
- Pneumatic pressure testing
- Pre-tensioning pipelines

### Process description

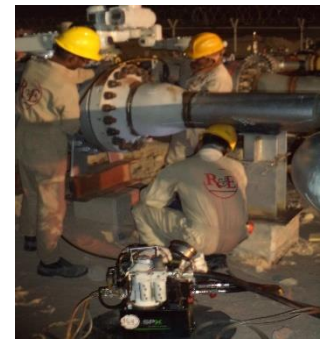
- Engineered air blowing is an efficient way to remove construction debris, loose rust, liquids, and other contaminants
- Every air blow procedure is specifically engineered for the individual system being cleaned.





# Commissioning & Starting Up

## FLANGE MANAGEMENT - REINSTATEMET



### EQUIPMENT

- Air compressor
- Hoses with rated pressure w

### Tools

- Manual & Hydraulic Spanners
- Manual & Hydraulic Torque wrench
- Hydraulic torqueing pumps
- Hand tools

### Description

- Check that joint faces are clean and free from cuts, indentations and other marks. Note particularly the presence of radial marks crossing the joint face
- All preservations substances removed.
- No grease or bolt lubricant on any gasket or flange face including grooves of ring type joints
- Torque to stretch the bolt using Manual & Hydraulic Torque Tools
- Torque to overcome friction at the bolt threads
- Torque to overcome friction at the nut spot face







# Commissioning and starting up

## BOLT TORQUEING - TENSIONING



### EQUIPMENT

- Air compressor.
- Torque Machine
- Tension Machine
- Special Hand tools

### Tools

- Manual torque wrench
- Hydraulic pump
- Hydraulic Torque Wrenches
- Hydraulic Tensioner

### Process description

- the twisting force required to spin the nut up along the threads of a bolt
- Bolts are designed to stretch just a small amount, and this elongation is what clamps the joint together.
- The elasticity of the material used in the bolt's manufacture causes it to want to return to its original un-stretched shape.
- This inherent bolt spring tension causes the clamping force and together with the friction in the bolt's threads, work to prevent loosening



# Commissioning and starting up

## LEAK & VACCUM TEST



### EQUIPMENT

- Nitrogen tanker
- Nitrogen bullets
- Nitrogen booster up to 400 bar
- Vacuum pump for vacuum test

### Tools

- Pipe lines
- Vessels
- Instruments tightness
- Vacuum system

### Process description

- Leak and vacuum test are conducted as close to startup as possible to confirm at site that there are no leaks from flanges or fittings in the plant.
- Also, includes man-ways on vessel, columns and drums along with valves.
- It is absolutely necessary to test all equipment and lines in the unit.
- An official pressure test shall be conducted.



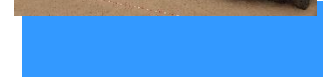
# Commissioning and starting up

## MECHANICAL EQUIPMENT TEST RUN



### Description

- Test is performed for 4 hours to prove equipment work in stable condition and all variables are within acceptance range.
- The mechanical run test is performed after successful Mechanical completion
- The data collection normally started after stabilization







# Commissioning and Starting up

## CATALYST LOADING



### EQUIPMENT

### Scope

### Description

- Hopper
- vinyl or canvas hose
- Crane

■ Catalyst loading is a critical step that promotes longevity of the catalyst and increased production. A variety of dense loading methods are offered. Conventional funnel and chute loading is most common but have been slightly modified for distribution and dust control.

- Catalyst is slowly filled into the tube through a specially designed funnel and the loading rope is gradually pulled out of the tube as the catalyst layer builds up.
- ensures a filling without extra voids and a high uniform density along the full length of the tubes is obtained. The catalyst is charged from buckets and the time consuming and expensive socking of the catalyst is avoided. Weighing of catalyst loaded in each tube is not necessary.



# Clients



مؤسسة البترول الكويتية  
Kuwait Petroleum Corporation



إحدى شركات مؤسسة البترول الكويتية  
A Subsidiary of Kuwait Petroleum Corporation



البترول الوطنية  
KNPC  
إحدى شركات مؤسسة البترول الكويتية  
A Subsidiary of Kuwait Petroleum Corporation



شركة صناعة الكيماويات البترولية (ش.م.ك.)  
PETROCHEMICAL  
INDUSTRIES COMPANY K.S.C.  
إحدى شركات مؤسسة البترول الكويتية  
A Subsidiary of Kuwait Petroleum Corporation



الشركة الكويتية لنفط الخليج (ش.م.ك.)  
KUWAIT GULF OIL COMPANY (K.S.C.)



Kuwait Foreign Petroleum Exploration Company  
الشركة الكويتية للاستكشافات البترولية الخارجية



Kuwait Petroleum International  
شركة البترول الكويتية العالمية



شركة ناقلات البترول الكويتية - س.ك.أ.  
KUWAIT OIL TANKER COMPANY S.A.K.



OIL SECTOR SERVICES COMPANY  
A SUBSIDIARY OF KUWAIT PETROLEUM CORPORATION



وزارة الكهرباء والماء  
Ministry of Electricity and Water



# Schlumberger

# Location

## **Kuwait Branch**

### **R&E Petroleum**

- P.O.: 4421 - Salmiya 22045 - Kuwait  
Tel : 00965 22272270-2  
Fax : 00965 22272271  
Mob: 00965 99655627
- Email: [elisa@re-petroleum.com](mailto:elisa@re-petroleum.com)

## **Egypt Branch**

### **R&E Petroleum Services**

- P.O.: 21311 - Alexandria - Egypt  
Tel : 0020 35853835  
Fax : 0020 35838490  
Mob: 0020 1099990203
- Email: [egypt@re-petroleum.com](mailto:egypt@re-petroleum.com)

## **Lebanon**

### **R&E Holding - Head Office**

- P.O.: 16-6523  
Tel : 00961 4 525322  
Fax : 00961 4 418939  
Mob: 00961 3 143336
- Email: [info@re-pfm.com](mailto:info@re-pfm.com)