ABU DHABI OIL REFINING COMPANY (TAKREER)

RUWAIS REFINERY EXPANSION PROJECT OPPORTUNITIES AND CHALLENGES

Presented by:

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RUWAIS REFINERY EXPANSION PROJECT OPPORTUNITIES AND CHALLENGES

Company Overview

Abu Dhabi Refinery

Ruwais Refinery
Overview:-

- Abu Dhabi Oil Refining Company (TAKREER) was established in 1999 to take over the responsibility of refining operations from ADNOC.
- Takreer’s areas of Operation include refining of Crude Oil and Condensate and Supply Of Petroleum Products in compliance with Domestic and International Specifications.
- Takreer is responsible for developing ADNOC’s refining industry, started with the establishment of Abu Dhabi Refinery in April 1976 and Ruwais Refinery in June 1981.
Overview (cont’d....):

- Aiming at becoming a leader in the oil refining business, Takreer is now working on expanding its activities in the downstream sector.

- Takreer is now in the process studying and implementing a series of new investments, that will help the company realize its goals for the future in line with ADNOC’s strategic plans.
Overview (cont’d....):

Takreer main objectives Include:

- Maintain Best HSE Standards
- Quality focused in oil Refining
- Be reliable Supplier of Refined Products
- Apply Cost Effectiveness approach in all levels.
- Attract and retain motivated professionals
- Be a pace-setter and Global Player in the Oil Refining business.
- Identify and deploy Product and Process Technologies, Techniques and Methodologies that provide COMPANY with a competitive Edge.
- Achieve the pre-determined Nationalization targets
Overview (cont’d....):-

Takreer owns and operates two Refineries viz:

- Abu Dhabi Refinery
- Ruwais Refinery
Abu Dhabi Refinery:-

- A grass root refinery was set-up with a capacity of 15,000 bpsd, to meet a growing local need for petroleum products in April 1976. Subsequently, in 1983 the refinery was expanded to process a further 60,000 bpsd.

- However the demand continued to grow in the fast developing Emirate, and “Adnoc” decided to expand capacity yet again to 85,000 bpsd in December 1992, with stringent environmental considerations in mind to include additional units for gas oil desulphurization and sulphur recovery.
Ruwais Refinery:-

- Ruwais Refinery is located 240 km west of Abu Dhabi city.
- Soon after commissioning the original 120,000 bpd Hydroskimming Refinery in June 1981, plans were drawn up to add 27,000 bpd Hydrocracker complex which was started in 1985.
- Two 140,000 bpd condensate processing trains were commissioned during 2000-2002 to process condensate produced in the onshore gas fields of Abu Dhabi. Currently these are the largest such condensate splitters in the world.
Ruwais Refinery:-

- In further compliance & contribution to HSE preservation, Unleaded & Low Sulphur Gas Oil (ULG/LSGO) facilities were added & commissioned in early 2006 aimed to increase Gasoline productions and Low Sulphur Gas Oil.
- A new Catalytic Reformer (12,000 bpd) and Isomerisation plant (19,000 bpd) were added in January 2006.
To support the refined product domestic demand growth as well as growing demand for clean fuels and chemicals in the Middle East and around the world, TAKREER is proceeding with a mega grass root Project to expand its refining capacity at Ruwais by addition of 400,000 barrels per day of crude distillation capacity.
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OPPORTUNITIES AND CHALLENGES
Background:-

- To establish the optimum scheme and meet the new requirements, TAKREER engaged Foster Wheeler, UK to carry out a feasibility study to implement a new Crude Oil Refinery in Ruwais with the optimum residue conversion scheme.
- The new Refinery will produce propylene, unleaded gasoline, naphtha, liquefied petroleum gas (LPG), aviation turbine fuel, kerosene, gas-oil, bunker fuel and other hydrocarbon derivatives.
Basic engineering design is currently in progress. The refinery is expected to be commissioned in early 2014. The facilities will meet high environmental standards and be designed to produce hydrocarbon products safely and efficiently.
Objectives: -

The Project will achieve the following objectives:

- Increase future Refining Capacity at Ruwais by 400,000 bpcd in a new Grass Roots facility.

- Upgrade bottom of the barrel by Residue Fluid Catalytic Cracking (RFCC) when processing Murban Atmospheric Residue and will produce 1.1 million TPA of Propylene for petrochemicals feedstock.
Refinery Configuration:

- The Process Configuration consists of 21 Process Plants and 20 supporting Offsite and Utilities Units. Latest technology to reduce the carbon footprint has been incorporated enabling TAKREER to become an environmental pace setter in the years ahead.

- The core unit in the configuration is the RFCC Unit which will be one of the largest in the world with a capacity of 127,000 bpsd.
Besides transportation fuels (gasoline, diesel, jet), the Refinery will produce light olefins (ethylene, propylene, butylene).

The Refinery offers integration opportunities for polyolefin production, (mainly polypropylene).
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Products:-
The main production slate will be as follows:
- LPG (as propane)
- Propylene
- Naphtha
- Gasoline blend component
- Jet A1
- Diesel
- Slurry to existing Fuel Oil
- Sulphur
Project Status:-

- **Project Launch**
  The Feasibility Study was completed in 2007 indicated that the new facilities in Ruwais provided a viable option to increase crude oil distillation capacity with an optimum residue conversion scheme and the PROJECT was launched.

- **Basic Design**
  The Basic Design (FEED) for the PROJECT is being finalised including the preparation of Enquiries for the Engineering, Procurement and Construction (EPC) phase.

- **EPC Packages**
  The implementation of the new Refinery will be through several EPC Packages.
### EPC Packages:

<table>
<thead>
<tr>
<th>EPC PACKAGE</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>Crude Distiller + Associated Units</td>
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<tr>
<td>2</td>
<td>Residue Fluid Cat Cracker + Associated Units</td>
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<tr>
<td>3</td>
<td>Offsites and Utilities</td>
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<td>4</td>
<td>Tankage + Associated Interconnecting Piping</td>
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<td>5</td>
<td>Site Preparation</td>
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<td>6</td>
<td>Non-Process Buildings</td>
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<td>7</td>
<td>Marine Facilities</td>
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Work Breakdown Structure

RUWAIS REFINERY EXPANSION

- CRUDE COMPLEX
- RFCC
- HYDROTREATING COMPLEX
- SULPHUR COMPLEX
- TANK FARM
- OFFSITES / MARINE
- UTILITIES
RUWAIS REFINERY EXPANSION PROJECT
OPPORTUNITIES AND CHALLENGES

Project Milestones:-

▪ FEED Duration 16 Months

▪ Followed by EPC Award and 48 months EPC Implementation.

▪ Based on the above durations, it is expected the new facilities will be in production early 2014.
# RUWAIS REFINERY EXPANSION PROJECT OPPORTUNITIES AND CHALLENGES

## Project Schedule:

<table>
<thead>
<tr>
<th>Activity</th>
<th>2007 Q1, Q2, Q3, Q4</th>
<th>2008 Q1, Q2, Q3, Q4</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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<th>2014 Q1, Q2</th>
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**Notes:**
- The schedule is divided into two phases: Engineering and Construction.
- The Engineering phase covers activities from 2007 to 2011.
- The Construction phase spans from 2012 to 2014.
Challenges:-

- Due to the immense size of the new Complex, many challenges face the PROJECT. These include optimum initial basic design through to implementation of the various EPC Packages with subsequent commissioning, start-up and handover of the new facilities.

- As each stage progresses, the PROJECT has many interfaces that need to be managed in an optimum fashion. TAKREER is proactive in meeting these challenges so that the PROJECT will be completed in time in order to achieve a pace setting Refining Complex in Ruwais, UAE.
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