

ENVIRONMENTAL ASPECTS IN REFINERIES AND PROJECTS

Presented by

Abdulla Ali Al Mansouri

Manager, Corporate Support Division

Abu Dhabi Oil Refining Company



Tokyo January, 2012

ENVIRONMENTAL ASPECTS
IN REFINERIES AND
PROJECTS

AGENDA

- Takreer Profile
- Basis for New Projects
- HSE Performance
- HSE Role in Projects
- Takreer Key Projects promoting HSE

TAKREER PROFILE

ENVIRONMENTAL ASPECTS IN REFINERIES AND
PROJECTS



TAKREER PROFILE

Name Plate Capacities
History of refineries



Abu Dhabi Refinery

85,000 bbl/
Day

Abu Dhabi Refinery

1976

•Original Plant, 15,000 Bbl /day

1983

•New Refinery 60,000 Bbl /day

1996

•Plant Expansion, 85,000 Bbl /day

Ruwais Refinery

400,000 bbl /
Day

Ruwais Refinery

1981

•Hydro-skimmer units 120,000 bbl/day

1985

•Hydro-cracker units

2000

•Condensate units 280,000 bbl/day

2006

•Gasoline units

Other Facilities

- Power Generation 660 MW
- Water Desalination 14.0 MM Gallons/day
- Hazardous Material Treatment, 26 MMT/ Year

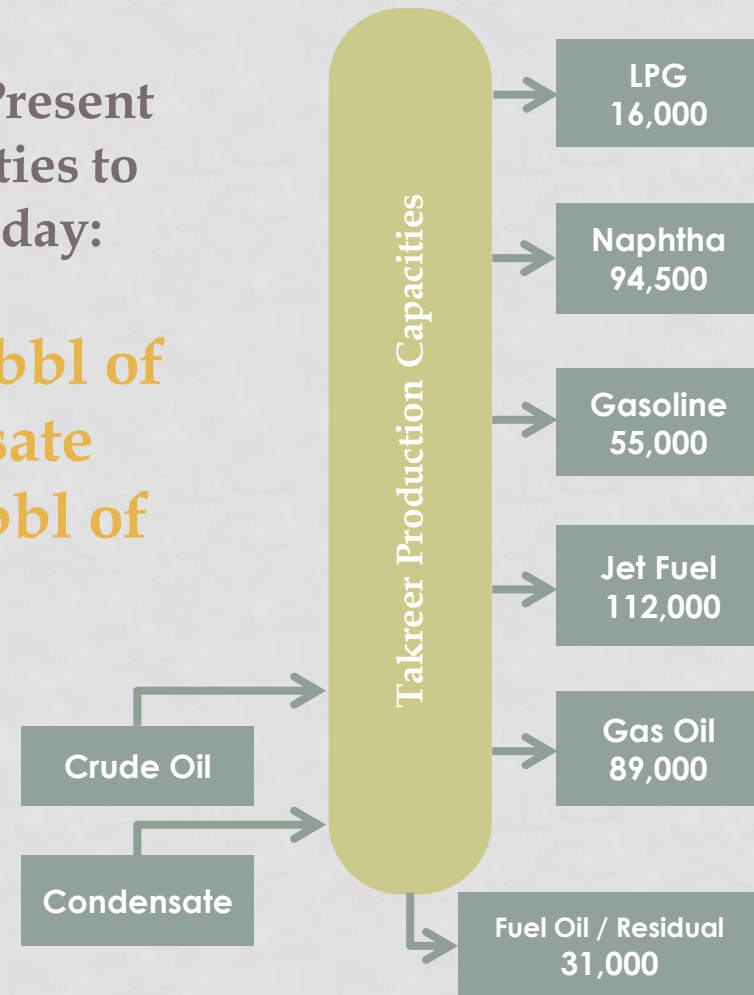
Takreer Refined Products

TAKREER PROFILE

Production
Barrels / Day

Takreer at Present
have capacities to
process per day:

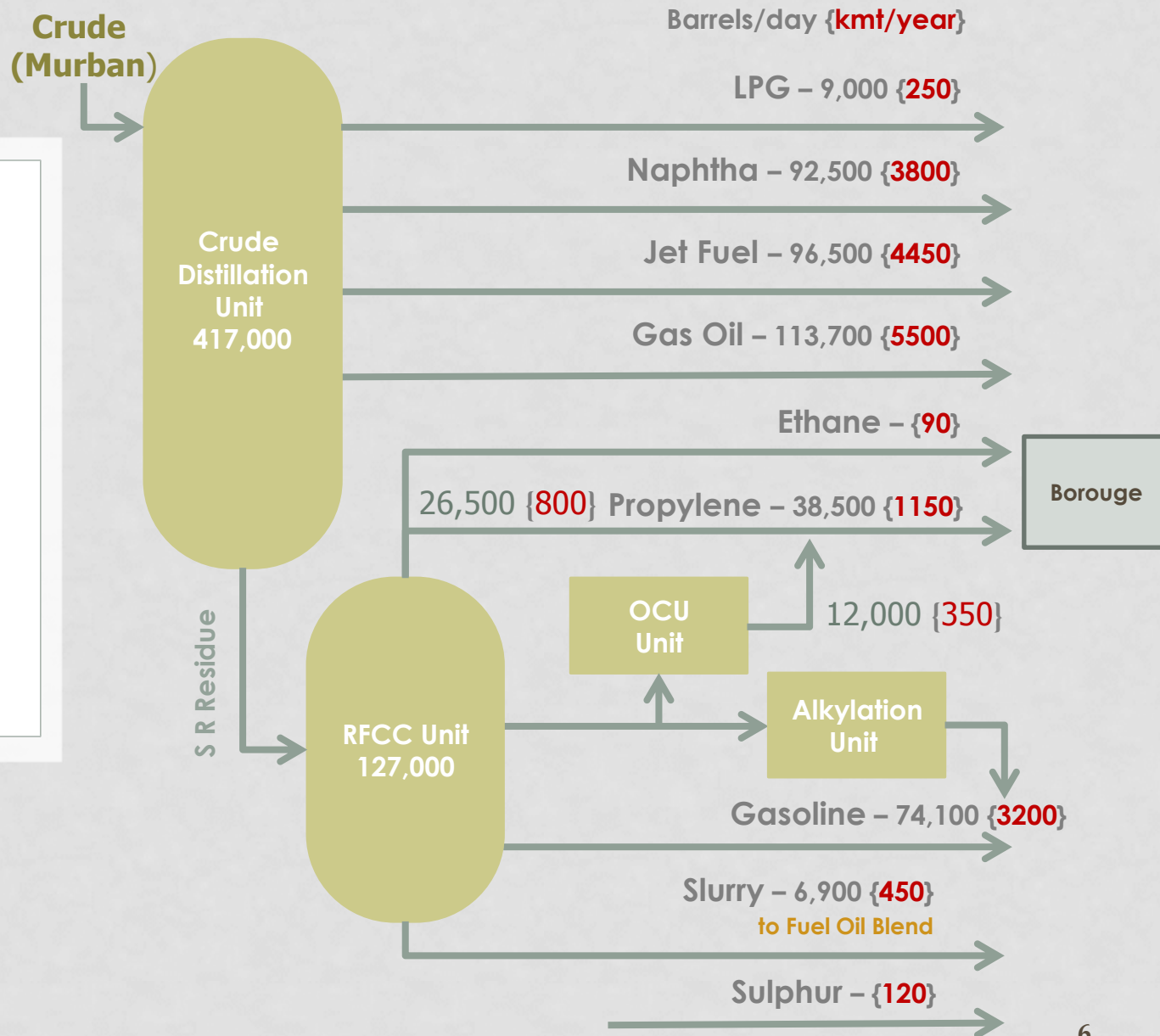
- 280,000 bbl of
Condensate
- 200,000 bbl of
Crude



New Grass Root Refinery Basic Configuration

TAKREER PROFILE

Ruwais Refinery Expansion
Project



BASIS FOR NEW PROJECTS

ENVIRONMENTAL ASPECTS IN REFINERIES AND
PROJECTS



BASIS FOR NEW PROJECTS

Driving Factors for New Projects

To boost production new projects are continuously taken up at Takreer

Driving Factors for new Projects:

- Market Demand & Growth
- Environmental & Quality Regulations
- Integration and Diversification

BASIS FOR NEW PROJECTS

Key Best Practices Area

- **Emphasis on Environmental Stewardship Program**
 - Emphasizes Conservation, Energy efficiency, and the Environmental and Socially responsible management of energy resources
 - Eliminate Flaring from Production Facilities
- **Focus on Innovation and Technology Development**
 - Latest process technology based plants
 - Technology Transfer Incentive Program
 - Scientific Research and Experimental Development
 - Value-Added Opportunities

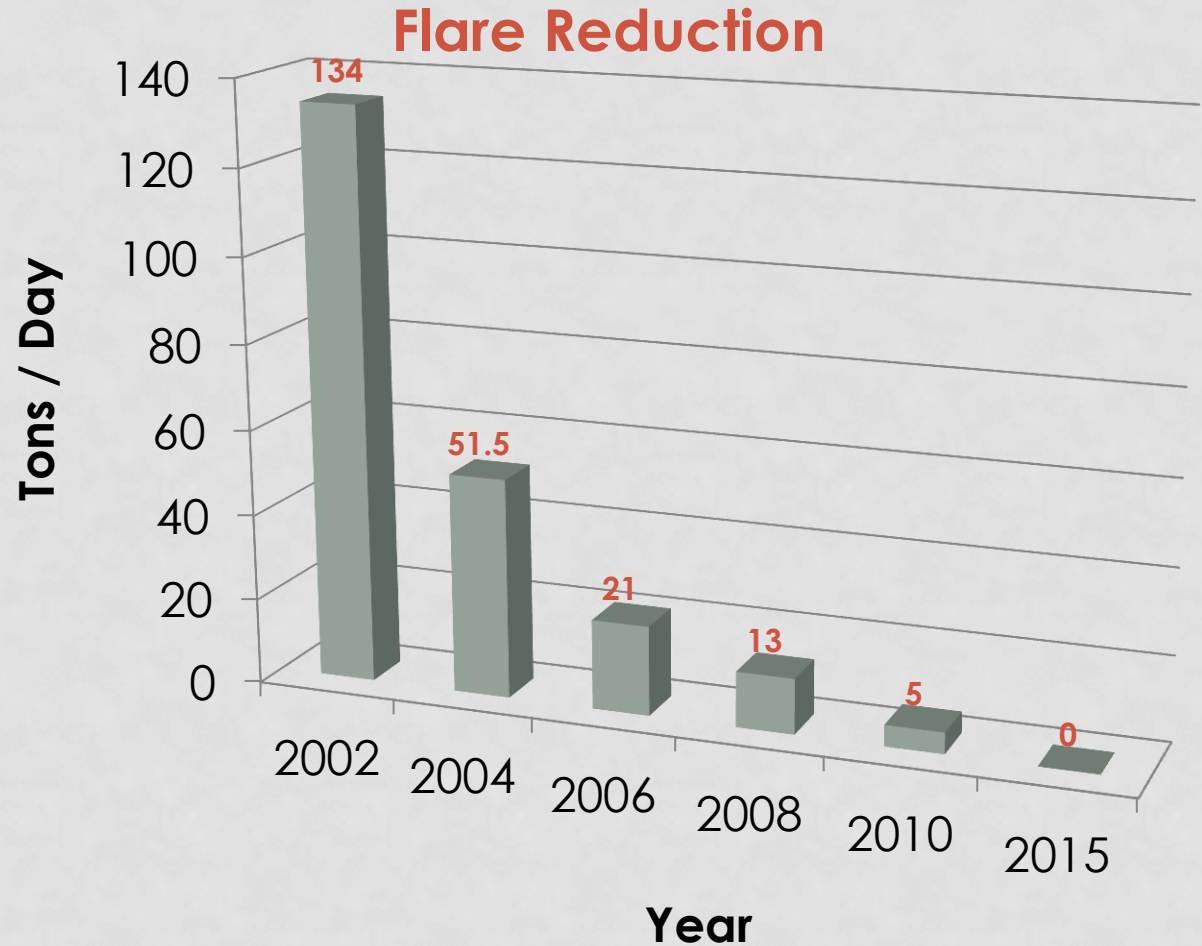
HSE PERFORMANCE

ENVIRONMENTAL ASPECTS IN REFINERIES AND
PROJECTS



HSE PERFORMANCE

- After Kyoto, Emission control is more focused area in HSE to further enhance the HSE performance
- Emissions controlled within stringent limits set by ADNOC



HSE ROLE IN PROJECT

ENVIRONMENTAL ASPECTS IN REFINERIES AND
PROJECTS



HSE ROLE IN PROJECTS

HSEIA Report for Projects

- For all projects HSEIA Report is **now a Living** document
- Considers the full life cycle of project, facilities and operations
- It must address the HSE impacts in each of the life cycle phases i.e.
 - Project conception
 - Design, tender
 - Construction
 - Commissioning,
 - Operation,
 - Decommissioning,
 - Abandonment and
 - Site restoration of a project

HSE ROLE IN PROJECTS

HSEIA Report

Phase 1

How to design for HSE Integrity

The report presents an overview of anticipated HSE Hazards, impacts and associated levels which are based on analysis of relatively broad HSE information of conceptual technical design and the environment in which the project will be located

Phase 2

How to build for HSE Integrity

The report is based on the detailed design include all HSE considerations of project construction, commissioning, performance testing and demobilisation of contractor(s) demonstrate follow-up to the recommendations made in the Phase 1

Phase 3

How to operate and to maintain HSE Integrity

The Phase 3 HSEIA Report addresses all HSE aspects of routine and non-routine operations and must be based on finalised construction, which may include modifications from earlier detailed design and/or late changes in predicted impacts

Phase 4

How HSE Integrity will be maintained during and after shutdown of a project

The report includes all HSE considerations of shutdown, decommissioning, mothballing and/or removal or discontinuation of an operation, including site restoration

TAKREER KEY PROJECTS PROMOTING ENVIRONMENT

ENVIRONMENTAL ASPECTS IN REFINERIES AND
PROJECTS



TAKREER KEY PROJECTS PROMOTING HSE

Completed Projects

- **ULG (Unleaded Gasoline and Low Sulphur Gas Oil)**
>> **Completed 2005**
 - To meet the quality demand of Unleaded Gasoline and Low Sulphur Gas Oil (50 ppm)
 - The scope main units include the following:
 - **Licensors' Units**
 - Light Naphtha Hydrotreater
 - Heavy Naphtha Hydrotreater
 - Light Naphtha Isomerization
 - CCR Reformer
 - Gas Oil Hydrotreater
 - Sulphur Recovery
 - **Open Art Units**
 - H₂S removal
 - Water reuse
 - Revamp of existing facilities
 - **Utility and Offsite Facilities**
 - Steam Generation
 - Condensate Recovery
 - Boiler Feed Water System
 - Nitrogen Production

TAKREER KEY
PROJECTS
PROMOTING HSE

Completed Projects



We Refine Right

- BeAAT (Centralized Waste Treatment Facility)

>> Completed 2009

- Centralized Waste Treatment Facility (BeAAT) build and operate to service all OPCOs Solid Waste Management
- The project involves installation of facilities to enable the storage, segregation, treatment and disposal of hazardous wastes generated by ADNOC group of companies to safeguard human health and environment such waste comprises of:

- Sludge 40%, Catalyst 15%, other 45%
- Waste generation rate 6324 tons / year

- It includes following units:

- | | |
|------------------------------------|---|
| ▪ Solidification Unit | 9845 TPY |
| ▪ Centrifugation Unit | 5000 TPY |
| ▪ Thermal Desorption Unit | 8600 TPY |
| ▪ Incinerator Unit | 5500 TPY |
| ▪ Physical/Chemical Treatment Unit | 27 TPY |
| ▪ Mercury Distillation Unit | 49 TPY |
| ▪ Landfills Class-I/II | 48,800 m ³ / 32400 m ³ 17 |

TPY = Ton Per Year

TAKREER KEY
PROJECTS
PROMOTING HSE

Completed Projects



- **Takreer Research Center**
 - >> **Completed 2009**
 - **Commissioned with vision to support Takreer Refining Business in Areas:**
 - **Troubleshooting and Technology Support**
 - **Process Modeling and Product Development**
 - **Pilot Plant Testing and Evaluation of Catalysts**
 - **Feedstock and Process Units' Evaluation.**
 - **Environmental related Studies**
 - **Basic and Applied Research.**
 - **Human Resources Development**
 - **Collaboration with reputed Research & Development Centers and companies like JCCP / Idemitsu Kosan, IFP, UOP and GS**

TAKREER KEY
PROJECTS
PROMOTING HSE

Completed Projects

- Inter Refineries Pipelines Project -1

>> Completed 2010

- 700 KM of pipeline to transfer products (Gasoline, Gas Oil, Jet fuel, Atmospheric residue) between Abu Dhabi and Ruwais Refineries and Mussafah terminal
- It is more environmentally secured and economical way of transportation of oil in large quantities between two locations
- Phase 2 of inter refinery pipeline project is under construction to meet year 2025 enhanced local market demand and reduce surface transport for fuel transfer



We Refine Right

TAKREER KEY PROJECTS PROMOTING HSE

On Going Projects

• Green Diesel Project

>> Completion 2011

- Production of Ultra Low Sulphur Gas Oil with maximum 10 ppm Sulphur content
- Environmental friendly & “Stay in Business” Project
- New Process Units include:
 - New Process Units
 - Unit 801 Vacuum Unit – 35,000 bpsd
 - Unit 804 Sour Water Stripper – 35 m³/h
 - Unit 807 Hydrogen Purification – 68,700 Nm³/h
 - Unit 812 Naptha Stabilizer Unit - 45 m³/h
 - Unit 805 H₂S Removal Unit – 8740 Nm³/h
 - Licensor Units:
 - Unit 815 Gas Oil Hydrotreater Unit 44,000 BPD
 - Unit 803 Mild Hydrocracker Unit – 41,000 bpsd
 - Unit 806 Sulphur Recovery Unit – 100 TPD
- Revamp of Existing Unit include
 - Vacuum Distillation Unit
 - Gas Oil Hydrotreating Unit

TAKREER KEY PROJECTS PROMOTING HSE

On Going Projects

Continued...

- **Zero Flaring**
 - >> **Completion 2013**
 - Flare gas recovery is a smart solution to reduce combustion emissions, such as NO_x, CO and CO₂ and turn environment liability into a positive cash flow
 - Takreer embark on two phases of Flare Gas Recovery projects to reduce gas flaring at and recovering it for use as fuel
 - This project will facilitate recovery of Fuel Gas components from various units of refinery to approach Zero Flaring condition by installing Flare Recovery facility comprising of one Liquid Ring Type Compressor and Auxiliary equipment