

## Refinery Economics

### Training Duration

5 days

### Training Date

18-22 April 2010 at Doha, Qatar

In any of the 5 star hotel. Exact venue will be informed later.

### Training Fees

- 3300 US\$ per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch

### Training Certificate

Define Management Consultants Certificate of course completion will be issued to all attendees.

Language: English

### Introduction

Over the past decade, there has been significant volatility in the profitability of petroleum refining. In order to put this volatility in perspective and to gain some insight into future trends, it is important to understand the fundamental factors that affect refinery product prices and margins. The course will begin with a detailed discussion of both crude oil and product markets, including pricing and trading options. The course then moves into the refinery to explore the effects of crude oil type on refining yields and to examine the interactions between crude oil selection and refinery complexity.

### Description

The course is followed with a description of refinery process technology. Key refining technologies are described such as crude oil distillation, heavy oil conversion options, hydro-treating, and catalytic reforming

Although oil refineries have many similarities, each refinery is customized to most profitably supply a specific market.

Profitable refinery operations involve many economic decisions, such as crude oil selection and production planning. These are important business processes critical for maintaining refinery competitiveness.

### Training Objectives

To make the refinery production planning, accounts, operations staff, process engineers understand the crude & products pricing mechanism, how the market prices change, market fundamentals and its linkage to refining margins.

Will also include a discussion of several means refiners are using to improve profitability

### Training Methodology

There will be interactive discussion based around case studies and presentations to highlight course details.

### Who Should Attend

Refinery Production Planning, Operations Department, process engineers and Marketing Accountant

### OUTLINE

#### Refining Economics

- Introduction to refining.
- Crude & product pricing.
- Refining Margin Calculations.
- Nature of crude oils.
- Refined products quality.
- Refining technology/complexity
- Simple & Complex refineries
- Nelson complexity index
- Refining yields
- Refining costs

Case Study No. 1 Refinery process technology

## Refining Economics value drivers

- Industry Economic Fundamentals
  - Asset Availability "On stream factor"
  - market driven "Crude & product pricing"
  - Regulatory requirements
  - Margin "the low cost producer"
  - Cash Advantage of New Production
  - Operating Cost (\$/BBL)
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- Operational Requirements
  - Refinery processes
  - Value chain
  - Process control and optimization

## Feed Stocks Supply and Demand Drivers, Issues and Alternatives

- Historical/current global crude market fundamentals.
- Refining and refined product market fundamentals.
- Introduction to feed stocks (qualitative)
- Naphtha market
- LPG market outlook
- Condensate market and its impact.
- Alternative feed stocks
- Refinery Information System(RIS) - Relational Database Production Planning
- Production Scheduling
- Performance Monitoring
- Yield accounting and data reconciliation

## Case study: New refinery project economics

## Group Discussion, Last Day Review, Evaluation & Summary

## **TRAINING INSTRUCTOR**

### **ENGR. ZAKI MIKHAIL ZAKI**

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#### Education

B.Sc in Chemical Engineering in 1970, from  
Cairo University, Faculty of Engineering.

#### Experience

☐ El Nasr Petroleum Refinery from 21/2/1971 until 1/12/1978.

From 21/2/1971-1/2/1976

As Shift Engineer in Crude oil & Petroleum products movement section.

From 1/2/1976-1/1/1977

In Production Planning.

From 1/1/1977-1/12/1978

In Programming Department as Senior Operation Programmer.

☐ (Abu Dhabi Marine Operating Company ADMA-OPCO) from 2/12/1978 until  
26/6/1991

In the Storage & Export section.

From 2/12/1978 – 1/9/1984

As a Shift Supervisor.

From 1/9/1984-1/7/1986

As a Day Training Supervisor.

From 1/7/1986-1/10/1988

As Senior Day Supervisor from 1/7/1986-1/10/1988.

\*From 1/10/1988-26/6/1991

As a Storage & Export engineer.

For involvement & responsibilities of storage & export engineer in details, please  
refer to the following page.

☐ From 9/10/1999 till 17/06/2004 as Training & Safety Manager.

(Alex carbon Black Co.S.A.E is multinational company petrochemical industry, ISO-9002, ISO-14001, QS-9000, certified TPM award, OHSAS ISO-18001, ISO/TS-16949 and TQM "total quality management")

Participated in development of HR management through upgrading performance management system, competency evaluation & up grading suggestion scheme, incentive scheme & implementation of "TQM" total quality management system organization development and recruitment process.

**\*From 19/06/2004 till date joint Midom “Middle- East company for Operation& Maintenance of Hydro Carbon Industries” as a Quality Manager with the following responsibilities:**

- Establishing and administering the Refinery Health, Safety, Environmental and Quality (HSEQ) Management System documentation and ensures the control of the HSEQ records.
- Encourage management support for HSEQ initiatives.
- Controls the HSEQ Management System documentation.
- Train Refinery Employees for HSEQ Activities
- Organizing internal audits of Quality, Health and Safety and Environmental Management Systems.
- Follow up audits’ corrective and preventative actions ensuring their implementation.
- Responsible for the Refinery Site Incident Reports categorizing, logging, and reporting.
- Organizing and participating in HSEQ Management System Reviews.

#### **Work Responsibilities for HSEQ Manager with MIDOM**

##### **Administer the Refinery Health, Safety and Quality (HSEQ) Management System**

- Control the updating and issue of the refinery HSEQ manuals
- Maintain master copies of refinery HSEQ manuals
- Notify amendments to departments and key focal points and retain amendments on file for not less than one year
- Administer and control the distribution of HSEQ management system documents
- Through the relevant departmental managers, ensure that HSEQ management system records are properly maintained
- *Organize and Participate in HSEQ Management System Reviews*
- Agree and publish the dates of meetings at the beginning of each year
- Prepare a review of the previous meeting’s minutes and of outstanding actions
- Report on the status of current quality initiatives
- Report on the results of internal and external audits

**Report on the status of HSEQ incidents (Site Incident Reports) SIR:**

Sets the requirements for the reporting, logging, investigation, follow-up & close out of all HSEQ incidents and establishes the criteria for identification and reporting of types and categories of incidents.

It is applicable to all departments and sections within the refinery organization

To facilitate the process of continual improvement all incidents reported shall be assigned a level of investigation, which is commensurate with the risk presented by the incident to personnel, the

environment, or the business. The results of the investigation together with any actions or preventive measures proposed will be recorded. When agreed actions have been completed and are confirmed as effective, the incident will be closed.

#### Organize Internal Audits

- Prepare and publish the schedule of internal HSEQ audits
- Identify the elements of the system to be included in the scope of each audit
- Ensure that all departments are audited at least every six months
- Organize unscheduled audits as required by the Refinery Manager
- Follow up audits to ensure corrective and preventative actions have been implemented

#### Coordinate Quality initiatives

- Together with the relevant departmental managers, plan the implementation of initiatives which have been identified and approved by the Management System Review Committee
- Monitor the progress of these initiatives and report progress at the Management System Review
- Follow up initiatives to ensure close-out has been completed satisfactorily

#### Motivate and Train Refinery Personnel

- ❖ Participate in the development of HSEQ Management System training packages
- ❖ Prepare and deliver training modules as appropriate
- ❖ Provide training for Refinery personnel as internal auditors
- ❖ Conduct SIR "Site Incident Reporting" Training on weekly basis for all Refinery employees once per year.
- ❖ Covering all Shift Operation Employees Twice/ year Training in the following Topics:
  - 1.HESQ Management System "Procedure, Manuals& Work Instruction implementations.
  - 2.SIR "Site Incident Reporting" Reporting, Follow up and Close out.
  - 3.Self Internal Auditing Teams.

### Support Refinery HSEQ Systems

- Promote the refinery HSEQ system by ensuring an open and positive approach when conducting audits and reviews
- Encourage management support for HSEQ initiatives
- Promote HSEQ awareness
- Ensure any visitors are properly supervised and follow safety procedures while on company property
- Lead by example when conducting audits or site visits, and ensure all members of audit teams set high standards of safe working

As MIDOM's Management Representative the company has achieved the accreditation of ISO 14001:2004 and OHSAS 18001 on 11/08/2005 by SGS Société Générale de Surveillance SA (SGS SA).and ISO 9001:2000 on 13/02/06 by SGS Société Générale de Surveillance SA (SGS SA).

### Perform refinery business economics studies such as the following:

1. Explore new economic opportunities to boost the refinery margin
2. Production lost opportunities
3. Economics of unplanned shut downs
4. Participate in the preparation of annual plans for operations to meet estimated production requirements
5. Support top management in developing business strategies.

### 1. Work Responsibilities: (For Storage & Export Engineer with ADMA-OPCO)

Supervise efficient operations in Storage and Export Section for storage and efficient export of crude oil from Das. Supervises comprehensive agency activities and ensures proper maintenance of facilities.

(There are 14 tanks with total capacity of 8 M. barrels, plus 3 bunker fuel tanks and one condensate. The loading pumps are computer –controlled driven by 7 gas turbines. There are 2 control rooms and 2 separators. Crude oil lines are 42- and 48 up to shore value controlled by 1-meter skid. Tankers are visiting Das minimum of 12 per month).

### 2. Work Performed:

#### (I) Supervision:

- (i) Plans, and supervises the activities of assigned personnel in Storage & Export Section.
- (ii) Performs supervisory functions and exercises responsibility at the Unit Head level as established by Management.

#### (II) Planning Activities:

- i. Receives expected dates of tankers arrival from Senior Operations Programmer (SOP).

- ii. Receives daily production rates from Process Section.
- iii Synchronizes targeted, levels of export with those of production, highlighting any deficiencies / excessive levels to Supervisors

### III. Control of Work:

- a) Tours the tank farm, control rooms, loading pumps daily to ensure compliance with set programs and orderly and safe operations,
- b) Ensures and participates in production of timely/orderly of daily reports such as capacity, crude oil levels, weather, etc.
- c) Checks personally a certain computer readings for loading crude oil tankers.
- d) Attends with representatives of the Supreme Petroleum Council (SPC) analytical tests of crude oil conducted in Oil Laboratory. Authorizes certificate of quality and resolves any operational problems in the laboratory.
- e) Communication-coordinates with Marine Section on Das various tankers/ships movement in Das Port ensuring availability of berths for due tankers.
- f) Initials hot, cold, entry and excavation work permits for Supervisor's signature.
- g) Participates in regular safety meetings and tours the tank farm to ensure compliance with safety rules and regulations and promote awareness of subordinates on it.

### IV. Maintenance Role

- i. Supervises implementation of planned maintenance schedule ensuring safe, economic and that Production Operations are not interrupted,
- ii. Authorizes all work/service requests by subordinates for repairs.
- iii. Tests and accepts completed work.
- iv. Participates in scheduling major shutdown maintenance

### V. Modification:

- i. Studies and initiates modifications to facilities.
- ii. Writes scope of work supplying sketches.
- iii. Agrees such modifications with discipline engineers on Das and justifies major modifications to Engineering Division.
- iv. Comments on engineering package ensuring operational requirements are included.
- v. Monitors implementation and accepts completed work.

### VI. Shipping Agency Activities:

- i. Supervises and controls the activities of shipping agency to all tankers/ships in Das port.
- ii. Checks for accuracy and signs all disbursement accounts, oil loading, shipping documents, port dues prior and after Master's signature.
- iii. Authorities all accounts to Finance Division / Agents.
- iv. Ensures timely production of Berth Occupancy Report

## VII. Co-ordination Function:

- i. Liaises with Operations Programmer / Oil Movement Controller on crude level, export program, arrival / departure of tankers and queries from shareholders.
- ii. Liaises with Government oil Inspector and Petroleum Authority personnel on quality of oil, quantities exported, documentation of tankers, port dues and movement of ships.
- iii. Attends Department Morning Co-ordination meetings to co-ordinates
- iv. Operational activities within Department.

## III. Safety Role:

- i. Follows-up the implementation of the Division's Annual Safety Program.
- ii. Supervises and ensures compliance with allocated tasks required by the audit team of the International Safety Rating Systems (ISRS).
- iii. Updates the safety procedures within the Storage & Export's Area.
- iv. Ensures that appropriate and safe house keeping is always maintained and issues instructions / work orders to repair / service safety and near miss items.

## 3. Other related work:

Performs other related duties such as: participating in preparing the Department's capital and operating budgets, studying , analyzing and commenting on modes of operations , procedures , code of practices recommending enhancement , Telexing daily status of operation in the Section to SOP ...etc .

## 4. Work Relations:

Daily contacts with Senior Operations programmer to co-ordinate crude export ships movement and queries from shareholders

- Daily contacts with SPC representatives / Abu Dhabi Port authorities on Das on quality / quantity of oil movement of ships and port dues.
- Frequent contacts with Marine / Process Section's personnel at own level to co-ordinate activities.
- Frequent contacts with discipline, engineers / Engineering Division on maintenance, specification and standards.

- Internal Trainings Conducted:

1. Communication & Interpersonal Skills
2. Quality audit & process hazard analysis
3. Better Communication & Human Relations at the Workplace
4. Executive Communication Program
5. Communication Techniques for Today's Manager

- 6. Communicating to Reduce Stress on the Job
- 7. Work planning and performance evaluation
- 8. Refinery Quality Management

- External training attended:

1. Measurement and control of crude oil and petroleum products by SGS Redwood at Geneva, 1986.
2. Management Training at UAE by UMC from 30/03/86 to 05/04/86.
3. Appraisal Interviewing Skills at UAE by PST from 03/03/85 to 06/03/85.
4. Education in Hazardous Area Operation at UAE by SIR from 08/10/84 to 10/10/84.
5. Ruston Gas Turbine Maintenance & Operation by RGT at UAE from 14/07/84 to 19/07/84.
6. Enriching your management style-The 360 Degree Way in Dr/ T.V.Rao Management centre Hyderabad India 1999.
7. Managerial assessment of proficiency "MAP" at "Gyanodaya" Management training centre of Aditya-Birla Group at Bombay 2000.
8. Train the trainer Workshop- to catalyze learning & change 2002, at "Gyanodaya".
9. Six Sigma Green Belt Training at ACBC 2003 by PMG India.
10. ISO 9001:2000 Quality systems Lead Auditors Training by SGS IRCA Certified Course No.: A 17038 with successfully passed Grade A+, in 2005.
11. OHSAS 18001:1999 Occupational health and Safety Lead Auditors Training by SGS IRCA Certified Course on 17/07/05.

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