EPROM

ACHIEVEMENTS
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11. EGYPTIAN REFINING COMPANY (ERC).

12. MARINE TERMINAL SERVICES.
1. INTRODUCTION

COMPANY VISION
EPROM is a customer oriented company and is therefore set to attain a leading position as an operation and maintenance contractor within Egypt and the Middle East while offering state-of-the-art Management techniques.

COMPANY MISSION
EPROM as the first Company in Egypt providing full-fledged Operation and Maintenance Management Services to various large scale companies takes into consideration the complete satisfaction of its clients through the dedication to achieve the following:

• Provide quality services, and supply top of the line performance, which in return results into maximizing profitability to our clients, and simultaneously minimizing costs.
• Comply with our sophisticated HSEQ management system, which is being implemented on all sites managed by us.
• Achieve excellence through engaging top notch, and highly competent personnel.

SHAREHOLDERS
Egyptian Projects Operation & Maintenance is a joint stock company according to Egyptian Investment Law No.8/1997.

The shareholders are:

- 5% AMRYA PETROLEUM REFINING CO.
- 5% ALEXANDRIA PETROLEUM CO.
- 10% PETROJET
- 10% ENPPI
- 10% EMC.
- 10% PETROMAINT.
- 50% EGPC.
**PROJECTS**

EPROM is the sole leading company in Egypt to Manage and Operate Projects. The company particularly operates Oil Refineries, Petrochemical Plants, Marine Terminals and Gas Plants, among other technical services it provides.

EPROM is known and established to use the latest Operations and Maintenance Management techniques to deliver the best results which have been proved to exceed clients' requirements and expectations.

EPROM as an EGPC company has a huge potential to be awarded multiple contracts acting as the sole O&M provider for all prospective companies within the Egyptian Petroleum Sector. EPROM is backed up with huge resources; expertise, manpower, not to mention the well-tailored training programs provided to employees of highest technical caliber.

Worth mentioning is the fact that all large scale contracts awarded to EPROM since its establishment in 2002 (initially under the name MIDOM) have been smoothly renewed up until today in a clear sign of content and satisfaction with EPROM performance so far; as regards, work fluency, plant outputs, promptness and feasibility.

Based on its successive achievements within local market EPROM currently seeks further expansion in the region and has been technically accepted in several international bids it has participated in; be it directly as a main contractor or indirectly as a subcontractor to other companies.

For that reason and more EPROM has founded a couple of prominent branches in Africa and the Gulf Area to avail its outstanding services in both regions in an attempt to strengthen its existence there as well as facilitate work flow and coordination with its sites around and employees the world.
2. Technical Support Services

Provide technical and consultancy services to Egyptian Refining Company (ERC) at the EPC contractor Premises GE&S South Korea.

Follow up EPC Contractor site construction activities in Egyptian Refining Company (ERC) Cairo.

Provide technical consultancy service to AL AMRIA REFINERY (A.P.R.C.) to Enhancing quantities & Specs of Vacuum Distillates for (VDU).

Provide Inspection Services for local and worldwide Companies

Participate in Tenders and Proposals

Electronic Documents Management System (EDMS) To manage all EPROM Projects Documents Electronically

Being agreed to cooperate with the following companies:
- SIDI KRIR Petrochemical Company (SIDPEC) to Provide Technical, Engineering, And Training Services.
- ASSUIT Refining Company (ASORC) to provide Technical consultancy Services for the new CCR Project.
- PETROBEL and GPC to Install Automatic Sampling Systems for the Crude transfer lines
- ANRPEC to provide Technical consultancy Services for the new CCR Project.
3. Technical Support Services (World Wide)

<table>
<thead>
<tr>
<th>Country</th>
<th>Service Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAIN</td>
<td>Inspection (TR).</td>
</tr>
<tr>
<td>TURKEY</td>
<td>Inspection (TR).</td>
</tr>
<tr>
<td>KSA</td>
<td>Inspection (TR).</td>
</tr>
<tr>
<td>QATAR</td>
<td>Lab Services.</td>
</tr>
<tr>
<td>UAE</td>
<td>Training Services.</td>
</tr>
<tr>
<td>USA</td>
<td>Technical Support (UOP).</td>
</tr>
<tr>
<td>INDIA</td>
<td>Technical Support (UOP).</td>
</tr>
<tr>
<td>CHINA</td>
<td>Technical Support (UOP).</td>
</tr>
<tr>
<td>CHILI</td>
<td>Technical Support (UOP).</td>
</tr>
<tr>
<td>THAILAND</td>
<td>Technical Support (UOP).</td>
</tr>
<tr>
<td>KAZAKHSTAN</td>
<td>Technical Support (UOP).</td>
</tr>
<tr>
<td>KUWAIT</td>
<td>Technical Support (UOP).</td>
</tr>
<tr>
<td>RUSSIA</td>
<td>Inspection (TR).</td>
</tr>
</tbody>
</table>
## 4. MOUs, Partners and Technical Cooperation

<table>
<thead>
<tr>
<th>Company</th>
<th>Scope of Cooperation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENPPI (ENPPI)</td>
<td>Technical Support</td>
</tr>
<tr>
<td>EMC (EMC)</td>
<td>Maintenance, Construction, Inspection, etc.</td>
</tr>
<tr>
<td>ABB (ABB)</td>
<td>Electrical Industries</td>
</tr>
<tr>
<td>SGS (SGS)</td>
<td>Technical Support</td>
</tr>
<tr>
<td>ALFA LAVAL</td>
<td>Technical Support</td>
</tr>
<tr>
<td>VEOLIA (VEOLIA)</td>
<td>Water Treatment / Technical Support</td>
</tr>
<tr>
<td>OGS (OGS)</td>
<td>Training Support</td>
</tr>
<tr>
<td>KBC (KBC)</td>
<td>Project Management / Technical Support</td>
</tr>
<tr>
<td>Company</td>
<td>Scope of Cooperation</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Petroconsult - SULZER</td>
<td>Rotating Equipment, Repairs, Refurbishment</td>
</tr>
<tr>
<td>COMESA</td>
<td>Marketing in Nile Basin Countries</td>
</tr>
<tr>
<td>Engineering Systems Group Co.</td>
<td>Technical Support</td>
</tr>
<tr>
<td>INMA Kingdom</td>
<td>Training / Technical Support / Consultancy</td>
</tr>
<tr>
<td>NALCO</td>
<td>Water Treatment / Technical Support</td>
</tr>
<tr>
<td>SULZER</td>
<td>Rotating Equipment, Repairs, Refurbishment</td>
</tr>
<tr>
<td>TECNICAS REUNIDAS</td>
<td>Project Management / Technical Support</td>
</tr>
<tr>
<td>UOP</td>
<td>Refineries’ Development &amp; Design</td>
</tr>
<tr>
<td>T.I.M.E Services</td>
<td>Catalyst Handling</td>
</tr>
</tbody>
</table>
5. EGPC Assignments

Thanks to EPROM successful experience in the field of projects operation & maintenance for oil refineries, petrochemical and gas plants, the Egyptian General Petroleum Corporation (EGPC) has assigned EPROM to implement and undertake the following tasks on its behalf;

1. Implement the ZLD (Zero Liquid Discharge) approach in all oil refineries and petrochemical plants.
2. Study of all alternatives for water, utilities, Hydrogen & Energy saving methods in all EGPC companies.
3. Preliminary technical study for a new Atmospheric Distillation Unit in Alexandria Area with capacity 5million ton/year.
4. Provide technical consultancy services to oil refineries.
5. Study Crude & Products networks and pipelines integration and coordination between Alexandria Petroleum Companies.
6. Apply Linear Programming (LP) in oil refineries.
7. Study of debottlenecking in the Storage of petroleum Products in order to facilitate export and import process of petroleum products

Al Amreya Petroleum Refining Co. 
APRC

Alexandria Petroleum Company 
APC

Cairo Oil Refining Company 
CORC

Middle East Oil Refinery 
MIDOR

Assiut oil Refining Company 
ASORC

Al-Nasr Petroleum Company 
NPC

Suez Oil Processing Company 
SOPC

Alexandria National Refining and Petrochemical Company 
ANRPC

Egyptian Linear Alkyl Benzene 
ELAB
6. TRAINING

The company implemented an annual training plan carefully put the employer on the road to reach the desired perfection since 2003.

Training Hours

<table>
<thead>
<tr>
<th>Year</th>
<th>Training Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>4889</td>
</tr>
<tr>
<td>2004</td>
<td>60000</td>
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<tr>
<td>2005</td>
<td>65000</td>
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<tr>
<td>2006</td>
<td>71000</td>
</tr>
<tr>
<td>2007</td>
<td>77000</td>
</tr>
<tr>
<td>2008</td>
<td>100000</td>
</tr>
<tr>
<td>2009</td>
<td>44913</td>
</tr>
<tr>
<td>2010</td>
<td>60967</td>
</tr>
<tr>
<td>2011</td>
<td>54453</td>
</tr>
<tr>
<td>2012</td>
<td>82461</td>
</tr>
<tr>
<td>2013</td>
<td>48308</td>
</tr>
<tr>
<td>2014</td>
<td>59393</td>
</tr>
</tbody>
</table>
EPROM Projects

Since 2002

Since 2006

Since 2006

Since 2009

Since 2010

Marine Terminal Alex., Dekhaila, Damietta Ports
7. Middle East Oil Refinery (MIDOR)
Contract Date
EPROM has been Managing MIDOR under a global Operation and Maintenance Management Contract since August 2002

Refinery Description
- MIDOR is the most advanced refinery in Africa and is being classified as the sixth in the Mediterranean, based on technological complexity; reaching a standard of 11.5, according to Nelson Complexity Index.
- The refinery’s designed capacity is 5 million tons/year; equivalent to 100000 bbl/day.
- Refinery Units can be summarized as follows:
  - Crude & Vacuum Distillation (CDU / VDU).
  - Naphtha Hydrotreater (NHT).
  - Naphtha Splitter Unit.
  - Continuous Catalytic Reformer (CCR).
  - Isomerization (PENEX).
  - Kerosene (MEROX).
  - Distillate Hydrotreater (DHT).
  - Hydrocracker (HC).
  - Hydrogen (H2) Plant.
  - Delayed Coker Unit (DCU).
  - Light Ends & LPG Recovery.
  - Sulphur Plant & Tail Gas Treatment.
  - Amine Regeneration Unit
  - Sour Water Stripper Unit
  - LPG Treatment.

Main Products
LPG, Premium Gasoline, Gas Oil, Kerosene, Jet Fuel, Coke, Sulphur.

Scope of Work:
EPROM is designated to cover most Operation and Maintenance Management activities for MIDOR refinery, this includes the following scope:

1. Process units, utilities, and off-site operations
2. Crude and products pipelines transfer operation
3. Operations management
4. Maintenance Management
5. Production planning using linear programming “LP”
6. Inspection
7. Technical support
8. HSEQ management systems
9. Competency program for human resources
10. Procurement services
11. Dekhela Port Marine Terminal Services for shipped products
**EPROM Manpower On-Site**

EPROM has a total number of 876 employees on MIDOR site from various sectors of experience.

**Long-Term Business Success**

**I- Achieve MIDOR Annual Production Plans.**

Delivering oil refining production rates the right way is a responsibility that EPROM takes seriously in MIDOR Refinery. Our Operational and Maintenance Excellence Management System guides us as we seek to achieve increasingly higher levels of Production, safety, operational and environmental performance. This focus helped us achieve the annual production schedule plan since 2003.
Hydrocarbon Loss %

% White Product Recovery

Jet Fuel (tons)
II- Safety First and Accreditations.

- Accrediting uninterruptedly since 2004 till this day by SGS and TUV Nord for compliance Health, Safety Environment & Quality regulations according to:
  - EMS 14001.
  - OHSAS 18001.
  - ISO 9001.

- Preparing MIDOR to be ranked one of the Top Ten Middle East and Africa by applying for SOLOMON Benchmarking twice; in 2008, 2010 and currently preparing the Refinery for Solomon Benchmarking in 2016.
- EPROM is the sole responsible entity for the correct application of all TUV SUD recommendations and best practices as part of TUV SUD regular asset integrity audits over MIDOR.
- Committing to implement all MARSH surveillance for risk assessment recommendations in MIDOR annually since 2002.

III- Client Satisfaction.

- Maintaining no violated MIDOR Refinery contractual KPI’s since 2003.
- Keeping all MIDOR products locally and internationally accepted with a record of zero customer complaints.
- Achieving the highest crude and feedstock quantity processed during 2008 of about 36.6 MMBBLS/year while the contractual obligation is 34 MMBBLS/year resulting in an increase of 8%.
- EPROM received an acknowledgement letter from EGPC in 2009 stating its highest Diesel production achieved that year.
IV- Maximize Client Productivity.
- Enabling MIDOR to utilize its Coker and Hydrocracker spare capacity to process feedstock materials within the existing CDU/VDU unit such as Fuel oil 3.5% and 1% Sulphur and waxy distillates.
- Sustaining feed rate 6% above design rate in multiple cases and thereby significantly increased MIDOR productivity.
- Managing all waste water resources to have Zero Liquid Discharge in MIDOR.

- Efficient Production Planning through blending different stock materials in MIDOR Refinery final products tanks to increase our Client’s profitability and satisfy local market needs for strategic petroleum products in times of crises
- Operation successfully sustained feed rate 6% above design rate in multiple cases and thereby significantly increased MIDOR productivity.

V- Design Improvement
- Conducting successfully 237 feasible, economic and environmental PFCPs through engineering and economic studies.
- Allowing for a cost-free unloading of approx. 1000/tons/Day of waxy/fuel oil trucks into slop tanks.
- Modifying tanks to Increase Diesel Storage Capacity by 46,000 m³.
- Modifying tanks to allow receipt of extra 58000 m³ of VGO.
- EPROM managed to alter designs and settings in the truck loading area of allowing for a cost-free unloading of approx. 1000/tons/Day of waxy/fuel oil trucks into slop tanks.
- Implementing successfully the first Phase of MIDOR DCS modernization project for Hydrocracker, Hydrogen, and Coker units, October 2014.

Process & Facilities Change Proposal (PFCP’s)
VI- Expansions and Revamps at MIDOR

- Working in close collaboration with UOP to expand refinery production capacity from 100,000 bbls/day to 160,000 bbls/day EPROM is effectively involved in the linear programming model and the detailed feasibility studies (DFS) of this huge expansion project.

- Installing a Crude Distillation Pre-flash tower to increase refinery throughput by 15% from 100,000 BBL to 115,000 BBL at the same unit capacity.

- Upon EPROM engineering advice the EPROM O&M team is currently busy installing a knockout drum in the Hydrogen Unit for better performance of the molecular sieves.

- Boosting the Coker production from 151 m³/hr (22,800 BPSD) to 170 m³/hr (25,663 BPSD) through installing new Process Heater Cell.

VII- Cooperation with International Bodies

Engaging and collaborating with a vast variety of Licensors and Vendors from all over the world.

- KOTCH-GLITSCH to maintain and replace all tower internals.
- KTI to maintain and replace heaters internals.
- UOP to expand MIDOR from 100,000 bbl. /day to 160,000 bbl. /day.
- ALFA LAVAL to test and maintain special design plate heat exchanger (PACKINOX).
- HALLIBURTON to test and clean heater tubes.
- FURMANITE to install special clamps to stop leakage of high pressure flanges by injecting chemical compound.
- **UOP** to replace catalyst under nitrogen blanket, maintain and replace all reactors & package internals.
- **TIME / EUROCAT / ANABEEB** to replace catalyst under nitrogen blanket for reactors.
VIII- Flexibility to Process a Vast Variety of Crude Oils

- Refining a Vast Variety of more than 25 Crude Oil types rather than the initially designed ARH/ARL (50/50) crude blend.
- Executing the PROCESSING FOR OTHERS contract on behalf of MIDOR implementing more than 50 overall refinery test run for different crude blends without any off-spec complaints from 2005 until 2011.

IX- Industry Best Practice

- Extending Coker unit heater spalling intervals recording an almost 3 times longer than designer expectation.
- Performing for the first time “Hot stand by and Hot start up" of MIDOR Hydrogen Unit shutdown sequence to save H2.
- Managing MIDOR workshop for Re-tubing for more than 90 bundles and fabricating completely (about 25 bundles).
- Applying Asset Integrity Management programs in MIDOR Refinery, whereby disciplines of inspection, maintenance and operations have been incorporated to ultimately impact equipment and infrastructure integrity.
Applying successful maintenance and repair schemes including all supporting logistics, guarantee liaison and procurement activities within MIDOR Refinery have been privileged to experience and successfully manage a refinery major turnaround every 3 - 4 years and 3 - 4 shutdowns per year through more than 10,000 man-hours per year.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Units / Refinery</th>
<th>Duration (days)</th>
<th>From (Date)</th>
<th>To (Date)</th>
</tr>
</thead>
</table>
| 1   | Unit 13:Sulphur And Tail Gas Treatment  
     Unit 45:Spent Caustic Treatment | 8 days | 20/03/2003 | 27/03/2003 |
| 2   | Unit 13:Sulphur And Tail Gas Treatment | 10 days | 14/04/2003 | 23/04/2003 |
| 3   | Unit 08:Hydrocracker  
     Unit 09:Hydrogen Plant | 17 days | 10/07/2004 | 26/07/2004 |
| 4   | Unit 13:Sulphur And Tail Gas Treatment | 13 days | 12/10/2004 | 24/10/2004 |
| 5   | Unit 11:Delayed Coker unit | 5 days | 25/11/2004 | 29/11/2004 |
| 6   | Unit 08:Hydrocracker | 6 days | 03/12/2004 | 08/12/2004 |
| 7   | Unit 08:Hydrocracker  
     Unit 09:Hydrogen Plant | 5 days | 31/01/2005 | 04/02/2005 |
| 8   | Unit 1:Crude And Vacuum Distillation  
     Unit 2:Naphtha Hydrotreater  
     Unit 4:Catalytic Reforming Unit  
     Unit 11:Delayed Coker unit | 18 days | 01/04/2005 | 18/04/2005 |
| 9   | Unit 08:Hydrocracker  
     Unit 09:Hydrogen Plant | 13 days | 14/05/2005 | 26/05/2005 |
| 10  | Unit 4:Catalytic Reforming Unit | 15 days | 04/01/2006 | 18/01/2006 |
| 11  | Unit 2:Naphtha Hydrotreater  
     Unit 11:Delayed Coker unit | 40 days | 07/06/2006 | 16/07/2006 |
| 12  | Unit 15 –TR01:Sour Water Stripper | 8 days | 24/06/2006 | 01/07/2006 |
| 13  | Unit 14–TR01: Amine Regeneration | 12 days | 06/07/2006 | 17/07/2006 |
| 14  | Unit 15 –TR02: Sour Water Stripper | 9 days | 19/07/2006 | 27/07/2006 |
| 15  | Unit 14–TR02: Amine Regeneration | 5 days | 30/07/2006 | 03/08/2006 |
| 16  | Unit 08:Hydrocracker  
     Unit 09:Hydrogen Plant | 5 days | 18/09/2006 | 22/09/2006 |
<table>
<thead>
<tr>
<th>S/N</th>
<th>Units / Refinery</th>
<th>Duration (days)</th>
<th>From (Date)</th>
<th>To (Date)</th>
</tr>
</thead>
</table>
| 17  | Unit 1:Crude And Vacuum Distillation  
Unit 08: Hydrocracker  
Unit 09: Hydrogen Plant  
Unit 11: Delayed Coker unit | 31 days | 07/01/2007 | 06/02/2007 |
| 18  | Unit 2:Naphtha Hydrotreater  
Unit 4: Catalytic Reforming Unit  
Unit 5: Isomerization  
Unit 08: Hydrocracker  
Unit 09: Hydrogen Plant  
Unit 13: Sulpher And Tail Gas Treatment  
Unit 14: Amine Regeneration  
Unit 15: Sour Water Stripper | 22 days | 10/08/2007 | 31/08/2007 |
| 19  | Unit 08: Hydrocracker  
Unit 09: Hydrogen Plant  
Unit 11: Delayed Coker unit | 20 days | 01/04/2008 | 20/04/2008 |
| 20  | Unit 08: Hydrocracker  
Unit 09: Hydrogen Plant | 16 days | 18/07/2009 | 02/08/2009 |
| 21  | Unit 2:Naphtha Hydrotreater  
Unit 3: Naphtha Splitter  
Unit 4: Catalytic Reforming Unit  
Unit 5: Isomerization  
Unit 6: Kerosene Merox  
Unit 11: Delayed Coker unit | 21 days | 13/03/2010 | 02/04/2010 |
| 22  | Unit 1:Crude And Vacuum Distillation  
Unit 08: Hydrocracker  
Unit 09: Hydrogen Plant  
Unit 11: Delayed Coker unit | 18 days | 10/04/2011 | 27/04/2011 |
| 23  | Unit 08: Hydrocracker  
Unit 09: Hydrogen Plant | 13 days | 18/06/2012 | 30/06/2012 |
| 24  | Unit 13: Sulpher And Tail Gas Treatment | 47 days | 30/06/2013 | 16/08/2013 |
| 25  | Unit 1:Crude And Vacuum Distillation  
Unit 2: Naphtha Hydrotreater  
Unit 3: Naphtha Splitter  
Unit 4: Catalytic Reforming Unit  
Unit 5: Isomerization  
Unit 6: Kerosene Merox  
Unit 08: Hydrocracker  
Unit 09: Hydrogen Plant  
Unit 13: Sulpher And Tail Gas Treatment  
Unit 14: Amine Regeneration  
Unit 15: TR01/TR02: Sour Water Stripper  
Unit 53: Flare | 7 days | 30/08/2013 | 06/09/2013 |
Perfection is our business

**EPROM ACHIEVEMENTS – YEAR 2015**

<table>
<thead>
<tr>
<th>S/N</th>
<th>Units / Refinery</th>
<th>Duration (days)</th>
<th>From (Date)</th>
<th>To (Date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>Unit 4: Catalytic Reforming Unit</td>
<td>16 days</td>
<td>29/08/2014</td>
<td>14/09/2014</td>
</tr>
<tr>
<td>27</td>
<td>Unit 08: Hydrocracker</td>
<td>16 days</td>
<td>12/10/2014</td>
<td>28/10/2014</td>
</tr>
<tr>
<td></td>
<td>Unit 13-TR01/TR02: Sulphur And Tail Gas Treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unit 14-TR02: Amine Regeneration</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unit 15-TR02: Sour Water Stripper</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unit 53: Flare</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Unit 09: Hydrogen Plant</td>
<td>25 days</td>
<td>12/10/2014</td>
<td>06/11/2014</td>
</tr>
</tbody>
</table>

**ERP system figures.**

- Assets 47,000
- Routines 10,500
- History 450,000
- Categories 260
- Work with the Business intelligence and quality modules to enrich the maintenance performance.
- Integrate two new modules: Auto Value and MRPF.
- Customize all maintenance web and form to fit the need of the end users.
- Create all type of reports (standard 35 and discoverer).
8. EGYPTIAN LINEAR ALKYL BENZENE COMPANY (ELAB)
EPROM has been successfully managing Operation & Maintenance in ELAB (Egyptian Linear Alkyl Benzene) since 2006. ELAB Company is a Petrochemical Plant located in Amerya area, West Alexandria, EGYPT with a production capacity of 100,000 Tons/Year.

It produces Heavy Alkyl Benzene (HAB), but (LAB) the Light Alkyl Benzene remains its most important product common as a raw material for the manufacture of biodegradable detergents.

**Scope of Work**

EPROM is in charge of all activities related to the Global Operation & Maintenance Management of the plant.

- Operations management
  - Process units
  - Utilities
  - Off-site, including loading facilities.
- Maintenance management
  - Static equipment
  - Rotating equipment
  - Instrumentation
  - Electrical
  - Maintenance Planning & CMMS
  - DCS & PLC
- Marine terminal services for shipped products
- Inspection activities
- HSEQ
- Production Planning & Scheduling
- Laboratory
- Research & Development
- Technical Support

**EPROM Manpower On-Site**

EPROM Manpower at ELAB plant comprises of 208 highly skilled Engineers & Technicians.

ELAB Process Areas and Units Are UOP Licensed and consists of:

1. **Front End AREA**
   1. Prefractionation Unit
   2. Union Fining Unit
   3. Molex Unit

2. **Backend Area**
   4. PACOL Unit
   5. PEP Unit
   6. Detal Unit
3. Sulfolane & Utility Area
7. Sulfolane Unit
8. Utilities
9. Hot Oil Unit

4. Tank Farm

Main Products
- (LAB) Linear Alkyl Benzene
- (HAB) Heavy Alkyl Benzene

Long-Term Business Success

I- Achieve the annual production plan ahead of schedule since 2008
II- Increase Jet Return Flow Rates

Maximize LAB production and jet return production and reduce production rates of the less valuable products (LKD and HKD).

Frontend products compared with the test run conditions.

<table>
<thead>
<tr>
<th></th>
<th>Before EPROM Modifications</th>
<th>After EPROM Modifications</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>LKD/Feed</td>
<td>0.7%</td>
<td>0%</td>
<td>-100%</td>
</tr>
<tr>
<td>HKD/Feed</td>
<td>6.5%</td>
<td>0.9%</td>
<td>-86.15</td>
</tr>
<tr>
<td>JET-A1/Feed</td>
<td>76.84%</td>
<td>82.7%</td>
<td>7.63%</td>
</tr>
</tbody>
</table>

III- Increase Back-End Circulation Rate

Increase circulation rate to reach 123 % of unit design circulation capacity. Maximize productivity to reach 115 % of unit design productivity.

IV- Revamp Study to increase LAB Productivity to 130 %

Reach ELAB maximum productivity; further capacity increase requires equipment upgrade. Basic and detailed engineering as part of a UOP-ELAB revamp study.
V- Implementation of Water Injection System

Basic and detailed engineering of water injection to PACOL catalyst, system implementation, pre-commissioning and commissioning result in productivity increase by 125% of unit design capacity.

<table>
<thead>
<tr>
<th></th>
<th>Design case MTY</th>
<th>After Water Injection, MTY</th>
<th>% Design Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAB Production</td>
<td>100,000</td>
<td>125,000</td>
<td>125.0</td>
</tr>
<tr>
<td>HAB Production</td>
<td>6,000</td>
<td>6,335</td>
<td>105.6</td>
</tr>
<tr>
<td>Heavy Kerosene Production</td>
<td>-</td>
<td>3,220</td>
<td>-</td>
</tr>
<tr>
<td>Light Kerosene Production</td>
<td>3,855</td>
<td>2,170</td>
<td>56.2</td>
</tr>
<tr>
<td>Hydrogen Production</td>
<td>1,831</td>
<td>2,345</td>
<td>128.1</td>
</tr>
<tr>
<td>Off-Gas Production</td>
<td>1,033</td>
<td>840</td>
<td>81.3</td>
</tr>
<tr>
<td>N.Paraffin Requirement</td>
<td>80,000</td>
<td>96,653</td>
<td>120.8</td>
</tr>
<tr>
<td>Benzene Requirement</td>
<td>36,000</td>
<td>41,383</td>
<td>115.0</td>
</tr>
</tbody>
</table>

Water injection system result:
VI- **Increasing the FRONTEND on stream factor (Run Length) by EPROM Engineers**

A problem of heavy fouling in Prefractionation unit equipment:

- Stripper Column
- Stripper column reboiler
- Stripper feed preheater
- Stripper column overhead system.

Successful cooperation between EPROM team and DORF KETAL proceeded as follows:

- Chemical injection program of DA2305 and DA2370.
- Altering DORF KETAL injection methodology by 1) relocating the injection points and changing the dosing rates based on EPROM staff recommendations.

Result: Increase in the run lengths and decrease in the shutdown intervals
VII- Reducing Heavy Corrosion phenomenon in the stripper column overhead system:
Aggressive corrosion of stripper column overhead system leading to repeated leaks in the coolers (100-A1AB).
- Continuous source of hazard for personnel and plant.
- Repeated shutdowns for bundle replacement.
- Cooler effectiveness and normal operation interrupted.

EPROM and DORF KETAL teams’ cooperation
- Increase the wash water rate.
- Inject DORFKETAL chemicals DA2266 and SR1200.
- EPROM Change of DORF KETAL injection points’ location and dosing rates.

VIII- EPROM modification of operation conditions & parameters improve production at ELAB BACKEND
a. Reduce LAB n-paraffin & Benzene feed specific consumption.
b. Increase LAB productivity and enhance catalyst productivity and life.
c. Saving 69% of annual unit design consumption by reducing n. Pentane consumption.

<table>
<thead>
<tr>
<th></th>
<th>Design</th>
<th>Actual</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal paraffin specific Consumption</td>
<td>0.362</td>
<td>0.334</td>
<td>Ton LAB/Kg catalyst</td>
</tr>
<tr>
<td>Benzene Specific Consumption</td>
<td>0.84</td>
<td>0.778</td>
<td>Ton Feed/Kg catalyst</td>
</tr>
</tbody>
</table>

Increase LAB productivity and enhance catalyst productivity and life.
Results of optimizing process conditions:

<table>
<thead>
<tr>
<th></th>
<th>Design</th>
<th>Actual</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PACOL Catalyst Life</td>
<td>2.75</td>
<td>8.0</td>
<td>Ton LAB/Kg catalyst</td>
</tr>
<tr>
<td>Define Catalyst Life</td>
<td>278</td>
<td>670</td>
<td>Ton Feed/Kg catalyst</td>
</tr>
<tr>
<td>PEP Absorbers Cycle Time</td>
<td>20</td>
<td>up to 40</td>
<td>Minutes</td>
</tr>
<tr>
<td>DETAL Catalyst Life</td>
<td>2.6</td>
<td>7.3</td>
<td>Ton LAB/Kg catalyst</td>
</tr>
</tbody>
</table>

IX- **Design Improvement**

EPROM pays special attention to modifications that have economic and environmental feasibility or that improve industrial safety conditions.

![Graph: Process & Facilities Change Proposal (PFCP's)](image)

- Improve Operability: 15
- Safe Conditions Improvement: 9
- Cost saving: 8
- Yield Improvement: 5
- Enhance Specifications: 0
- Protect Environment: 1

**EPROM Implemented PFCBs in ELAB**
X- Repair of ELAB Recycle Gas Compressor.

The recycle gas compressor is considered one of the most critical pieces of equipment in ELAB complex mainly because of its size and function and the fact that it is solo run non-spared equipment.

After an emergency shutdown due to UPS system failure, the screw compressor was subject to a fatal defect that required an immediate involvement of KOBELCO, the vendor. The only available solution by vendor was to ship the solo-run compressor for repair by a Special Japanese Expert.

Since this would mean production interruption for an unidentified period of time EPROM Engineers decided to undertake all the required compressor corrective actions at EPROM sole responsibility.

The maintenance works included the following:

- Replacing Rotors
- Replacing defected thrust bearings
- Replacing defected radial bearings
- Replacing defected non-contact seals
- Replacing defected timing gears
- Replacing defected oil labyrinth
- Replacing defected wheel gear
- Replacing defected pinion gear
- Adjusting the compressors clearances

<table>
<thead>
<tr>
<th>S/N</th>
<th>S/D or T/A Name</th>
<th>Duration (Hours)</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S/D (Unit 100)</td>
<td>176</td>
<td>25 – 09 - 2014</td>
<td>02 – 10 - 2014</td>
</tr>
<tr>
<td>2</td>
<td>S/D (Unit 700)</td>
<td>246</td>
<td>18 – 03 - 2014</td>
<td>28 – 03 - 2014</td>
</tr>
<tr>
<td>3</td>
<td>S/D (Unit 700)</td>
<td>192</td>
<td>20 – 04 - 2013</td>
<td>26 – 04 - 2013</td>
</tr>
<tr>
<td>4</td>
<td>S/D (Unit 800)</td>
<td>362</td>
<td>26 – 02 - 2013</td>
<td>13 – 03 - 2013</td>
</tr>
<tr>
<td>5</td>
<td>S/D (Unit 100)</td>
<td>373</td>
<td>14 – 02 - 2013</td>
<td>11 – 03 - 2013</td>
</tr>
<tr>
<td>6</td>
<td>S/D (Unit 700)</td>
<td>444</td>
<td>13 – 02 - 2013</td>
<td>13 – 03 - 2013</td>
</tr>
<tr>
<td>7</td>
<td>S/D (Unit 100 &amp; 200)</td>
<td>243</td>
<td>29 – 10 - 2012</td>
<td>08 – 11 - 2012</td>
</tr>
<tr>
<td>8</td>
<td>S/D (Unit 100)</td>
<td>312</td>
<td>23 – 03 - 2012</td>
<td>05 – 04 - 2012</td>
</tr>
<tr>
<td>9</td>
<td>S/D (Unit 700)</td>
<td>402</td>
<td>11 – 12 - 2011</td>
<td>28 – 12 - 2011</td>
</tr>
<tr>
<td>10</td>
<td>S/D (Unit 100)</td>
<td>185</td>
<td>17 – 05 - 2011</td>
<td>01 – 06 - 2011</td>
</tr>
</tbody>
</table>
9. Alexandria Minerals Oils Company
Contract Date

EPROM had signed contract with Alexandria mineral Oil Company (AMOC) for providing Operation and Technical Services on Year 2006, AMOC Plant is located at El-Max Area, west Alexandria, AMOC has two complexes for Gas Oil Maximization and Lube Oil & Wax.

Plant Description

AMOC Plant consists of two complexes:

1. Gas Oil Maximization Project
   a. Vacuum Distillate Unit.
   b. Middle Distillate De-waxing Unit.
   c. Sulphur Recovery Unit.

2. Lube Oil complex
   a. Aromatic Extraction Unit.
   b. MEK De-waxing Unit.
   c. Lube Oil & Wax H.T. Unit.
   d. Wax Moulding Unit.

Main Products

- Neutral Lube Oil,
- Special Lube Oil,
- Paraffinic Wax,
- Gas Oil,
- Naphtha,
- LPG

Plant Licensors

- UOP,
- AKZO NOBLE,
- Laton Rython,
- Haldor Topose,
- IFP,
- Bechtel.

Scope of Work:

- Operation Management Supervision.
- Maintenance Planning, CMMS & Reliability.
- Inspection.
- Information Technology.
- Development & Technical.
Long-Term business Success:

I- Applying a water management in Wax Moulding Unit.
Applying water management processes to reach the adequate water consumption rates (3 m$^3$ per day) in wax molding unit instead of excessive water consumption rates (30 m$^3$ per day) besides the achieved consequences of decreasing chemical consumption rates and controlling corroding.

II- Applying hydrocarbon waste management.

III- Propose Different Methodologies to rationalize steam consumption rates
Through solving steam traps problems and condensate recycling, in addition to the Corrosion in soft water pipe lines problem.

IV- Accomplishments of EPROM IT team in AMOC
a. Design AMOC network infrastructure, domain and service structure.
b. Follow up the implementation process of Network infrastructure “Cabling – Switches”
c. Follow up the implementation process of Data Center “Server Racks – Core Switch – Router – Fire Wall – Internet Leased Line – SAN Storage”
d. Managing services like: Active directory – Exchange mail server – SharePoint – System Centre configuration manager – system center operation manager – MS SQL – WSUS – Backup solution – MS ISA.
e. Provide technical support for AMOC Document Management System.
f. Maximo System upgrades and migration process.
g. Enhance system performance and availability “Storage – Server Rack Switches” “2011”
h. Establishing “AMOC Electronic Technical Library”
i. Preparation of ERP “Oracle E-Business Suite” and IT security policy.
j. Upgrade the IOS (which support security desired protocols) for all switches.”2012”
k. Connect MAXIMO Server to Data Center
l. Upgrade ISA 2006 to MS FF TMG 2010. “2012”
m. Upgrading SAN Storage System. “2013”
n. Upgrade servers HW with 2 new servers. “2014”
V- **Shutdowns & Major Turnarounds Summary 2006 – 2014.**

EPROM is managing the maintenance planning & Inspection activities in AMOC Plant since 2006, and had planned several shutdowns and Majors turnarounds in such plant, in addition to the routines and regular tasks, One of the roles of Maintenance Planning department is to plan and schedule the shutdowns activities, then follows up planned activities and issuance daily reports during the shutdown period, and finally issuance shutdown close-out report after plant start-up, and hereunder a sample of shutdowns and Turnarounds as follows:

<table>
<thead>
<tr>
<th>S/N</th>
<th>S/D or T/A Name</th>
<th>Duration</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Middle Distillate De-waxing Unit (MDDU)</td>
<td>24 days</td>
<td>29/08/2006</td>
<td>21/09/2006</td>
</tr>
<tr>
<td>2</td>
<td>Lube oil complex</td>
<td>8 days</td>
<td>15/09/2006</td>
<td>22/09/2006</td>
</tr>
<tr>
<td>3</td>
<td>Lube oil complex</td>
<td>8 days</td>
<td>12/01/2007</td>
<td>19/01/2007</td>
</tr>
<tr>
<td>4</td>
<td>Hydrogen production unit</td>
<td>9 days</td>
<td>13/05/2007</td>
<td>21/05/2007</td>
</tr>
<tr>
<td>5</td>
<td>AMOC (Feed cut off)</td>
<td>2 days</td>
<td>21/07/2007</td>
<td>22/07/2007</td>
</tr>
<tr>
<td>6</td>
<td>Gas oil Complex</td>
<td>17 days</td>
<td>04/07/2008</td>
<td>20/07/2008</td>
</tr>
<tr>
<td>7</td>
<td>Middle Distillate De-waxing Unit (MDDU)</td>
<td>17 days</td>
<td>21/04/2008</td>
<td>07/05/2008</td>
</tr>
<tr>
<td>8</td>
<td>MP Refining Unit</td>
<td>10 days</td>
<td>07/11/2009</td>
<td>16/11/2009</td>
</tr>
<tr>
<td>9</td>
<td>Lube Oil Hydro-finishing Unit &amp; Hydrogen production unit</td>
<td>16 days</td>
<td>01/05/2010</td>
<td>15/05/2010</td>
</tr>
<tr>
<td>10</td>
<td>AMOC</td>
<td>28 days</td>
<td>02/12/2010</td>
<td>29/12/2010</td>
</tr>
<tr>
<td>11</td>
<td>MP Refining Unit, hot oil system &amp; MEK De-waxing and Wax Fractionation Unit</td>
<td>17 days</td>
<td>19/05/2011</td>
<td>04/06/2011</td>
</tr>
<tr>
<td>12</td>
<td>Gas oil Complex</td>
<td>11 days</td>
<td>25/03/2012</td>
<td>04/04/2012</td>
</tr>
<tr>
<td>13</td>
<td>Lube oil complex</td>
<td>8 days</td>
<td>07/03/2013</td>
<td>14/03/2013</td>
</tr>
<tr>
<td>14</td>
<td>Hydrogen production unit</td>
<td>9 days</td>
<td>17/10/2013</td>
<td>25/10/2013</td>
</tr>
<tr>
<td>15</td>
<td>Gas oil Complex</td>
<td>35 days</td>
<td>26/10/2013</td>
<td>29/11/2013</td>
</tr>
<tr>
<td>16</td>
<td>MP Refining Unit</td>
<td>1 day</td>
<td>20/05/2014</td>
<td>20/05/2014</td>
</tr>
<tr>
<td>17</td>
<td>Nitrogen Generation unit</td>
<td>3 days</td>
<td>01/06/2014</td>
<td>03/06/2014</td>
</tr>
<tr>
<td>18</td>
<td>Lube Oil Hydro-finishing Unit</td>
<td>2 days</td>
<td>15/07/2014</td>
<td>16/07/2014</td>
</tr>
<tr>
<td>19</td>
<td>Lube oil complex</td>
<td>22 days</td>
<td>11/08/2014</td>
<td>01/09/2014</td>
</tr>
</tbody>
</table>
VI- Planning Ordinary Maintenance Activities.

EPROM is managing and supervising the computerized Maintenance Management system (CMMS) in AMOC Plant and worked on several software’s EMPAC, MAXIMO 6.2 & MAXIMO 7.1 and hereunder a sample of CMMS Summary till Dec 2014:

<table>
<thead>
<tr>
<th>Discipline</th>
<th>No. of Assets</th>
<th>No., of Routines</th>
<th>No., of MWIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static</td>
<td>1868</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Rotating</td>
<td>252</td>
<td>257</td>
<td>47</td>
</tr>
<tr>
<td>Electrical</td>
<td>1158</td>
<td>1567</td>
<td>19</td>
</tr>
<tr>
<td>Substation</td>
<td>940</td>
<td>807</td>
<td>1</td>
</tr>
<tr>
<td>Pump &amp; Turbines</td>
<td>591</td>
<td>555</td>
<td>23</td>
</tr>
<tr>
<td>Instrument</td>
<td>19669</td>
<td>5509</td>
<td>29</td>
</tr>
<tr>
<td>Fire Fighting</td>
<td>1003</td>
<td>340</td>
<td>8</td>
</tr>
<tr>
<td>Communication</td>
<td>323</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Inspection</td>
<td>0</td>
<td>1075</td>
<td>24</td>
</tr>
<tr>
<td>Vibration</td>
<td>0</td>
<td>38</td>
<td>1</td>
</tr>
<tr>
<td>HVAC</td>
<td>331</td>
<td>97</td>
<td>11</td>
</tr>
<tr>
<td>Safety</td>
<td>647</td>
<td>175</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>26782</td>
<td>10420</td>
<td>197</td>
</tr>
</tbody>
</table>

VII- Upgrading CMMs Program from EMPAC to MAXIMO 6.2

Full supervision on upgrading maintenance planning system from EMPAC to MAXIMO 6.2 and business management of the project contractor until the delivery stage (Discuss offers- Prepare database - Executing project - Final test – Project acceptance )

VIII- Upgrading CMMs Program from MAXIMO 6.2 to MAXIMO V.7.1.

Assist in the supervision of maintenance planning system upgrading from MAXIMO 6.2 to MAXIM07.1 through the following:
- Assist in the preparation of the terms and specifications for selecting project contractor.
- Assist in the process of gap analysis.
- Data preparation and delivery to the contractor to be uploaded to the new database.
- Develop business strategy by designing appropriate workflow.
- Preparation and development of program reports in its forms and data collecting.
- The necessary tests on the system before issuing final system.

IX- Implementation of Reliability system for all units Equipment.
- Prepare and upload to MAXIMO the date base of Failure analysis (Problem, Cause and Remedy) according to OREDA&ISO14224
- Issuance and update of Criticality study for all Equipment items.
- Improve the availability of all assets through analysis of Equipment history
- Issuance of Key performance indicators Reports (KPI’s) to Improve Maintenance system.
X- **Issuance of all relevant reports.**
- Issuance of CMMS Weekly, Monthly, quarter, semi-annual and annual Reports.
- Issuance relevant KPI’s Reports.
10. **Egyptian Styrene & Polystyrene production company**

*(ESTYRENICS)*

---

**Diagram:**

- **Styrene Day Tank**
  - Styrene
  - Anti-Oxidant
- **Rubber Dissolving Unit**
  - Fresh Styrene
  - PIB
  - Initiator
  - Blue Dye
- **1st Pre-Poly Feed Drum**
  - Pre-Poly
- **Pre-Poly Reactor**
  - Polymer Melt
  - Mineral Oil
- **2nd Pre-Poly Reactor**
  - Polymer Melt
- **Polymerization Reactor**
  - Propylene
- **Pelletizing Trains**
  - Polymer Solids
- **HEATER 500H1**
  - In Separator (Internal Lubricant)
- **QC Silos**
  - Off-spec Polymer Recycle
- **Storage Silos**
  - Off-spec Polymer Recycle
- **Recycle Silos**
  - Recycle styrene
  - Vapors to Vacuum Package
  - Overhead
  - Oily Water
- **RSC**
  - Overhead to RSC
  - Overhead to ORC
- **ORC**
  - Overhead to ORC
  - Overhead to RSC

---

**Legend:**

- **RSC**: Recycle styrene
- **ORC**: Off-spec Polymer Recycle
- **HEATER 500H1**: Internal Lubricant
- **Pre-Poly**: Pre-polymer
- **Polymer Melt**: Polymer melt
- **Mineral Oil**: Mineral oil
- **Polymer Solids**: Polymer solids
- **Recycle styrene**: Recycle styrene
- **Vapors to Vacuum Package**: Vapors to vacuum package
- **Overhead**: Overhead
- **Anti-Oxidant**: Anti-oxidant
- **PIB**: Polystyrene butadiene rubber
- **Initiator**: Initiator
- **Blue Dye**: Blue dye
- **Oily Water**: Oily water
- **Overhead to RSC**: Overhead to RSC
- **Overhead to ORC**: Overhead to ORC
- **Overhead to RSC**: Overhead to RSC
- **Overhead to ORC**: Overhead to ORC
- **Recycle styrene**: Recycle styrene
- **Vapors to Vacuum Package**: Vapors to vacuum package
- **Overhead**: Overhead
- **Oily Water**: Oily water
ESTYRENICS:

EPROM has been successfully managing Operation & Maintenance in ESTYRENICS (Egyptian Styrenics Production Company) since 2010. ESTYRENICS Company is a Petrochemical Plant located in Dekhila Port, West Alexandria, EGYPT with a production capacity of 200,000 metric tons per year (MTA) of polystyrene. The plant has two parallel lines; SWING line produces HIPS or GPPS while HIPS line produces HIPS only.

Plant Units:

- Pre-polymerization & Polymerization.
- Devolatilization & Styrene Recovery.
- Pelletizing & Screening.
- Steam Generation.
- Hot oil System.
- Water Chilling & Refrigeration.

Plant Products:

- HIPS.
- GPPS.

Process Units Licensors:

- INEOS Technology

Scope of Work

EPROM is in charge of all activities related to the Global Operation & Maintenance Management of the plant.

- Operations management
  - Process units
  - Utilities
- Maintenance management
  - Static equipment.
  - Rotating equipment.
  - Instrumentation.
  - Electrical.
  - Maintenance Planning & CMMS.
  - DCS & PLC.
  - Workshop.
  - Supply Tools & Equipment.
  - Shutdowns & Turnarounds.
• Marine terminal services for Feed.
• Inspection activities.
• HSEQ.
• Laboratory
• Technical Support

EPROM Manpower On-Site

EPROM Manpower at ESTYRENICS plant comprises of 181 highly skilled Engineers & Technicians.

Long-Term Business Success

I- Operational achievement

A) RECIPE MANAGEMENT: EPROM team developed a complex arithmetic program to undertake recipe and conversion calculations that facilitate the review of DCS, Pre-polymerization and polymerization reactors at start-up phase.

B) ALARM MANAGEMENT SYSTEM: Malfunction of the Alarm system received from contractor caused lots of noise and multiple alarms interference and overlap. The EPROM team extensively worked on the alarm management system to reset alarms and segregate them according to units and priorities.

C) CONTROL VALVES TUNING: An anticipated off-spec polystyrene amount due to lack of control valve tuning was avoided, when EPROM team tuned the so far manually operated control valves. Fine tuning was reached in a subsequent phase of operation.

D) HIPS PLANT START UP: HIPS plant start-up was solely managed and supervised by EPROM team in the absence of licensor who only attended swing plant start-up. EPROM team managed to carry out all start up activities, produce on spec product and reach maximum capacity as well.

E) HIPS PLANT PRODUCTION UPGRADE: As an enhancement to ESTYRENICS production scheme EPROM team proposed and designed the upgrade of the HIPS plant to produce GPPS as well and acquired licensor approval of the plant upgrade process. The HIPS Plant was considered as a standby plant for the main GPPS plant in case of upset scenarios.

F) OLIGOMER PUMP DESIGN ALTREATION AND RELOCATION: There was a challenging design problem associated with the oligomer pump which affected the operation of the oligomer column and lead to off spec product. EPROM team proposed the relocation and adjustment of the pump which proved to be a very efficient solution.
II- Polystyrene Production achievement

Final production rate (ton)

<table>
<thead>
<tr>
<th>S/N</th>
<th>S/D or T/A Name</th>
<th>Duration</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SWING Plant March 2013 SD</td>
<td>132.5 hrs</td>
<td>5-Mar-2013</td>
<td>16-Mar-2013</td>
</tr>
<tr>
<td>2</td>
<td>HIPS Plant S/D March 2013</td>
<td>40 hrs</td>
<td>27-Mar-2013</td>
<td>1-Apr-2013</td>
</tr>
<tr>
<td>3</td>
<td>SWING Plant SD Aug. 2013</td>
<td>159.3 hrs</td>
<td>27-Aug-2013</td>
<td>11-Sep-2013</td>
</tr>
<tr>
<td>4</td>
<td>HIPS &amp; UTILITY Plant SD Sep 2013</td>
<td>83 hrs</td>
<td>10-Sep-2013</td>
<td>17-Sep-2013</td>
</tr>
<tr>
<td>5</td>
<td>HIPS, SWING &amp; UTL SD Dec 2013</td>
<td>23 hrs</td>
<td>1-Dec-2013</td>
<td>3-Dec-2013</td>
</tr>
<tr>
<td>6</td>
<td>SWING Shutdown June 2014</td>
<td>185 hrs</td>
<td>5-Jun-2014</td>
<td>13-Jun-2014</td>
</tr>
<tr>
<td>7</td>
<td>HIPS Shutdown July 2014</td>
<td>506 hrs</td>
<td>1-Jul-2014</td>
<td>22-Jul-2014</td>
</tr>
<tr>
<td>8</td>
<td>HIPS, SWING &amp; UTL SD Sep 2014</td>
<td>384 hrs</td>
<td>31-Aug-2014</td>
<td>16-Sep-2014</td>
</tr>
<tr>
<td>9</td>
<td>320-DA-002 Oligomer Removal Column De-blocking</td>
<td>439 hrs</td>
<td>16-Nov-2014</td>
<td>4-Dec-2014</td>
</tr>
</tbody>
</table>


EPROM is managing all maintenance & inspection activities in ESTYRENICS Plant since 2010. We planned, managed and executed several shutdowns and major turnarounds in ESTYRENICS in addition to the routines and regular tasks; hereunder a sample thereof;
IV- CMMS /ERP system implementation / upgrading.
- Prepare EST CMMS tender documents.
- Hold meetings with successful bidders
- Prepare SAP-ERP implementation plan with vendor.
- Preparing maintenance work instructions and PM routines
- Construct and operate MS-Access database for AMP and issue preventive and predictive maintenance work orders
- Upload plant registers and routines on SAP ERP.

V- ERP system figures.

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Static</th>
<th>Rotating</th>
<th>Electrical</th>
<th>Instrument</th>
<th>Inspection</th>
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<tbody>
<tr>
<td>No. of Assets</td>
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<td>864</td>
<td>388</td>
<td>664</td>
<td>5013</td>
<td>0</td>
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<tr>
<td>No. of Routines</td>
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<td>36</td>
<td>87</td>
<td>55</td>
<td>165</td>
<td>11</td>
</tr>
<tr>
<td>No. of MWIs</td>
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<td>36</td>
<td>93</td>
<td>55</td>
<td>365</td>
<td>11</td>
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<tr>
<td>No. of WOs</td>
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<td>6882</td>
<td>5666</td>
<td>2583</td>
<td>12234</td>
<td>4144</td>
</tr>
</tbody>
</table>

VI- Reliability Achievements.
- Review the site criticality study including all equipment types for all disciplines.
- Prepare FMEA and its related recommendations for high and medium critical equipment.
- Reflect criticality ranking on the AMP scheduling, reports, and specially highlighted on the preventive and predictive maintenance work orders.
- Provide general Assistance and awareness to all departments about criticality study and its importance to maintenance activities.
11. **Egyptian Refining Company (ERC):**

![Image of ERC construction project]

**Existing CorC Refinery**

**ERC Project**

- **Hydrogen Plant:** 87,000 km³/hr
- **Sulphur Plant:** 14° T.D x 3
- **Naphtha Hydrocracking Unit:** 22,400 BD
- **Reforming Unit:** 14,300 BD
- **Distillate Hydrosization Unit:** 32,100 BD

**Proprietary Licensed Technology**

**Open Art Technology**

Assumed 350 operating days per year

**Diagram**

- Natural Gas: 232.7 KTA
- Crude Units: 4 x 2,000 KTA
- Domestic Crudes: 167,300 B/D (6,243 KTA)
- Arab Medium Crude: 24,520 B/D (1,200 KTA)
- Atmospheric Residue: 91,228 B/D (3,204 KTA)
- Vacuum Unit: 14,428 B/D (506 KTA)
- Naphtha: 4,610 B/D (150 KTA)
- Kerosene: 3,120 B/D (1,040 KTA)
- Diesel: 2,661 B/D (920 KTA)
- Low Sulfur Naphtha: 294 B/D (9 KTA)

**Fuel Oil**

- Ultra-Low Sulfur Diesel: 45,170 B/D (1,712 KTA)
- Jet: 13,125 B/D (459 KTA)
- High-Sulfur Diesel: 9,206 B/D (314 KTA)
- FUEL OIL: 2,688 B/D (91.3 KTA)
- Coke: 1,205 T/D (412.3 KTA)

**Sulfur**

- 279 T/D (9.2 KTA)

**Sulfur**

- 6,475 B/D (224.1 KTA)

**Reformate**

- 11,303 B/D (412.9 KTA)

**Fuel Oil**

- 5,167 B/D (1,900 KTA)
ERC Refinery is a 4th generation technology refinery operating at a 4.2M.Tons/Year capacity and scheduled 2017 for commissioning. EPROM has signed a contract with ERC to manage the operation and maintenance of their facilities located in Cairo.

**Products:**

**Refinery Units:**
- VDU.
- Hydrocracker.
- Delayed Coker.
- Reformer.
- CCR.
- Distillate Hydro-treating.
- Amine Treatment & Regeneration.
- Naphtha Hydro-treating.
- De-ethanizer.
- Hydrogen Production.
- Sour Water Stripping.
- Sulphur Recovery.
- Tail Gas Treating.

**Licensors:**
- Axens - France
- Conoco Philips – USA
- Technip - Italy

**O&M Contract Scope of Work:**
- Operation Management
  - Process Units.
  - Utilities.
  - Off-sites.
- Maintenance Management:
  - Stationary Equipment.
  - Rotating Equipment.
  - Workshop.
  - Instruments & Electrical.
  - Inspection & Reliability.
- Technical Services:
  - Process Technology.
  - Economic & Production Planning.
- IT.
  - Procurement & Contracts.
- Engineering Services:
  - Projects.
  - Design & Drafting.
  - Maintenance Planning & CMMS.
- HSEQ Management.

EPROM Activities with ERC (In KOREA):
- Risk assessment.
- HAZOP study.
- 3D modeling.
- Perform DCS/ESD Factory Acceptance Test (FAT) including:
  - Reviewing FAT procedures
  - Review P&ID, Control Design
  - Review logic / Sequence Narratives.
  - Hardware check
  - System recovery
  - Auxiliary Console equipment
  - Process Graphic & System Graphics check
    - Graphic layout
    - Assign Function
  - I/O Point check
    - Description
    - Range, Eng. Unit
    - Alarm set value
  - Software Function
    - Complex loop with Narrative
    - DCS logic / sequence
  - DCS integration with subsystems
  - Communication point check
  - ESD sequence

EPROM Activities with ERC (In CAIRO):
- Site construction activities supervision.
- SAT activities.
- Safety & permits.
- Spare parts review.
EPROM has the responsibility of operating multiple marine terminals with full compliance to environmental regulations. The shipment terminals and their products are as mentioned below:

Marine terminal Name: Dekheila Port
Beneficiary: MIDOR
Shipped Products: Gasoline, Jet Fuel, and Petroleum Coke

Marine terminal Name: Alexandria Port.
Beneficiary: ELAB.
Shipped Products: Alkyl Benzene.

Marine terminal Name: Damietta Port.
Beneficiary: UGDC.
Shipped Products: Liquid Propane.
EPROM has been in charge of all marine handling scope for MIDOR export products since 2003 up until this day. We have exported among other products: Jet Fuel, Green Coke and gasoline in some previous years.

We are proud of having expanded our export capacity in Al Dekheila Port, Alexandria over the years and proven excellence and work professioncy.