SOUTH VALLEY DEVELOPMENT

Dai Hong Bo
Ellis Sarah Taylor
Fan Yuan Yuan
Lee Yuen Chang
Lint Eva Margaret
Introduction

- South Valley Development Project initiated by Egypt’s president in 1997
- Developed in Toshka, East Oweinat, and the New Governorate Oases
- Designed to ease population in the Nile Valley and to increase Egypt’s economy and change approx. 740,000 acres of desert into habitable land allowing 6 million people to live there by 2017
- Also creating 10,000 + job opportunities
Map of Area
TECHNICAL DATA

- SHEIKH ZAYED CANAL
- 2 MAIN CANALS, 4 BRANCHES
- 310KM LONG
- 540,000 ACRES
- LIVING CAPACITY FOR +/- 3 MILLION PEOPLE
2 MAIN PROJECTS

TOSHKA PROJECT
540,000 acres, southern Egypt

OWEINAT PROJECT
Underground Water Irrigation Project, 200,000 acres, southwestern Egypt
- Sheikh Zayed Canal connected to Lake Nasser
- Water pumped through canal into the desert
- Large pumping station installed on the western shore of Lake Nasser
SHEIKH ZAYED CANAL

- 30 METERS WIDE AT BOTTOM
- 54 METERS WIDE AT SURFACE
- 6 METERS DEEP

A PART OF FINISHED CANAL

THE SECTION PLANE OF THE CANAL

54m

6m

30m
MUBARAK PUMPING STATION

- BIGGEST PUMPING STATION
- 24 PUMPS
- 360 CUBIC METERS DISCHARGE PER SECOND
- ELECTRICITY SUPPLIED BY ASWAN HIGH DAM
Pumping Station
DESIGN

- Said to be one of the largest pumping stations in the world
- The specs of this pump have made it one of the 5 finalists for an Outstanding Civil Engineering Award presented by the American Society of Civil Engineers

OVERVIEW OF MUBARAK PUMP STATION CONSTRUCTION PROJECT
PUMP DESIGN

**MAIN PUMP**

<table>
<thead>
<tr>
<th>Model</th>
<th>Vertical shaft, centrifugal pump</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump bore</td>
<td>2,400 - 1,800 (mm)</td>
</tr>
<tr>
<td>Discharge volume</td>
<td>16.7 m$^3$/s</td>
</tr>
<tr>
<td>Speed</td>
<td>210 – 300 min$^{-1}$</td>
</tr>
<tr>
<td>Drive motor</td>
<td>12,000-kW synchronous motor</td>
</tr>
<tr>
<td>Number of units</td>
<td>24</td>
</tr>
</tbody>
</table>

**SYNCHRONOUS MOTOR**
MONITORING SYSTEM CONFIGURATION

- PUMP OPERATION
- AUTOMATIC PUMP ORIENTATION
- INLET AND OUTLET WATER LEVEL
- FAILURE NOTIFICATION
- ENERGY MANAGEMENT
MAIN FACILITIES OF PUMP

- AUTO WORKSHOP
- WATER PURIFICATION PLANT
- EMERGENCY DIESEL GENERATOR
- DISCHARGE BASIN
- ADMIN BLDG
- POWER RECESSION BLDG
- PUMP STATION
- INTAKE CANAL
- MEMORIAL BLDG
- ELECTRICAL WORKSHOP
- MECHANICAL WORKSHOP
- WASTE-WATER TREATMENT FACILITY
Mubarak Pumping Station

Alternative of piles around the base of pumping station:

- **Concrete Pile**
  - High Cost with high maintenance fee
  - Used by most of the pumping stations in North Afrika.

- **Steel Mini-Pile**
  - Lower cost and maintenance fee
  - Able to absorb the compression of station
  - Temperature range from 0 °C to 55 °C
East Oweinat Project

- Cultivate about 250,000 arces
- By using Nubia Sandstone aquifer system, underground water pumping from southern of Western Desert of Egypt.
According to Chemical analysis, the underground water is:

- From thermal characteristics.
- Contains low salt content.

Thus, it is suitable for irrigation purpose.
East Oweinat Project

Alternative:
- Do nothing – leave a huge piece of sandy and dry land.
- Slowly develop by it own government – time consuming and slow efficiency.
- Develop with international companies – huge project, efficient and increase country turnover in short period.

Problem
- Dewatering the shallow aquifer in some areas (e.g. Kharga Oasis), and lowering of the water level to uneconomic lifting depths.
**SOURCE OF INVESTMENT**

- TOTAL $90 BILLION
- MORE THAN 20% WILL COME FROM GOVERNMENT
- LESS THAN 80% WILL COME FROM COMPANIES OF SEA AND ABROAD
VARIOUS COSTS

- INVESTMENT TO TOSHKA REGION – $1.6 BILLION PROJECT
- A PUMPING STATION ESTIMATED AT $436 MILLION
- INSTALLATION COST OF EAST OWEINAT - $422 MILLION
- SHEIKH CANAL - $1.6 BILLION
- INFRASTRUCTURE - $550 MILLION
PROBLEMS OF IMPLEMENTING

- FOR THE LONG BUILDING PERIOD, THE INVESTING COMPANIES REQUIRED POWERFUL ABILITIES
- IN TERMS OF THE DETAILED BUDGETING AND PLOT, ANNUAL COST ASSESSMENT IS NECESSARY
- TAX OF INVESTORS WILL BE FREE. WIN-WIN SITUATION
SUMMARY

2 MAIN PROJECTS

- TOSHKA– MUBARAK PUMPING STATION AND SHEIKH ZAYED CANAL
- EAST OWEINAT PROJECT-SOLEY ABUNDANT UNDERGROUND WATER

OBJECTIVES FOR BOTH – TO DEVELOP AGRICULTURE-FOR-EXPORT, JOB OPPORTUNITIES, DIVERT INVESTMENT POOLS OUTSIDE OF OLD VALLEY TO NEW REGIONS