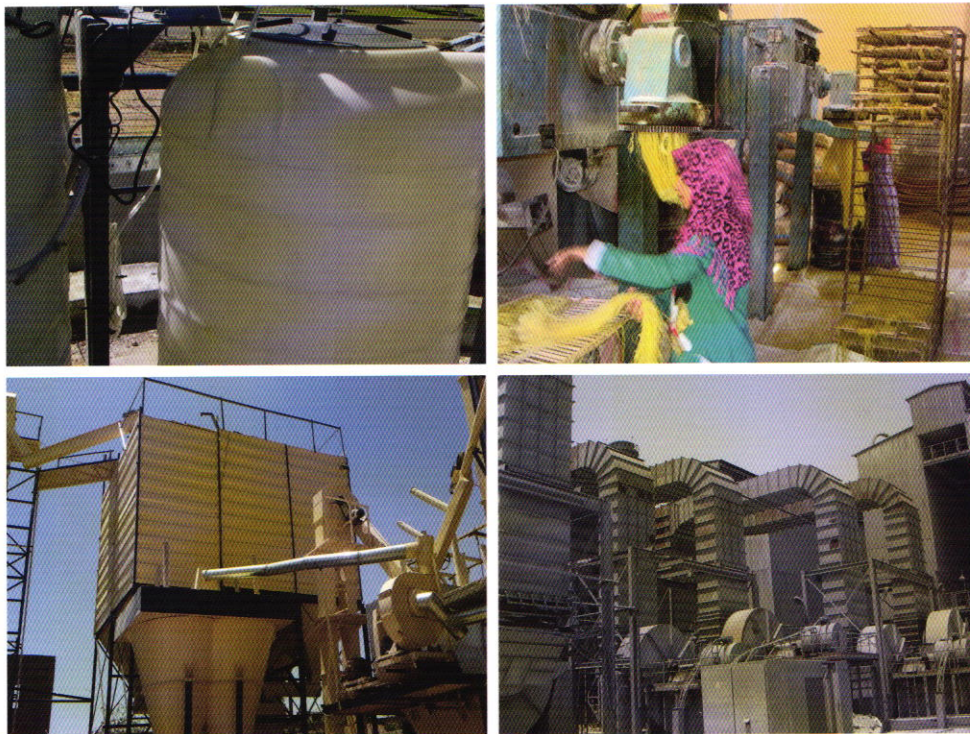




Ministry of Environment  
Egyptian Environmental  
Affairs Agency

## Private Public Sector Industry Project (PPSI)

# Success Stories





<b>Project:</b>	<b>Install 500 m<sup>3</sup>/d Industrial wastewater treatment plant</b>
<b>Company:</b>	<b>Egyptian International Pharmaceutical Industries Company (EIPICO)</b>
<b>Location:</b>	<b>10<sup>th</sup> of Ramadan City, Sharqia Governorate</b>
<b>Total Cost:</b>	<b>EGP 5 million</b>
<b>PPSI Grant:</b>	<b>EGP 0.936 million</b>

### **Introduction:**

The Egyptian International Pharmaceutical Industries Company (EIPICO) is a private company specialized in pharmaceutical production for the Egyptian and export markets. The company commenced production in 1985.

EIPICO produces over 300 pharmaceutical products.

### **Environmental Problem:**

The main problem was the discharge of industrial wastewater from the different production plants to the public sewer without any treatment. The combined effluent has high levels of BOD, COD, TSS, nitrogen, phosphorus and phenol that didn't comply with Law 62/93 limits amended by decree 44/2000 for discharges to the public sewer.

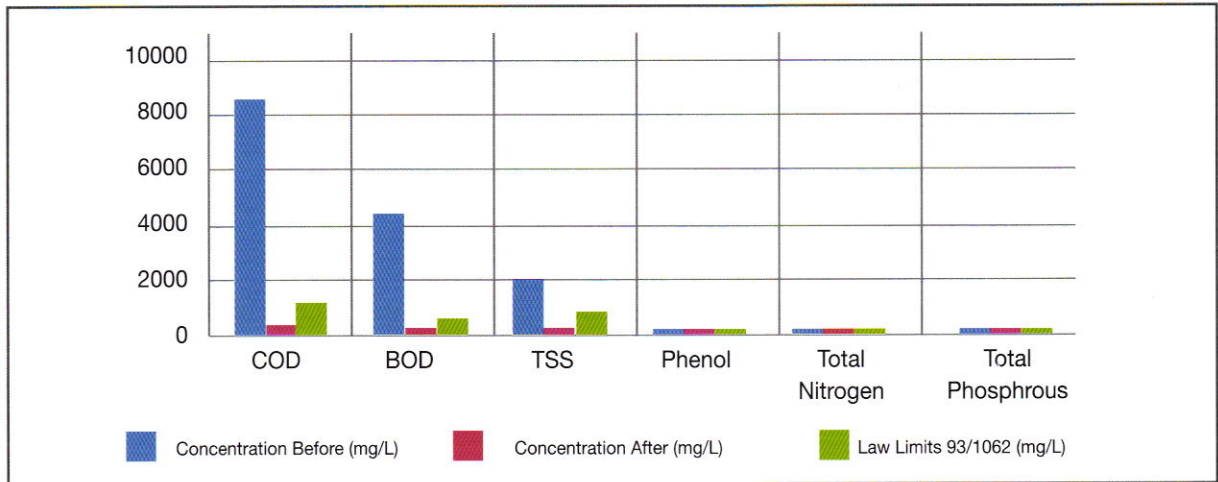
### **PPSI Support**

The company installed an industrial waste water treatment plant with a capacity 500 m<sup>3</sup>/day. Scope of supply included pH adjustment, balancing tank, screens, coagulation, flocculation and DAF unit, nutrient addition system, biological treatment (aeration and settling) and sludge treatment.

Total investment cost was EGP 5 million. PPSI provided technical support for the industrial wastewater treatment plant and a grant of EGP 0.936 million towards the investment cost.

### **Environmental Benefits**

- Reach full compliance with law 62/93 limits amended by decree 44/2000 for discharging industrial effluents to public sewer.
- Annual pollution load reduction is 419 tons of BOD (95%), 804 tons of COD (95%), 181 tons of TSS (95%), 4 tons of Phenol (99%) and 3 tons total phosphorus (97%) 7 tons of total nitrogen .



### Economic Benefits

Since the project is end of pipe treatment, there are no economic benefits.



**New Wastwater treatment plant**



<b>Project:</b>	<b>Switching the fuel used from Heavy Fuel (Mazout) to Natural Gas</b>
<b>Company:</b>	<b>EI-Mahmodia clay brick factories (17 factories)</b>
<b>Location:</b>	<b>EI-Mahmodia – Beheira Governorate</b>
<b>Total Cost:</b>	<b>EGP 14.7 million</b>
<b>PPSI Grant:</b>	<b>EGP 4.76 M</b>

### Introduction

The brickworks in El-Mahmodia district comprise 17 brick manufacturing kilns, where heavy fuel oil (mazout) was being combusted to produce cooked red bricks. These factories are surrounded by the River Nile (Rashed branch) at the east, Mahmodia - Desouk road at the west, and agriculture areas on the both other sides. Clay bricks are manufactured using clay, sand and water as raw materials. The manufacturing process has six main steps: 1) raw materials transportation and storage, 2) clay milling, 3) raw materials mixing, 4) brick molding, 5) brick drying and 6) bricks firing.

### Environmental Problem

The brick manufacturing process utilizes Open Hoffman Furnaces where heavy fuel oil was combusted and exhaust gases were naturally drafted using tall stacks (60-80 m). Measurements of stack emissions did not comply with the Egyptian Environmental Law 9/2009 especially in Carbon mono oxide (CO), Sulfur dioxide (SO<sub>2</sub>), and Particulate matter (PM).

### PPSI Support

PPSI supported the brick factories owners to switch the fuel used from mazout to natural gas.

Project components included:

- a- Natural gas external piping from the main off-take to the factories.
- b- Internal works for 17 factories including installation of piping and NG pressure reduction stations.
- c- Replacement of mazout burners with NG burners.

### Environmental benefits

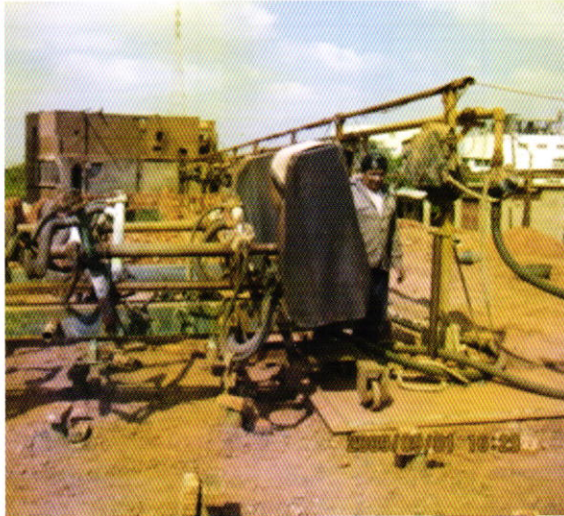
The project reduced stack emissions to reach compliance with legal limits, and also improved the work place environment particularly in reducing particulates and SO<sub>2</sub> emissions that can affect the respiratory system. In addition CO<sub>2</sub> greenhouse gas emissions were significantly reduced.

<b>Pollutant</b>	<b>Load before ton/year</b>	<b>Load after ton/year</b>	<b>Reduction ton/year</b>
Carbon mono oxide (CO)	1052	325	727
Sulfur dioxide (SO <sub>2</sub> )	508	141	367
Particulate matter (PM)	1923	114	1810

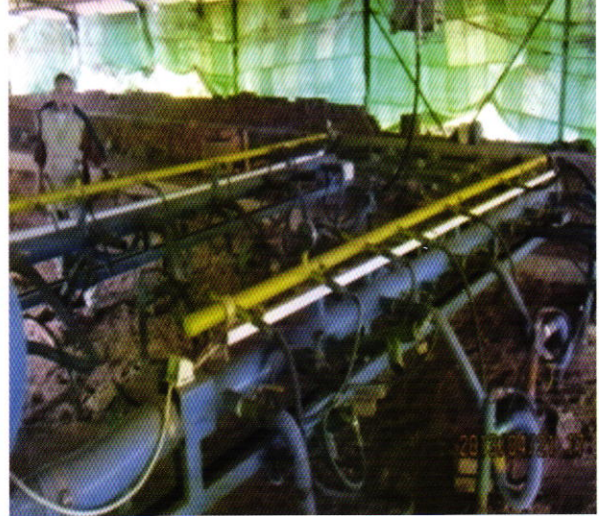


### Economic Benefits

The overall cost of the project was EGP14.7 M. PPSI supported the factories owners with grants of EGP 4.76 M. The payback period is about 11 months.



Old burner



New burner



Before implementation



After implementation



<b>Project:</b>	<b>Replacement of the old wet production line with new dry one</b>
<b>Company:</b>	<b>El Rabei Group Company</b>
<b>Location:</b>	<b>10th of Ramadan City</b>
<b>Total Cost:</b>	<b>EGP 2.54 million</b>
<b>PPSI Grant:</b>	<b>EGP 0.509 million</b>

### **Introduction:**

El Rabei Group Company, established in 1989, specializes in the manufacture of tahini and halva. The factory is located in 10th of Ramadan City and employs 183 staff.

The company processes 1,200 tpa of sesame seeds to produce 1,080 tpa of tahini. Wet peeling was used to separate sesame seeds from their husk followed by roasting, sieving and grinding to produce tahini. 750 tpa of halva are produced using sugar, fructose and lecithin. The sugar solution is cooked in drums before adding Halva Erk and molasses and then mixing with tahini to produce a halva-tahini paste.

### **Environmental Problem:**

Wastewater being discharged to the sewer system was very high in BOD, COD, TSS and oil and grease and non-compliance with law no. 62/93 and its decree no. 44/2000.

The main pollution problems arose from: a) the wet peeling of sesame seeds, which was done using salt solution and mechanically by primary bar blades with a peeling efficiency of less than 70% resulting in high amounts of seeds being discharged in the wastewater; and b) the halva process where cooking of sugar solution in old drums resulted in 5% losses through leakage thereby increasing the pollution load of the wastewater.

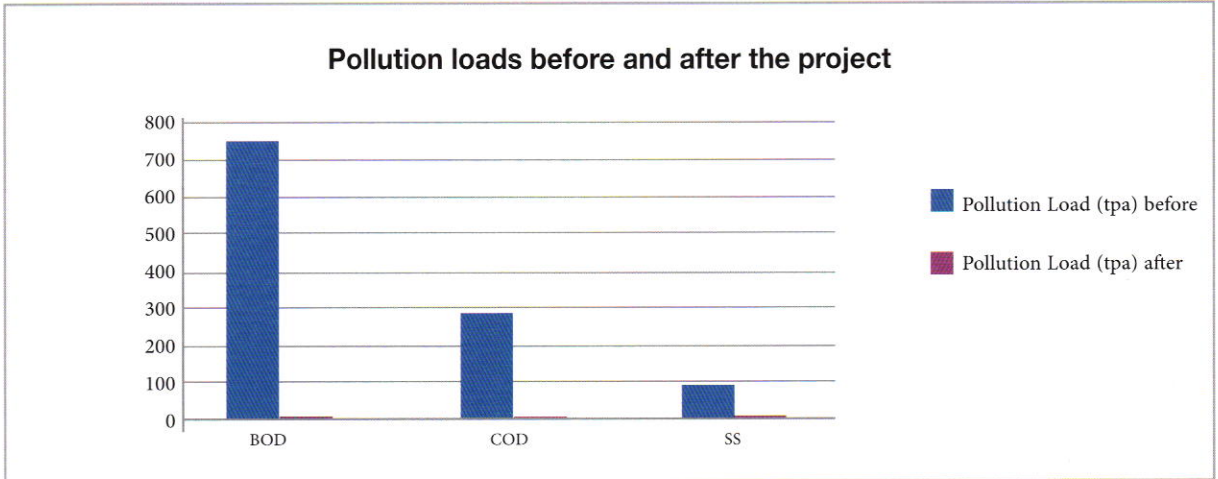
### **PPSI Support**

The project included the replacement of the tahini and halva production lines. The tahini wet processing was replaced with a 1,200 kg/hr dry process using a centrifugal system and vibrating screen for peeling with feed hoppers, bucket elevators, conveyors, destoner and sesame sifter. Overall water use was reduced by 85%. New 450kg fully automated batch cookers replaced the deteriorated cookers in the halva production with the closed system eliminating previous leaks.

Total investment cost was EGP 2.54 M. PPSI provided technical support and a grant of EGP 0.509 million towards the investment cost.

### **Environmental Benefits**

- The pollution load was reduced by 99% and the wastewater discharged is now compliant.
- Annual pollution load reduction is 772.15 tons of BOD , 301.9 tons of COD and 95.31 of suspended solids.
- Water consumption was reduced by 238 m<sup>3</sup>/d.



#### Economic Benefits

- Water and electricity savings: EGP 148, 667 per year.
- Savings in raw material losses and chemical consumption: EGP 656,255 per year.
- Sale of separated seed husk from peeling: EGP 61,200 per year.
- Payback: less than 4.5 years.



After Implementation



Before Implementation



<b>Project:</b>	<b>Recycling of liquid and solid wastes to produce high grade salt</b>
<b>Company:</b>	<b>The Egyptian Salts &amp; Minerals Co (Emisal)</b>
<b>Location:</b>	<b>Shakshouk, Fayoum Governorate</b>
<b>Total Cost:</b>	<b>EGP 55 million</b>
<b>PPSI Grant:</b>	<b>EGP 7.65 million</b>

## Introduction

The Egyptian Salts & Minerals Co (Emisal) is a private sector company located on the southwest shore of Qarun Lake. The company was established in order to conserve the aquatic life in Lake Qarun by extracting salts from the lake and recycling the water with less salinity. Lake Qarun is the third largest lake in Egypt with an area of about 5 km<sup>2</sup>, and was considered a fresh water lake until inflows from the River Nile stopped and the agricultural drainage became the only feed source to the lake. The lake has been facing serious ecological problems due to rising salinity as a result of agricultural drainage and high evaporation rates.

The company operates three plants, one for the production of sodium sulfate with a capacity of 110,000 t/y, another for production of sodium chloride with a capacity of 150,000 t/y, and the third a magnesium sulfate plant with a capacity of 27,500 t/y and 35,000 t/y sodium chloride. The first plant started operation in 1993, the second plant in 2001 and the third plant in 2008.

## Environmental Problem

The accumulated liquid waste (mother liquor) remaining after extraction of salts is continuously increasing and is very high in TDS at 232,000 mg/l. The mother liquor is pumped to evaporation ponds where around 50,000 tons of salt accumulate annually. With increasing amounts of mother liquor the company faced two problems: 1) lack of land space for new evaporation ponds; and 2) accumulations of evaporated salt that cause a solid waste problem and which has solidified hard rock making it difficult to crush for re-processing.

The mother liquor cannot be discharged to the lake as environmental regulations do not allow the discharge of concentrated brine into surface waters because of the detrimental effect on marine life unless the TDS is  $\pm 5\%$  of receiving medium (Law 9/2000 decree 1095/2011). On the other hand, the brine is too saline for irrigation purposes. The optimum solution is to extract the remaining salts from the discharged mother liquor and to reprocess the existing accumulations of salt to produce a saleable product.

The solid waste problem is further exacerbated by the old manual packing machines that result in accumulations of lost product and packing materials.

## PPSI Support

PPSI supported Emisal to implement the following sub-projects:

1. Establishment of a new plant for the production of Vacuum salts and Anhydrous Magnesium Sulfate salts with a capacity of 50,000 t/y to recycle the liquid waste (mother liquor). 450,000 m<sup>3</sup>/y of mother liquor from the sodium sulfate plant plus 25,000 m<sup>3</sup>/y of waste brine from the Epsom plant effluent is being used as feedstock for the new Vacuum Salt plant to produce 50,000 t/y of vacuum salt.

2. Install a unit for dissolving the accumulated blocks of sodium chloride for the production of medical grade salt with a capacity 10,000 t/y. The unit will process 50,000 t/y of accumulated salt piles to form a slurry that is fed with mother liquor to the vacuum salt plant to produce about 10,000 t/y pharma grade salt.



3. Automation of the existing salt packing machines to eliminate the solid waste that resulted from manual packing. Four packing machines have been upgraded with automated arms (billers).

The total investment cost is about EGP 55 M . PPSI provided technical support and a grant of EGP 7.65 M towards the investment cost.

### Environmental benefits

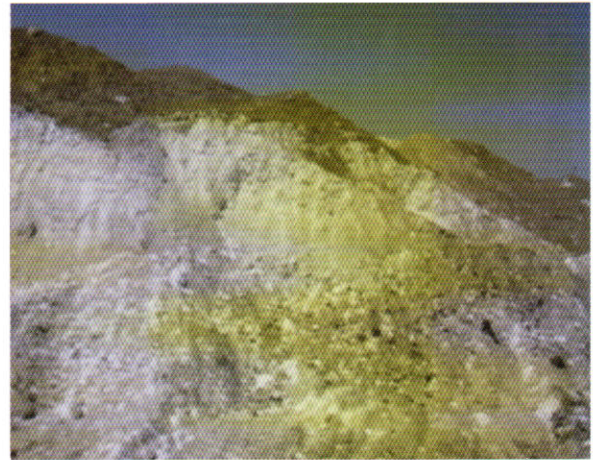
- Reduction of the accumulated mother liquor from 475,000 m<sup>3</sup>/y to 7,000 m<sup>3</sup>/y with a TDS load reduction by 50,000 t/y.
- Improved management of solid waste by re-processing the accumulated piles of sodium chloride salts. The existing piles are estimated to contain 200,000 tons of salt and are expected to disappear within 7 years.
- Improvement of working conditions and the elimination of solid waste which resulted from the manual packing machines.

### Economic Benefits

- The total investment cost is EGP 55 M , and the operation and maintenance costs are estimated to be EGP 2,247,330 annually.
- The annual net profit of these projects is estimated to be EGP 8.5 M from the production of: 50,000 ton/y sodium chloride and 10,000 ton/y pharma grade salt.
- The Pay-back period is about five years.



New Vacuum Plant



Salt accumulation



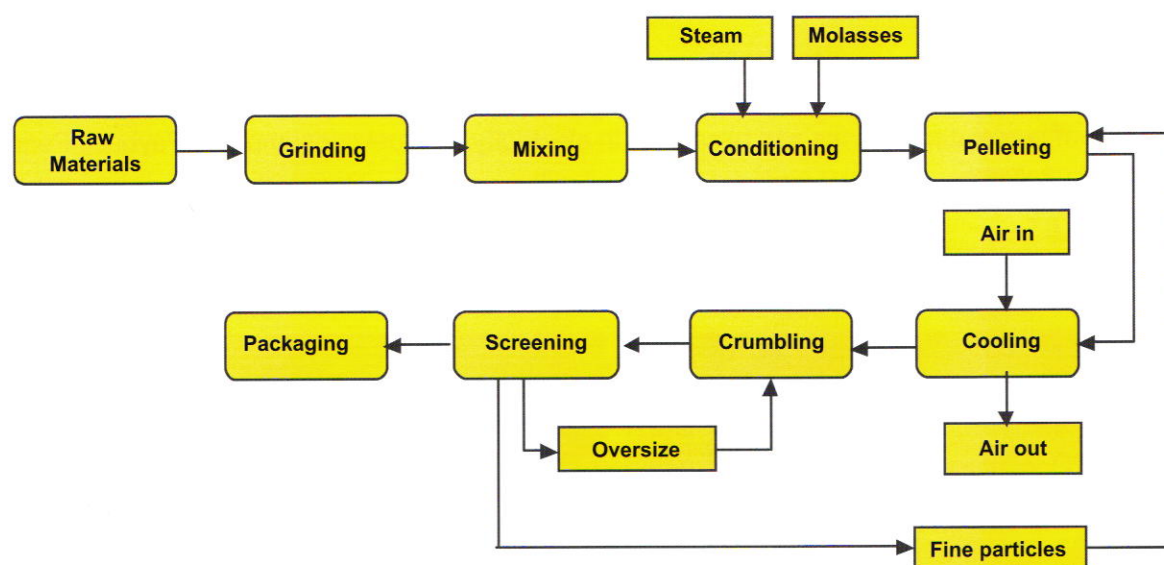
During Implementation

<b>Project:</b>	Replace deteriorated equipment for better work environment
<b>Company:</b>	Makka for Cattle Feed Industry
<b>Location:</b>	Al Zaraby Industrial Zone- Abo Teeg- Assuit
<b>Total Cost:</b>	EGP 5.88 million
<b>PPSI Grant:</b>	EGP 1.785 million

## Introduction

Makka for Cattle Feed Industry is a private company established in 1997 and specialized in cattle feed production with total production of 48000 tpa. The factory is located in Al-Zaraby industrial zone in Assiut governorate. The main products are cattle feed with Protein content of 10%, 14% and 16%.

Cattle feed are produced through the following process:



## Environmental Problem

The company had a serious problem regarding workplace dust emissions generated from raw material handling and processing due to the old and deteriorated processing equipment. Dust levels in the work place were high and non compliant with Environmental Law 9/2009

Location	Concentration (mg/m <sup>3</sup> ) PM10	Law limits (mg/m <sup>3</sup> ) PM10
Raw Material handling	10	
Grinding	24.5	
Mixing	17.5	3
Pelleting	8.3	
Packaging	9	



### **PPSI Support**

PPSI supported Makaa Company to upgrade the old production line in order to control the workplace dust emissions. The project included the following components:

- 1) Installing a new raw material receiving pit with cyclone.
- 2) Replacement of the old mixer machine, cooler, and crumbler with the installation of cyclones.
- 3) Installing new automatic weighing machines for raw material and products.

Total Investment cost was EGP 5.88 M. PPSI provided technical and financial support for the upgrading project with a grant of EGP 1.785 M.

### **Environmental Benefits**

The project reduced the workplace dust emissions by more than 90% to achieve the full compliance with law 9/2009 and improve workplace condition.

### **Economic Benefits**

Annual savings are about EGP 0.65 million arising from; a) reduction in production costs due to the decrease of raw material losses and b) savings in electricity and fuel consumption. Payback Period is about nine years.



Before Implementation



After Implementation