ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

ERC Hydro-Cracking Complex Project at Mostorod

FINAL VERSION

Appendix 6.3 – Cumulative Impact Assessment

51287-1

December 2008

Infrastructure & Environment

10th Floor
21, Misr Helwan Agriculture Road
Maadi, Cairo, Egypt
Telephone: +202 2359 5628 / 1487 / 1576 / 3819
Facsimile: +202 2359 1038
www.worleyparsons.com

Contents

Tables

Figures

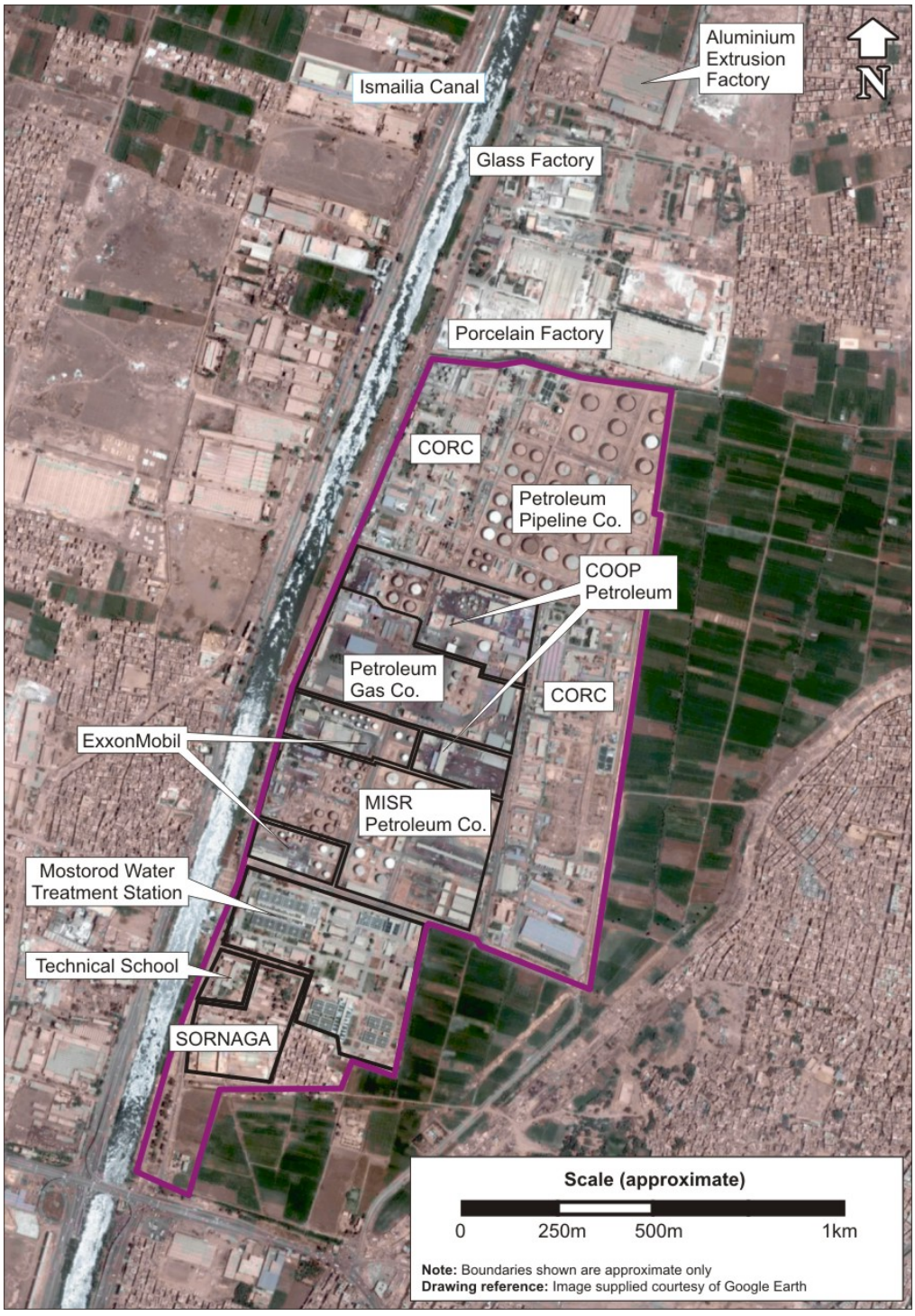
1. INDUSTRIAL FACILITIES IN THE PROJECT AREA

1.1 Introduction

As described in Section 1 of the main report, the proposed ERC oil product processing facility is located within an extensive industrial complex, which includes several petrochemical industries and ceramic and glass manufacturing facilities. In addition to this the wider zone has become highly urbanised over recent decades (Figure 1-1).

Following the Egyptian revolution and the initiation of the industrial boom in Egypt, Mostorod was considered as a key location for industrial expansion. CORC, PPC, SHEENI, SORNAGA, MISR GLASS, SAAD Aluminium, General Company for Ceramic and Porcelain, and six petroleum refined products storage and distribution terminals are among the companies that have established factories in Mostorod.

Figure 1-1 Project Area



1.2 CORC

The Cairo Oil Refining Company (CORC), owned by the EGPC, is one of the oldest refineries in Egypt. It has been in Mostorod since 1968. CORC is considered one of the main suppliers of refined petroleum products to the Egyptian market with an estimated supply of 25 % of the total demand for refined petroleum products in Egypt. The refinery is a typical refinery with a wide range of products. CORC has three main refining processes:

1. distillation (where crude oil fractions are separated according to boiling point). Products including butagas, gasoline, kerosene, jet fuel, diesel, and fuel oil are produced with a total production capacity reaching 22 000 tons per day.
2. reformation (including dehydrogenation and dehydrocyclization). Products resulting from the reformation process include: reformate gasoline, light naphtha, and solvents with a total production capacity reaching 1 900 tons per day.
3. isomerisation. The products from isomerisation include light naphtha and isomerate with a total production capacity reaching 1 100 tons per day.

These refined products are distributed to five petroleum storage and distribution terminals.

The CORC facility occupies an area of 0.167 km^2 and is centrally located in the industrial zone on the eastern bank of Ismailia Canal. The site lies partially within the boundaries of the Petroleum Pipeline Company (PPC). The CORC facility is situated to the south of the ERC North Plot.

Potential Negative Impacts

During the operation of the CORC facility, the following adverse environmental impacts may occur:

- Reduction of ambient air quality as a result of stack emissions made potentially worse by the old process technology and equipment. In addition, CORC is operating three flares that are contributing to greenhouse gases and nitrogen oxides.
- Release of fugitive air emissions from tanks are considered to have an adverse effect on the surrounding community air quality during operation.
- Accidental spillage or release of hydrocarbon products, processing chemicals, by-products, and other hazardous materials. These leaks may occur or have occurred in the vicinity of pipelines, pipe connections and storage facilities. Whatever the cause, the effect will be highly dependent on the size of spill, the nature of the geology and the type of compound released. A major release could be devastating to all the Valued Receptors (VRs) concerned, with the duration of impact in the order of decades.
- All the petroleum-related facilities in Mostorod divert their wastewater to CORC for primary treatment and/or oil/water separation. The treated wastewater is discharged to the Ismailia Canal via 2 outfalls. Accidental release of inappropriately treated wastewater may result in contamination of the Ismailia Canal.

- Noise levels during operation. This impact is considered insignificant due to the high fence around the facility and the relative distance to the nearest VR.
- Traffic levels going to and leaving the CORC facility should be relatively low during the operational stages.
- General litter and waste. General litter and waste could result in visual impacts if good-housekeeping efforts are not maintained. The prevailing winds in the area suggest that there is the potential for 'garbage' to be blown towards the ERC South Plots. Impacts may not be significant, but will be aesthetically unpleasant and potentially add to the nuisance factor.

Potential Positive Impacts

- Operation of the facility allows for National employment opportunities.
- Operation of the facility partially supplies the local market's demand for refined products.

Summary of Potential Environmental Impacts

Table 1-1 summarises the potential environmental impacts resulting from the CORC plant operations.

Table 1-1 Potential Environmental Impacts: CORC Plant

CORC Impact Assessment	Operational Phase						Accidental (Non-routine Events)					
	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity
Wastewater management	IN.	IN.	IN.	MO.	IN.	MO.	IN.	IN.	IN.	MA.	IN.	MO.
Solid waste management	IN.	IN.	IN.	IN.	MI.	MI.	IN.	IN.	IN.	IN.	MI.	MI.
Hazardous material and waste management	MI.	IN.	MA.	MO.	MA	MO.	MO.	IN.	MO,	MO.	MO.	MO.
Air emissions	MO.	MI.	IN.	IN.	IN.	MI.	MO.	MI.	IN.	IN.	IN.	MI.
Roads & Traffic	MI.	MI.	IN.	IN.	IN.	MI.	MI.	MI.	IN.	IN.	IN.	MI.
Employment												
Risk of fire/explosion	MO.	MO.	MO.	MO.	MO.	MO.	MA.	MA.	MA.	MA.	MA.	MA.

1.3 Petroleum Refined Products Storage and Distribution Terminals

Within the study area of Mostorod there are at least six refined petroleum products storage and distribution terminals. These include facilities owned by SHELL, EXXONMOBIL, TOTAL, CO-OP, MISR PETROL, and TAAWON. The combined area occupied by these five terminals is approximately 0.11 km^2. All these terminals can be considered to have the same industrial nature, however the storage capacity and size differs considerably. ExxonMobil and Shell have the largest terminals in terms of area and number of storage tanks; Total is the smallest. Each terminal receives a range of refined petroleum products from CORC consisting mainly of gasoline (80, 90, 92 and 95 octane), kerosene, and diesel. These products are distributed from the Petroleum Pipeline Company (PPC) via pipelines and stored in above ground storage tanks operated by each terminal independently. The distribution of these products to end-user fuel stations across Greater Cairo occurs on a daily basis. Products are distributed via tankers. All the six terminals lie on the same street referred to as "Petroleum Companies Street - *sahree' sharekat elpetrol*" on the eastern bank of Ismailia Canal. WorleyParsons were able to collect some information from each of the six storage and distribution terminals including the storage capacity, frequency of distribution, and number of tanker movements per day. All the information available was collected directly by the operating companies or independently on their behalf.

The terminals consist of:

- fixed roof, above ground storage tanks;
- piping, pumps and manifold system;
- tanker loading area; and
- spills, runoff and washwater collection system directed to CORC wastewater treatment plant

It is thought to be unlikely that underground storage tanks are present at these types of terminals.

Potential Negative Impacts

During the operation of these terminals the following adverse environmental impacts may occur:

- Reduction of ambient air quality as a result of VOC and hydrocarbon emissions resulting from loading and transit losses, as well as leaks from storage tanks and pipework.
- Fugitive air emissions may have an adverse environmental effect on the surrounding community air quality.
- Movement of tankers will cause exhaust emissions and mobilisation of dust (particularly on unpaved roads) resulting in reduced air quality.

- Accidental spillage or release of hydrocarbon products, chemical additives, oily water and other hazardous materials. A major release could be significant to all the VRs concerned, with the duration of impact in the order of decades. In particular, leaks from piping and/or storage tanks caused by corrosion may occur over time if appropriate maintenance is not in place. Contaminants may be released to the soil and into the groundwater.
- Accidental release of wastewater may result in contamination of the Ismailia Canal which is situated less than 70 m from the terminals.
- Elevated levels of traffic noise may be generated by the high density of tankers at the sites.
- Movement of tankers will increase the traffic congestion in the area.

Potential Positive Impacts

- Operation of the facility will guarantee the supply of the local market partially with its needs from petroleum refined products.
- Employment opportunities for the operation of the terminals and distribution of products.

Summary of Potential Environmental Impacts

Table 1-2 summarises the potential environmental impacts resulting from the petroleum refined products storage and distribution terminals.

Table 1-2 Potential Environmental Impacts of petroleum refined products storage and distribution terminals

Terminals Impact Assessment	Operational Phase						Accidental (Non-routine Events)					
	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity
Wastewater management	IN.	IN.	MI	MI	MI	IN	IN.	IN.	IN.	MA.	IN.	IN.
Solid waste management	IN.	IN.	IN.	MI.	IN.	MI.	IN.	IN.	IN.	IN.	IN.	IN.
Hazardous material and waste management	MI.	IN.	MA.	MO.	MA.	MI.	MO.	IN.	MO,	MO.	MO.	MO.
Air emissions	MO.	MI.	IN.	IN.	IN.	MI.	MO.	MI.	IN.	IN.	IN.	MI.
Roads & Traffic	MI.	MI.	IN.	IN.	IN.	MI.	MI.	MI.	IN.	IN.	IN.	MI.
Employment												
Risk of fire/explosion	MO.	MO.	MO.	MO.	MO.	MO.	MA.	MA.	MA.	MA.	MA.	MA.

1.4 Public Company for Ceramics & Porcelain (SHEENI) and SORNAGA Company for Ceramics

The **Public Company for Ceramics and Porcelain** was established in 1955. The company is located directly to the south of the ERC North Plot with a total land area of 0.123 km^2. The company produces fine porcelain for households and durable porcelain for hotels, aviation companies, tourist villages and restaurants. The company also produces dinner, coffee and tea sets, vases and artware. These products have traditional decorations consisting of Islamic, Pharaonic and Classic Patterns. In addition the company produces sanitary ware.

The **Sornaga Company for Ceramics** is a well established facility producing ceramic products in Egypt since 1905. The company lies in the most southern part of the Mostorod industrial area on the eastern bank of Ismailia canal, 350 m to the south west of the ERC South Plot 1. The facility has a total area of 0.05 km^2.

The company produce heavy duty, unglazed, red ceramic floor tiles. Different sizes of ceramic tiles are produced for application in different purposes such as flooring in factories, workshops, laboratories, hospitals, schools, hotels, railway stations, fuel stations, swimming pools and paving purposes in front of shops. The company also produces “anti-rain” ceramics used in roofing.

In the absence of technical information about the exact operating processes at SHEENI and SORNAGA, WorleyParsons assumed that the facilities apply a typical ceramic process which includes aspects such as raw material preparation (milling, mixing, and spray drying), drying ovens/kilns, dyeing, firing, and product preparation.

Potential Negative Impacts

During the operation of the SHEENI and SORNAGA facilities, the following adverse environmental impacts may occur:

- Reduction in ambient air quality as a result of dust generation (TSP and PM_{10}) produced by the use of kilns, mixers, furnaces, crushers, etc. In addition, raw materials (clay, crushed limestone) may be mobilised by the wind if stockpiles are not appropriately managed.
- Air quality may reduce due to fugitive and stack gas emissions including SOx, NOx, CO, and CO_2 from the furnace and kiln.
- Movement of trucks, carrying raw material to the sites, will cause exhaust emissions and mobilisation of settled dust particles resulting in reduced air quality.
- Truck movements will add to the traffic congestion in the area.
- Noise levels during operation and truck movements.

- General litter and waste. General litter and waste could result in visual impacts if good-housekeeping efforts are not maintained. Impacts may not be significant, but will be aesthetically unpleasant and potentially add to the nuisance factor.
- The rejected/crushed final products represent a significant source of solid waste that may alter the soil characteristics (e.g. changing pH).

Potential Positive Impacts

- Operation of the facilities allows for National employment opportunities.
- Operation of the facilities partially supplies the local market's demand for porcelain (pottery) and sanitary ware, and the local market's demand for ceramic tiles.

Summary of Potential Environmental Impacts

Table 1-3 summarises the Potential Environmental Impacts caused by the Public Company for Porcelain & Ceramics.

Table 1-3 Potential Environmental Impacts of Public Company for Porcelain & Ceramics (SHEENI)

SHEENI Impact Assessment	Operational Phase						Accidental (Non-routine Events)					
	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity
Wastewater management	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
Solid waste management	IN.	IN.	IN.	IN.	MI.	IN.	IN.	IN.	IN.	IN.	MI.	IN.
Hazardous material and waste management	IN.	IN.	IN.	IN.	IN.	IN	IN.	IN.	IN.	IN.	IN.	IN.
Air emissions	MI.	MI.	IN.	IN.	IN.	MI.	MI.	MI.	IN.	IN.	IN.	MI.
Roads & Traffic	MI.	MI.	IN.	IN.	IN.	MI.	MI.	MI.	IN.	IN.	IN.	MI.
Employment												
Risk of fire/explosion	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.

1.5 Petroleum Pipeline Company (PPC)

The Petroleum Pipeline Company site at Mostorod is located between the ERC North and South Plots. It covers a total area of approximately 0.3 km^2. PPC transports crude oil from Suez via pipelines and stores the product in the tank farm at the Mostorod site before supplying the CORC refinery. After processing at the CORC refinery, the refined petroleum products are returned to the PPC site to be stored in tanks awaiting distribution to the terminals. The main infrastructure on the PPC site includes the tank farm, consisting of 40 above ground storage tanks equipped with either floating or fixed roofs, and the associated piping, pumps and manifolds to control the distribution.

Potential Negative Impacts

During the operation of the facility, the following adverse environmental impacts may occur:

- Reduction in ambient air quality resulting from fugitive air emissions from the storage tanks. The storage tanks mainly hold crude oil, intermediate, and final refined petroleum products originating from CORC for a total usable capacity of 417,152 m^3. The emissions from the storage tanks mainly consist of VOCs. There are 40 tanks, including 33 fixed roof tanks, and 7 floating roof tanks. The estimated total emissions from the tanks are 12.04 $g.s^{-1}$ for the fixed roof tanks, and 0.22 $g.s^{-1}$ for the floating roof tanks (PESIA, 2008).
- Accidental leaks and spills or release of hydrocarbon products, chemical additives, oily water and other hazardous materials. A major release could be devastating to all the VRs concerned, with the duration of impact in the order of decades. In particular, leaks from piping and/or storage tanks caused by corrosion may occur over time if appropriate maintenance is not in place. Contaminants may be released to the soil and into the groundwater.
- It is assumed that limited traffic visits the site, therefore minor impacts are related to vehicle emissions and noise.
- General litter and waste. General litter and waste could result in visual impacts if good-housekeeping efforts are not maintained. Impacts may not be significant, but will be aesthetically unpleasant and potentially add to the nuisance factor.

Potential Positive Impacts

- Operation of the facility allows for National employment opportunities.
- Operation of the facility supplies CORC's demand for crude oil and provides a storage tank farm prior to refined product distribution.

Summary of Potential Environmental Impacts

Table 1-4 summarises the Potential Environmental Impacts caused by the Petroleum Pipeline Company.

Table 1-4 Potential Environmental Impacts PPC Company

PPC Impact Assessment	Operational Phase						Accidental (Non-routine Events)					
	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity
Wastewater management	IN.	IN.	MI.	MO.	MI.	MI.	IN.	IN.	IN.	MA.	IN.	MO.
Solid waste management	IN.	IN.	IN.	IN.	MI.	MI.	IN.	IN.	IN.	IN.	MI.	MI.
Hazardous material and waste management	MI.	IN.	MA	MO.	MA.	MI.	MO.	IN.	MO,	MO.	MO.	MO.
Air emissions	MO.	IN.	IN.	IN.	IN.	MI.	MO.	MI.	IN.	IN.	IN.	MI.
Roads & Traffic	IN.	IN.	IN.	IN.	IN.	IN.	MI.	MI.	IN.	IN.	IN.	MI.
Employment												
Risk of fire/explosion	MO.	MO.	MO.	MO.	MO.	MO.	MA.	MA.	MA.	MA.	MA.	MA.

1.6 AL SAAD for Aluminium

Al Saad Aluminium Company is north of the ERC North Plot. It covers an area of approximately 0.4 km^2. The main activity at the site is the manufacturing of aluminium kitchenware and rods for domestic use (aluminium windows, curtain rails, etc.).

Typically these industries will form/shape aluminium and "finish" the metal including surface preparation. The key processes involved in this industry can be separated into three steps including: fabrication, preparation and finishing

No emission data are available for the operation of the AL SAAD aluminium factory. In the absence of site specific information it is assumed that the potential impacts from the Al Saad Aluminium Company are similar to a typical aluminium factory.

Potential Negative Impacts

During the operation of the facility, the following adverse environmental impacts may occur:

- Reduction in ambient air quality due to facility emissions. The main sources of air emission in the aluminium industry are: exhaust gases, including PM_{10}, SOx, NOx, CO and CO_2, resulting from fuel combustion. In addition, oil mists and fumes are generated from alkaline degreasing, while acid mists are generated from anodising, chemical coating, plating, electroplating and metal finishing techniques. In addition, acid fumes are generated from pickling and metal finishing techniques. The hot dip coating technique generates chloride mist, dust and gaseous compounds.
- Wastewater produced by the aluminium industry include acidic or alkaline streams from the cutting and forming, pickling, anodising, chemical coating and other metal finishing techniques. The use of cutting oils and degreasing produces oily wastewater. Organic solvents used in degreasing and painting may also be present in the wastewater together with metals and metal salts used in pickling, anodising, coating, plating, electroplating and other metal finishing techniques.
- Potential hazardous wastes which may impact the soil and groundwater if inappropriately managed and disposed include spent lube oil from the garage and maintenance workshops, and polishing and etching sludge.
- Solid wastes are produced during the industrial process and consist of scales, aluminium chips generated from metal cutting, forming, degreasing, pickling and electroplating, residues in spent solutions from various processes.
- Movement of trucks, carrying raw material to the sites, and finished products from the site, will cause exhaust emissions and mobilisation of settled dust particles resulting in reduced air quality.
- Truck movements will add to the traffic congestion in the area.

- Noise levels during operation and truck movements.

Potential Positive Impacts

- Operation of the facility allows for National employment opportunities.
- Operation of the facility supplies a local and wider demand for a range of aluminium products.

Summary of Potential Environmental Impacts

Table 1-5 summarises the Potential Environmental Impacts caused by the Al Saad Aluminium Company.

Table 1-5 Potential Environmental Impacts AL SAAD Aluminium

Al Saad Impact Assessment	Operational Phase						Accidental (Non-routine Events)					
	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity
Wastewater management	IN.	IN.	IN.	MO.	IN.	MI.	IN.	IN.	IN.	MA.	IN.	MO.
Solid waste management	IN.	IN.	IN.	MO.	MI.	MI.	IN.	IN.	IN.	IN.	MI.	MI.
Hazardous material and waste management	MI.	IN.	MO.	MO.	MO.	MI.	MO.	IN.	MO,	MO.	MO.	MO.
Air emissions	MO.	MI.	IN.	IN.	IN.	MI.	MO.	MI.	IN.	IN.	IN.	MI.
Roads & Traffic	MI.	MI.	IN.	IN.	IN.	MI.	MI.	MI.	IN.	IN.	IN.	MI.
Employment												
Risk of fire/explosion	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.

1.7 MISR Glass

Misr Glass Company was established in 2004. Misr Glass is adjacent to the ERC North Plot and covers a total land area of 0.064 km^2. Misr Glass manufactures and decorates glass containers for consumer and pharmaceutical products.

Typically glass manufacturing involves the preparation of a molten glass from silica sand and other raw materials such as lime, dolomite, soda, and cullet (broken glass) in a kiln. For the manufacture of special and technical glass, lead oxide, potash, zinc oxide, and other metal oxides are added to the raw material. Refining agents include arsenic trioxide, antimony oxide, nitrates, and sulphates. Metal oxides and sulphides are used as colouring or decolouring agents.

The most important fuels for glass-melting furnaces are natural gas, light and heavy fuel oil, and liquefied petroleum gas. Electricity (frequently installed as supplementary heating) is also used. Energy requirements range from 3.7 to 6.0 kilojoules per metric ton ($kJ.t^{-1}$) glass produced.

No emission data are available for the operation of the Misr Glass factory. In the absence of site specific information it is assumed that the potential impacts at the Misr Glass company are similar to a typical glass factory.

Potential Negative Impacts

During the operation of the facility, the following adverse environmental impacts may occur:

- Ambient air quality may be reduced due to:
  - Fugitive and stack gas emissions from the furnaces and cooling process. This includes two types of air emissions, those generated from the combustion of fuel for operating the glass-melting furnaces, and fine particulates from the vaporisation and recrystallisation of materials in the melt. The main emissions are SO_x, NO_x and PM_{10} which can contain heavy metals such as arsenic and lead. Particulates from lead crystal manufacture can have a lead content of 20–60% and an arsenic content of 0.5–2%. Speciality glass can release hydrogen chloride (HCl), hydrogen fluoride (HF), arsenic, boron, and lead from raw materials.
  - Dust emissions from raw material receiving, storage and handling.
  - Glass container pressing, and blowing operations produce a periodic mist when the molten material comes into contact with the release agent used on the mould. Cold-top electric furnaces, in which the melt surface is covered by raw material feed, release little particulate matter, as the blanket acts as a filter to prevent the release of particulate matter. Some releases of particulates will take place in tapping, but furnace releases are typically in the order of 0.1 kilogram per ton (kg/t).
  - Lead glass manufacture may result in lead emissions of about 2–5 $kg.t^{-1}$. In all cases, the concentration of heavy metals and other pollutants in the raw flue gas depends on

the type of fuel used, the composition of the feed material, and the portion of recycled glass. High input of sulphates or potassium nitrate may increase emissions of sulphur dioxide and nitrogen oxides, respectively. Where nitrate is used, more than two thirds of the introduced nitrogen may be emitted as nitrogen oxides. The use of heavy metals as colouring or decolouring agents will increase emissions of these metals.

- Water: there will be the risk of contaminating the groundwater resource in the event of spillages or leaks of the raw products (e.g. refining agents, metal oxides and fuel oils).
- Noise: there will be an increase in the overall background noise during operation resulting from increased traffic to supply raw material and deliver finished products as well as from operation activities (i.e. glass manufacturing).

Potential Positive Impacts

- Operation of the facility allows for National employment opportunities.
- Operation of the facility supplies a local and wider demand for a range of glass products.

Summary of Potential Environmental Impacts

Table 1-6 summarises the Potential Environmental Impacts caused by the Misr Glass Company.

Table 1-6 Potential Environmental Impacts MISR Glass Plant

Misr glass Impact Assessment	Operational Phase						Accidental (Non-routine Events)					
	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity
Wastewater management	IN.	IN.	IN.	MO.	IN.	MI.	IN.	IN.	IN.	MA.	IN.	MO.
Solid waste management	IN.	IN.	IN.	IN.	MI.	MI.	IN.	IN.	IN.	IN.	MI.	MI.
Hazardous material and waste management	MI.	IN.	MI.	MI.	MI.	MI.	MO.	IN.	MO,	MO.	MO.	MO.
Air emissions	MO.	MI.	IN.	IN.	IN.	MI.	MO.	MI.	IN.	IN.	IN.	MI.
Roads & Traffic	MI.	MI.	IN.	IN.	IN.	MI.	MI.	MI.	IN.	IN.	IN.	MI.
Employment												
Risk of fire/explosion	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.

1.8 Mostorod Water Treatment Station

Mostorod Water Treatment Station is located to the south of ERC South Plot 1. The total area of the site is 0.17 km^2. The station treats and purifies fresh water and produces potable drinking water according to National standards. The water is withdrawn from the River Nile (intake point from Ismailia Canal) and following treatment and purification is pumped into the public drinking water network. This station feeds Heliopolis and Nasr City provinces.

The system purifies the fresh water through stages of pre-filtration and ultra filtration to remove colour, suspended particles, algae, vegetation, bacteria and viruses.

As the raw water enters the Mostorod water treatment, it is treated with a coagulant chemical, to aid the clarification process. Lime is used for pH adjustment, softening, and corrosion control. After the raw water has been treated with pre-treatment chemicals, it is gently mixed by large mechanical paddles to enhance flocculation. Then the water travels into basins where the particles settle. The settled particles form a sludge layer on the bottom of each settling basin. The clarified water is then disinfected by the addition of free chlorine. Chlorinated water then enters large settling basins, allowing additional settling time for suspended particles and disinfection contact time.

Potential Negative Impacts

During the operation of the facility, the following adverse environmental impacts may occur:

- Solid Wastes: Solid wastes consisting of wooden debris, gravel, vegetation, garbage and settling sludges resulting from the mechanical screening and secondary treatment process of the raw water.
- Water impacts due to accidental spillages of chemical additives (e.g. Chlorine).
- Low levels of background noise would be anticipated from the facility.
- Low volumes of traffic would be anticipated at the facility.

Potential Positive Impacts

- Operation of the facility allows for National employment opportunities.
- Operation of the facility supplies Heliopolis and Nasr City provinces with potable water.

1.9 Petroleum gas company PETROGAS

PETROGAS's main activity is the filling of gas cylinders with natural gas for domestic and commercial use. The site is located to the east of ERC South Plot 1. It covers an area of approximately 0.2 km^2.

Typical LPG cylinder refilling facilities consists of the following components: bulk storage facilities, LPG distribution lines, pumps and manifold systems, re-fill stations, gauge systems and other equipment.

Potential Negative Impacts

During the operation of the facility, the following adverse environmental impacts may occur:

- Reduction in ambient air quality due to fugitive air emissions from leaks in pipelines, pumps and manifold systems as well as during the refilling operations.
- Ambient air quality will also be reduced by truck movements generating dust and engine exhaust emissions.
- Noise: there will be an increase in the overall baseline noise during operation resulting from increased traffic movement as well as from operation activities (i.e. refilling activities).

Potential Positive Impacts

- Operation of the facility allows for National employment opportunities.
- Operation of the facility supplies domestic and commercial users with LPG cylinders.

Summary of Potential Environmental Impacts

Table 1-7 summarises the Potential Environmental Impacts caused by the Mostorod Water Treatment Station.

Table 1-7 Potential Environmental Impacts water treatment plant

Water treatment Impact Assessment	Operational Phase						Accidental (Non-routine Events)					
	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity	Ambient Air Quality	Ambient Noise levels	Ground water quality	Surface Water quality	Land	Terrestrial Ecology & Biodiversity
Wastewater management	IN.	IN.	MO.	MO.	IN.	MI.	IN.	IN.	IN.	MO.	IN.	MO.
Solid waste management	IN.	IN.	IN.	IN.	MI.	MI.	IN.	IN.	IN.	IN.	MI.	MI.
Hazardous material and waste management	IN.	IN.	MI.	MI.	MI.	MI.	IN.	IN.	MO,	MO.	MO.	MO.
Air emissions	IN.	MI.	IN.	IN.	IN.	MI.	IN.	MI.	IN.	IN.	IN.	MI.
Roads & Traffic	IN.	IN.	IN.	IN.	IN.	IN.	MI.	MI.	IN.	IN.	IN.	MI.
Employment												
Risk of fire/explosion	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.