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## PROJECT: SUEZ THERMAL POWER PLANT

COUNTRY: EGYPT

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### ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SUMMARY

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# **SOCIAL IMPACT ASSESSMENT SUMMARY**

## **SUEZ THERMAL POWER PLANT PROJECT**

**Project Name:** Suez Thermal Power Plant  
**Country:** Egypt  
**Project Number:** P-EG-FAA-016

### **1. Introduction**

1.1 The Egyptian Government through the Egyptian Electricity Holding Company (EEHC) has approached the ADB for possible financing of the Suez Thermal Power Plant. As a requirement, EEHC commissioned Power Generation Engineering and Services Company (PGESCO - Egypt) to prepare the technical documents and procedures required by the African Development Bank and the Egyptian Environmental Affairs Agency (EEAA) concerning the Environmental and Social Assessment of the proposed project.

1.2 EEHC is seeking financial assistance from the ADB for the construction and operation of this 1x650 MWe, dual fuel power plant. The proposed plant is designated as a Category A project under ADB and WB rules and a Category C project under the Egyptian environmental regulations and therefore requires a full Environmental Impact Assessment. Financing from ADB is conditional upon obtaining the environmental clearance from both the Egyptian regulatory authorities and the ADB and subsequent posting on ADB's website of this Summary for at least 120 days before the project proposal can be submitted to its Board for financing consideration. The summary presents the project description and justification; policy, legal and administrative framework; description of project environment; project alternatives; potential impacts and mitigation/enhancement measures; enhancement and mitigation measures; environmental hazard management; monitoring program; public consultations and disclosure; conclusion; and contacts.

### **2. Project Description and Justification**

2.1 East Delta Electricity Production Company (EDEPC), a company incorporated in Egypt and affiliated to EEHC proposes to construct and operate a new thermal power plant at Suez, about 3km south of the city of Suez, Ettaqa District, in Suez Governorate, on the northern shoreline of the Suez Gulf; approximately 150 km East of Cairo. The site is within an existing walled compound of the former Suez power plant covering an area of approximately 90,549.37m<sup>2</sup>. The proposed power plant will consist of one thermal unit, with a nominal electricity generating capacity of 650 megawatts (MWe). The power output from the proposed plant will be sold to the Egyptian Electricity Transmission Company (EETC

2.2 The power plant will include the following main elements:

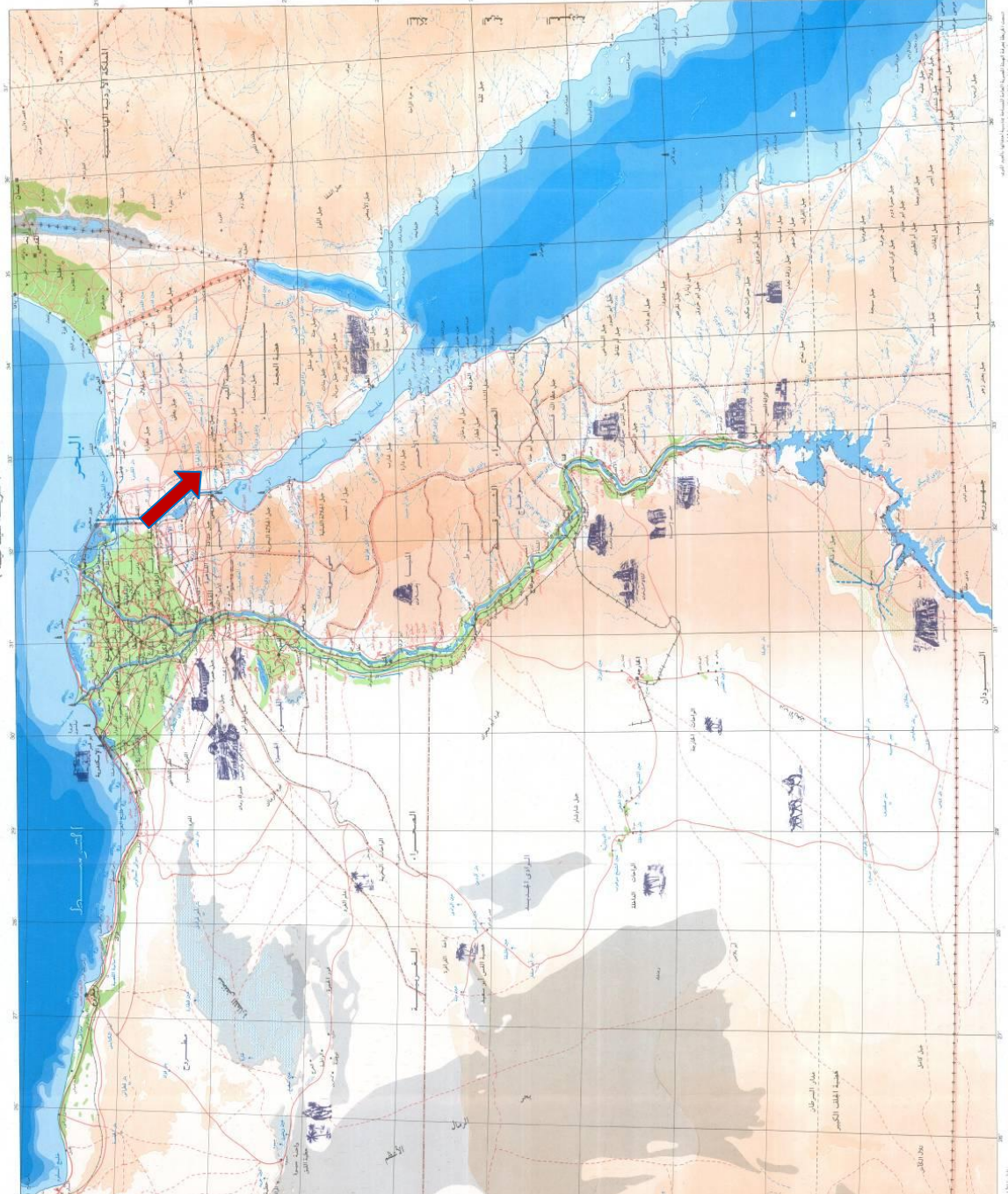
- (i) One generating unit primarily fired by natural gas consisting of one outdoor boiler for steam generation and one steam turbine generator (STG) providing 650 MWe (nominal) electrical generation capacity per unit;
- (ii) Circulating water system, with the main pumps and associated piping, the intake and discharge structures, the screening system, the chlorination system and the cathodic protection system;
- (iii) Heavy fuel oil and light fuel oil storage tanks;
- (iv) Intermediate water storage, the demineralization plant and the make up water system; and
- (v) Transformers to be connected to the new 220 kV switchgear.

2.3 The power plant will utilize natural gas as its primary fuel, delivered to the site via an existing pipeline to be operated by GASCO, and also have the capability to operate using mazout (heavy fuel oil) in emergency situations, which will not be used for more than 7 days (or less than 2%) of operating time per year. The ability to "dual-fuel" the power plant (with natural gas or mazout) will provide security of electricity supply in the event that gas supplies are unavailable for any reason. Suez Gulf water, will be used as non-contact cooling water and for process water following demineralisation. Cooling water will be returned to the Suez Gulf via a discharge structure located on the Gulf shoreline.

2.4 The project comprises, also, the dismantling and demolition of the present Suez old power plant, which has ceased to operate, and ended to decommissioning since 30 October 2002. Old facilities to be dismantled and demolished include the following main components: Generator (97 MW), Transformers, Circuit Breakers, Water Treatment Equipment, Boiler Feed Water Treatment, Sanitary Wastewater, Steam Generation Equipment, Instrument air compressors, Fuel "heavy oil" pump station, Steam Turbines Equipment, Cooling System Equipment, Storage and Service Fuel Tanks, Main Building (Administration building, Boiler building, Turbine building, and transformer building), Clarification Area, Other Facilities (Central workshop building, Warehouse buildings, Security fire fighting and transportation buildings), All batteries are Alkali-type, contained in Sealed containers.

The location map is presented below:

جمهورية مصر العربية  
(خريطة سياحية)



مصدر الخريطة: الهيئة العامة للتخطيط الاقتصادي، القاهرة، 1985

مصدر الخريطة: الهيئة العامة للتخطيط الاقتصادي، القاهرة، 1985

### **3. Policy, Legal and Administrative Framework**

**3.1 Government of Egypt Requirements:** Beginning in the 1950s, the Government of Egypt has promulgated several laws and regulations concerning protection of the environment. The Egyptian standards have been drawn from the range of provisions in the following documents:

- Law 4/1994 and its amending Law 9/2009 and the Prime Minister's Decree No. 338 of 1995, which promulgates the Executive Regulations of Law 4.
- Law 48 of 1982 regarding the protection of the River Nile and waterways from pollution and the Decree No. 8 of 1983 promulgating its Executive Regulations.
- Law No. 93 for 1962 regarding the drainage of liquid wastes, particularly sanitary drainage.
- Law of Labor No. 12/2003.
- Law No. 38/1967 amended by Law No. 31/1976 on public cleanliness and collection and disposal of solid waste.

**3.2** Law 4/1994 and Law 9/2009 require that, for establishments requiring licenses, an environmental impact assessment must be prepared and submitted to the Egyptian Environmental Affairs Agency (EEAA) for review. The environmental impact assessment must be submitted to the EEAA by “the Competent Administrative Authority (CAA) or the licensing authority” for the project in question. For the Power Plant Project, the Competent Administrative Authority is the Egyptian Electricity Holding Company (EEHC) and the Licensing Authority is the Suez Governorate.

**3.3** Egyptian EEAA regulations specify the technical scope or contents of an environmental impact assessment. As a matter of practice, environmental impact assessments for power plant projects typically have a scope and organization similar to World Bank environmental assessments. In addition to environmental impact assessment requirements, the Government of Egypt has established air pollution and water pollution limits applicable to the Power Plant project. These limits are discussed in the ESIA report in detail, along with the actual air and water pollution levels expected from the Power Plant.

**3.4 African Development Bank Guidelines:** The African Development Bank's Environmental and Social Assessment Procedures (ESAP), published in June 2001, states that projects assigned to Category 1 require a full Environmental and Social Impact Assessment (ESIA), including the preparation of an Environmental and Social Management Plan (ESMP). Policies and Guidelines include:

- African Development Bank Group's Policy on the Environment (February 2004).
- Integrated Environmental and Social Impact Assessment Guidelines (October 2003).
- Environmental and Social Impact Assessment Procedures (ESAP) for AfDB's Public Sector Operations (June 2001).

- Assessment Guidelines – Energy (March 1997).
- Handbook on Stakeholder Participation (2201).
- Disclosure of Information Policy (2005).
- Environmental Assessment Guideline on Renewable and Non-renewable Energy (March 1997).
- Policy on Involuntary Resettlement (2003)

**3.5 *World Bank Guidelines and Safeguard Policies:*** The World Bank’s Operational Policy 4.01 (October 3, 1991 and its updates, 1999) provides guidance on the types of assessments that should be performed for different types of projects, and on the scope and content of those assessments. According to Operational Directive 4.01, thermal power plant projects require a full Environmental Assessment (EA). No safeguard policies were triggered except for the Environmental Impact Assessment. The World Bank has established guidelines concerning air pollution and water pollution from thermal power plants (*Pollution Prevention and Abatement Handbook-Part III* (July 1998)) revised in December 2008.

3.6 Public Consultation Process has been designed in accordance with the AfDB and the World Bank Guidance for the Preparation of a Public Consultation and Disclosure Plan (January 1996);

3.7 The ESIA has assessed the impacts of the demolition of the old Suez power plant and the construction and operation of the new Suez Power Plant and has also considered the cumulative air quality impacts of the plant and other existing industry in the project area. Consideration has also been given to the operation of the transmission line and other outside facilities. Permits will be required from the relevant Competent Administrative Authorities.

### **Environmental Management Organization**

**3.8 *During Design and Construction:*** During construction, Project Management Unit / Environmental Management Staff (PMU/EMS) and the Assistant Plant Manager in collaboration with PGESCO Site Manager will ensure that all contracts with Contractors and sub-contractors stipulate all construction management measures (as given in this ESMP), operational design criteria and environment, health and safety standards which must be implemented at the project site

3.9 Implementation of these measures will be enforced by PMU/EMS and supervised by the Assistant Plant Manager, supported by EDEPC Project Manager in collaboration with PGESCO, Site Manager, who will have direct responsibility for the Environment, Safety and Quality

Assurance program on site during construction and operation. The Assistant Plant Manager is responsible for ensuring that construction works comply with the requirements of the ESMP and all environmental permits.

**3.10 *During Power Plant Operation:*** During operation, direct responsibility for environmental compliance and the implementation of the mitigation, management and monitoring measures will continue to be with the Plant Environmental Staff under direct supervision of the Assistant Plant Manager who will report directly to the Chairman/General Manager of EDEPC/SPP

3.11 The Assistant Plant Manager will be based at the site and will be responsible for recruiting, training and managing his/her staff. He/she will be responsible for implementing the mitigation and management measures described above and for monitoring and record keeping of stack emissions; air quality; noise emissions; quality of water discharge; and waste management.

3.12 The Assistant Plant Manager will also have lead responsibility for maintaining a written Environmental Register with respect to environmental impacts as required under Egyptian and World Bank guidelines. The written records will identify the characteristics of discharges and emissions, details of periodic testing including results, procedures for follow-up environmental safety actions and the person in charge of this follow-up. Results of environmental monitoring shall be recorded and submitted to the EEAA, EEHC and to any other party (i.e. ADB etc.) as required. The EEAA, WB and ADB are entitled to audit the project company in order to ensure conformity with environmental standards and requirements

3.13 The Assistant Plant Manager will supervise and lead the Environmental Department (ED) and the Environmental Management Staff (EMS) directed by the ED.

#### **4. Description of the Project Environment**

4.1 The land cover on the site consists primarily of bare sand, with scattered low-growing vegetation. No residences, agricultural activities or other significant land uses are located on the site or in its immediate vicinity and the arid nature of the area provides little opportunity for neither agricultural production nor large animal rearing. The annual average wind speed for 2006 was 4.37m/sec. Wind speeds rarely exceeded 10 meters/second. The prevailing wind direction was generally from the North and/or North Northwest for over 60% of the year.

4.2 Geomorphologically, the site region represents a portion of the Eastern desert on the coast of the Suez Gulf. The geomorphic feature of the region is classified as a coastal plain restricted between the high cliffs of Jabal Ettaqa and the shoreline of the Gulf of Suez. It attains its maximum width north of Suez City. The site is covered with sands and silts laid down by the wadis (drainage courses) dissecting and draining

the mountainous areas. The seabed slope in the inner Gulf (near Suez City) is around 1:250; the slope of the western coast (Ettaqa-Adabiyyah) is also around 1:250.

4.3 The project area lies within the hyperacid climatic province of Egypt characterized by a mild winter and hot summer. During 2006, the monthly average low temperature ranged between 11.5°C and 26.2°C, and the monthly average high temperature ranged between 18.6°C and 38.3°C. The high temperature exceeded 42°C in some summer days. During 2006, the average yearly temperature was around 23.9°C, and the average yearly humidity was around 52.25%. The air pressure is generally high all through the year; its minimum level occurs in August. The annual average surface water temperature in the Suez Gulf site area is 23.6°C, with a range of 15.7°C (recorded in February) to 30.4°C (recorded in August). The highest monthly average surface water temperatures are 27.1°C in July and 28.0°C in August. The Suez area has a dry climate. The annual evaporation reaches 300 mm, and the maximum evaporation rate occurs in June or July. Rainfall is very limited and scarce. It occurs an average of only 11 days per year. The average yearly rainfall reaches around 16.2mm per rainfall. The rainy season starts in November and ends in March.

4.4 Accordingly, similar to most industrial areas around the globe, the project area appears to have little ecological significance and low biodiversity due to the immense alteration of the natural ecology. Such areas are considered a man-made environ. In these areas only those plants and animals that tolerate urban pressures and that can live close to man are found. No archaeological resources are known in this site. Local archaeological authorities have been consulted, where they confirmed that the near area around the site proved that no historic resources exist.

4.5 The main transport infrastructure linking the Suez area to the country main ports facilities is principally based on road network. The site is accessible through, at least, two main highways. The Suez/Red Sea highway runs parallel to the Gulf of Suez. The Maadi/El-Ain Al-Sokhna highway crosses the southern part of the area from northwest to southeast.

## **5. Project Alternatives**

**5.1 Current Situation (“No Action” Option):** The no action alternative to the proposed Suez power plant would result in the future demand for electricity exceeding supply. Hence the lack of a secure and reliable electricity generation and supply system, would constrain existing and future economic development and restricting socio-economic development. As a result, the “no action” option is not considered to be a viable or acceptable alternative to the proposed project.

**5.2 Alternative Technologies and Fuels:** The Suez project will be a one gas/oil-fired steam cycle unit of 650MWe nominal generating capacity each. The EEHC’s selected this after a review of the following:

- gas/oil-fired steam units

- gas/oil-fired combined cycle units
- gas/oil-fired simple cycle combustion turbine units
- pumped storage
- nuclear units
- wind farms
- integrated solar-thermal generating units
- photovoltaic patches

Other possible options include “importing electricity”, “rehabilitation of existing power plants”, “transmission and distribution investment” and “IPPs”.

5.3 These technological alternatives are constrained by the following:

- **Importing electricity:** Egypt is interconnected to Libya on the western side and Jordan, Syria and Lebanon on the eastern side, these are all net importers.
- **Renewable energy:** Current world market cost of wind based electricity is 5.9-7.38 US¢/kWh, which is higher than the cost from natural gas thermal plants. Therefore, renewable energy is not competitive unless further subsidies are provided.
- **Rehabilitation of existing power plants:** While EEHC has concluded the rehabilitation of seven of its existing power plants, these efforts are not enough to cope with the growing demand for electricity.
- **BOOTs/IPPs:** Three BOOT projects (650 MWe each) have been built in Egypt in late 1990's and early 2000's. However private sector participation is dwindling given the worldwide reduction in investor's interest in the power sector.

5.4 The steam cycle (SC) technology, which fires natural gas as a main fuel and mazout as a back-up fuel, has Plant efficiency in excess of 50% and the investment cost is around \$760/kWe (EPC basis with multiple packages). Given that CC plants show lower investment cost and higher plant efficiency, there should be a distinguished rationale to justify why the SC technology has been selected for the proposed project. Other attributes include: operational flexibility, grid stability, unforeseen risk of new technology, fuel flexibility and local manufacturing capacity.

5.5 Hence, with the current policy to limit CC to 30-35% in the generation mix (as identified by EGEAS), and with urgent need of supply capacity with load following capability, SC technology has been identified as the most viable option for the Suez project. Natural gas has been selected as the main fuel for the power plant and compared to other fossil fuels generating technologies, steam turbine generators have a relatively low emissions of carbon dioxide (CO<sub>2</sub>), moderate emission level of nitrogen oxides (NO<sub>x</sub>), and lowest emissions, almost traces, of sulfur dioxide (SO<sub>2</sub>) and particulates.

## 6. Potential Impacts and Mitigation/Enhancement Measures

6.1 A thorough assessment of the impacts of the proposed plant has been carried out based on information provided by EEHC, EDEPC and their sub-consultants. A combination of quantitative and qualitative assessment techniques, ranging from computer and/or physical modeling for air, water, noise and traffic impacts to ecological and aquatic surveys and visual evaluation, have been undertaken. The results of the assessment work have been compared with the environmental standards set by the Government of the Arab Republic of Egypt and the African development Bank as well as the World Bank. The following items are examined in the corresponding sub-sections of the ESIA Study Report:

- Air Quality;
- Aquatic Environment;
- Noise and Vibration;
- Flora and Fauna;
- Land use, Landscape and Visual Impacts;
- Soils, Geology and Hydrology;
- Traffic;
- Socio-economics and Socio-cultural Effects;
- Archaeology, Historical and Cultural Heritage;
- Natural Disaster Risks;
- Major Accident Hazards;
- Solid Waste Management;
- Public Health Effects;
- Occupational Health and Safety; and
- Associated Infrastructure.

*Additional information is presented on environmental, health and safety issues relating to demolition, construction and operation of the New Suez power project.*

6.2 For each of these items, a concise description and evaluation of the significance of potential impacts of the project is presented in the ESIA study report. The conclusions of the assessment are that with suitable mitigation measures described in ESMP the project is in compliance with the environmental requirements of the Government of Egypt and the African Development Bank as well as the World Bank with respect to demolition process and construction of the new plant.

**6.3 *Air Quality: Demolition and Construction Dust:*** Demolition and construction activities will result in locally high levels of dust. This may affect residential receptors or sensitive environments which lie in the immediate boundaries of the power plant. Existing concentrations of

airborne dust are already high in this urban industrial area. Potential impacts from dust emissions on site will be significantly reduced by careful management and the implementation of mitigation measures to reduce dust generation.

**6.4 Stack Emissions and Background Air Quality:** The power plant will burn natural gas as its primary fuel. As a result, the principle pollutant during normal operation will be NO<sub>x</sub>. During emergency operation (and for not more than 2% of operating time), the burning of heavy fuel oil will result in emissions of particulate matter and SO<sub>2</sub> along with trace amounts of other pollutants. Emissions from the plant will meet Egyptian, AfDB and World Bank Guidelines.

**6.5 Aquatic Environment:** Cooling water and process water for power plant operation will be drawn from the Suez Gulf via an intake structure. The quantity of the cooling water that will be returned back to the Suez Gulf is about 20-26m<sup>3</sup>/sec. Process water that will be abstracted from the Suez Gulf is about 0.07% of this quantity. Cooling water will be returned to the Suez Gulf via a discharge structure whilst waste process water will be disposed of after treatment via discharge system, which includes two pathways: plantation irrigation network and City sewer system. The key potential impacts of the power plant on the aquatic environment will therefore be impacts to the aquatic flora and fauna during power plant construction and operation.

6.6 Impacts on physical aquagraphy, water quality and removal of, or disturbance to, aquatic habitats, flora and fauna due to dredging and construction during construction of the power plant. Given that the area of impact is very localised, losses in many cases are temporary. The impacts of power plant construction on the aquatic environment are not considered to be significant. In addition, good site management and engineering practices during construction will ensure that any residual impacts are reduced to a minimum.

6.7 Power plant operation will result in a heated plume of waste cooling water being discharged into the Suez Gulf. All discharges of process water will be treated prior to discharge to ensure that the Egyptian, AfDB and World Bank waste water quality guidelines are met. Treatment includes neutralization, oil separation, flocculation and filtration.

6.8 The returned cooling water will be released at a temperature of no more than 8°C at the point of discharge. Thermal modeling of the discharge plume shows that, during lowest flow at full load operation, the point at which the plume has decreased in temperature to 3°C above ambient, lies at approximately less than 100 m from the point of discharge. The mixing zone has been defined by the HRI/MWRI to be 100-150 m from the point of discharge.

**6.9 Noise Impacts:** The demolition, construction of the new Suez power plant and construction traffic are expected to generate a maximum noise level of 59 dB(A) and 0.3dB(A), respectively, during the day at the fence of the power plant and 57dB(A) at night. These worst-case demolition and construction noise levels are both within Egyptian and World Bank<sup>(1)</sup> Guidelines.

6.10 The potential noise emissions from the new Suez plant during operation have been modeled to provide noise contours in the area around the site. The predicted operational noise levels at the site boundary and at all receptors are below the Egyptian and World Bank guidelines during daytime and night-time (max. level is 52.3 dB (A)).

**6.11 Flora and Fauna:** No areas protected for their conservation value are located on, or in the vicinity of, the project area. The proposed site itself and the surrounding land is poorly vegetated with much of the area having been disturbed by urban developments. Given that the potential impacts of demolition, construction and operation on power plant area likely to be localized and good site management practices will be implemented, no significant effects are predicted.

**6.12 Land Use, Landscape and Visual Impacts:** The land use at the project site is industrial land. There is no loss of this land to the power plant development, as this land is dedicated for a power generation activity since late 1983, therefore there is not significant land use impacts due to the New Suez power project.

6.13 The surrounding land use is generally industrial. As the land is highly urbanized with limited vegetation, all existing views will be insignificantly influenced by the power plant and given the surrounding industrial context, the visual intrusion of the power plant will be minimal. Visual impacts of the power plant from the residential areas are also not expected to be significant given the orientation of the apartments. The potential landscape and visual impacts of the project are therefore expected to be minor and not significant.

**6.14 Soils, Geology and Hydrology:** Due to the characteristics of the soils and geology of the site, in particular the lack of any sensitive features, and the mitigation measures proposed as part of the demolition, construction and operation of the power plant, no significant impacts are predicted to occur. In addition, preliminary land surface investigations confirmed the site as being uncontaminated. However, soil sample testing is recommended for further geotechnical investigation.

**6.15 Traffic:** There is some potential for increased congestion on the main roads to the power plant, due to construction vehicles, however the impacts will only occur during the peak construction phase and during peak hours. These are predicted to be insignificant. Mitigation measures will be put in place to reduce the potential for impacts to arise.

**6.16 Socio-economics and Socio-cultural effects:** There are around 300 workers at the old plant who will have to be re-deployed as follows: 250 will be retained by the new Suez Power Plant, 50 will be redeployed to EDEPC. However, many of these will apply for unpaid leave to be able to work on the construction of the new plant where preference is given to local labor. Although a considerable number of workers will be

re-employed elsewhere in the greater EDEPC area, their families/homes will remain in Suez, i.e. no resettlement or loss of income will take place as a result of the re-employment.

6.17 The power plant will provide a net positive socio-economic impact through the provision of employment opportunities and attraction of economic investment into the area. In addition, the use of local labor (95% during construction), will maximize these positive impacts through the development of the local skill base and will also generate increased demand for local services, materials and products.

6.18 Fish catches will be boosted, as indicated in the main document, scientific research has shown that certain species of the fish grow considerably faster in warmer water.

**6.19 *Archaeology, Historic and Cultural Heritage:*** No available information was found which identified any archaeological, historic or cultural remains on the site or in the surrounding area. Consequently, no impact is predicted to occur on any known archaeological, historic or cultural resources. EDEPC have incorporated mitigation measures into the construction program by preparing a chance finds procedure.

**6.20 *Natural Disaster Risks:*** An assessment of the risks to the power plant from seismic activity has concluded that given the engineering measures incorporated into the design of the power plant, the potential environmental impacts of a seismic event during power plant operation are not anticipated to be significant. Furthermore the power plant will be designed to conform to the International Building Code Zone 2 seismic criteria, according to US regulations for earthquake. These design criteria are therefore considered sufficient to withstand the level of seismic activity experienced in the area.

**6.21 *Solid and Hazardous Waste Management:*** The management of wastes during demolition, construction and operation of the power plant will include mitigation measures to collect and store waste on-site, record all consignments of solid or contaminated waste for disposal and periodically audit waste contractors and disposal sites to ensure that disposal is undertaken in a safe and environmentally acceptable manner according to the rules set by Law 4/1994, Law 9/2009 and the Governorate of Suez.

6.22 During demolition, construction and operation, all wastes including debris waste, general waste, packaging waste, commercial wastes, raw-water pre- treatment sludge, tank sludge and interceptor sludge will be disposed of by licensed waste contractors according to the rules set by Law 4/1994, Law 9/2009 and the Governorate of Suez.

**6.23 *Occupational Health and Safety:*** With the provision of a high standard of health and safety management on site, demolition, construction and operation of the power plant in accordance with good industry practice, the occupational health and safety risks associated with demolition, construction and operation of the power plant will be minimized and are not significant.

## **Enhancement and Mitigation Plan**

6.24 The Environmental and Social Management Plan (ESMP) includes mitigation measures, design of monitoring programs where appropriate, and specification of management measures (including institutional responsibility and training requirements). The mitigation measures represent a synthesis of those measures which are part of the basic power plant design and those that have been recommended in the ESIA report for both the construction and operational phases of the power plant. The mitigation measures discussed in the report are summarized in the following two Tables, together with respective environmental monitoring and management arrangements. It should be noted that many of the mitigation measures presented below for the construction phase, will be carried forward into plant Operation.

**Table 1**  
**Demolition Impact Mitigation and Management Measures**

Issue/Impact	Mitigation Measures
<p><i>Air Quality</i> Dust emissions caused by demolition activities, demolition vehicle movements, and transport of demolished materials</p>	<p>Implementation of good site practices including</p> <ul style="list-style-type: none"> <li>• demolition method is not blasting, but is top-down deconstruction, in the reverse order to that of demolition, progressive, level by level having regard to type of demolition;</li> <li>• wherever possible, external non-load bearing cladding shall be removed first;</li> <li>• debris to be removed at frequent intervals and stockpiles shall not be allowed to build up. Waste shall be removed on a daily basis as far as reasonably practicable;</li> <li>• appropriate siting and maintenance of stockpiles of demolished materials so as to minimize dust blow;</li> <li>• minimizing drop heights for material transfer activities;</li> <li>• roads will be kept damp via a water bowser;</li> <li>• roads will be compacted and graveled if necessary;</li> <li>• site roads will be maintained in good order;</li> <li>• regulation of site access;</li> <li>• sheeting of lorries transporting demolished materials and spoil;</li> <li>• enforcement of vehicle speed limits on dust roads to &lt;35 km/h</li> </ul>
<p><i>Water Quality</i> Generation of demolition site run-off. Surplus groundwater during soil remediation and wastewater that may cause adverse water quality impacts on water sensitive receivers.</p>	<p>Mitigation activities will include the following</p> <ul style="list-style-type: none"> <li>• no discharge of effluents into the Suez Gulf - all effluents shall be collected and removed off site for treatment by approved firms;</li> <li>• development of a site drainage plan which reduces flow velocity and sediment load;</li> <li>• protection of temporary stockpiles of soil from erosion by using a reduced slope angle where practical, sheeting and by incorporating sediment traps in drainage ditches;</li> <li>• maintenance of well kept demolition site.</li> <li>• proper site management to minimize surface water run-off, soil erosion, soil remediation activities and the impacts of sewage effluents;</li> <li>• adequate maintenance of drainage systems to prevent any overflow;</li> <li>• critical areas within the Site shall be clearly marked and provided with protective measures to control site run-off.</li> <li>• Temporary channels shall be provided to facilitate run-off discharge into the appropriate watercourses, via a silt retention pond;</li> <li>• drainage channels shall incorporate sediment basins or traps and baffles to enhance deposition rates;</li> </ul>
<p><i>Issue/Impact</i></p>	<p><i>Mitigation Measures</i></p> <ul style="list-style-type: none"> <li>• wheel washing facilities will be installed to ensure no earth, mud and debris is deposited on roads. Sand and silt in the wash water from such facilities shall be settled out and removed before (in line with effluent discharge standards discharging the used water into water drains;</li> <li>• temporary water/toilet facilities will be provided and sewage discharges on site will be connected to the existing sewer or sewage treatment facilities where possible;</li> <li>• the contractor shall not discharge directly or indirectly into any public sewer stormwater drain any effluent or contaminated water without the prior written consent of the site engineer in consultation with the Asistant Plant Manager.</li> </ul>

Issue/Impact	Mitigation Measures
<p><i>Noise</i> Arising noise impacts related to operation of demolition plant and vehicles.</p>	<p>Implementation of good site practices including:</p> <ul style="list-style-type: none"> <li>• enforcement of vehicle speed limits;</li> <li>• strict controls of vehicle routing;</li> <li>• demolition plant equipment to be fitted with silencers;</li> <li>• no noisy demolition activities at night;</li> <li>• prohibition of heavy vehicle movements at night;</li> <li>• use of protective hearing equipment for workers.</li> </ul>

Issue/Impact	Mitigation Measures
<p><i>Flora and Fauna</i> Site clearance- vegetation removal and habitat disturbance.</p>	<ul style="list-style-type: none"> <li>• Good site management practices will be observed to ensure that disturbance of habitats off-site are minimized. Specific mitigation measures include restricting personnel and vehicles to within demolition site boundaries, lay down areas and access roads;</li> <li>• Trees growing by the fence of the power plant will be kept since they will not obstruct any demolitions and due to their importance as wind shields.</li> </ul>

Issue/Impact	Mitigation Measures
<p><i>Land Contamination</i> Site clearance, excavation and disposal of material, exposure of potentially contaminated soils, spillage or leakage of substances on land, movement of equipment and vehicles on site.</p>	<p>The potential for impacts are largely dependent on management of the demolition site and activities. The following mitigation measures will be implemented</p> <ul style="list-style-type: none"> <li>• development of effective site drainage systems;</li> <li>• restriction of access only to demolition site areas;</li> <li>• monitoring and control of spoil;</li> <li>• disposal of waste materials unsuitable for reuse at appropriately licensed sites;</li> <li>• provision of oil and suspended solid interceptors;</li> <li>• management of excavations during demolition to avoid the generation of drainage pathways to underlying aquifers;</li> <li>• provision of impermeable bases in operational areas to prevent absorption of spillages.</li> <li>• machinery and/or any other items that are suitable for reuse on other locations or sold out to a licensed contractor will be transported using safe means so as to keep the soil secured against any hazard;</li> <li>• Hazardous wastes will be disposed of by a licensed contractor, with strict adherence to the EEAA regulations and controls of the Law 4/1994 and Law 9/2009. Disposal procedures will be audited by the project engineer and EDEPC.</li> </ul>

Issue/Impact	Mitigation Measures
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<p><b>Traffic and Transport</b>  Disruption, noise and increased air pollution due to increased traffic, heavy loads and abnormal loads.</p>	<p>Standard good practice measures will be implemented as follows:</p> <ul style="list-style-type: none"> <li>• adherence of abnormal load movements to prescribed routes, outside peak hours and advance publication of movements if required;</li> <li>• demolition shifts will be staggered;</li> <li>• scheduling of traffic to avoid peak hours on local roads;</li> <li>• transportation of demolition workers by contract bus.</li> <li>•</li> </ul>
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Issue/Impact	Mitigation Measures
<p><b>Socio-Economic Environment</b>  Positive Impacts identified.</p>	<p>Present labor force of the existing old Suez power plant have already been granted the right to choose where they will go to work within the overall East Delta Electricity Production Facilities.</p> <p>Quite fair rules for re-employing all members of the old Suez staff with no loss of their employment rights, including salaries, overtime, insurance, health care, and social &amp; cultural benefits.</p> <p>Families/homes of considerable number of workers who will be re-employed elsewhere in the greater East Delta area will remain in Suez, i.e. no resettlement or loss of income will take place of the re-employment.</p> <p>Activities related to demolition work take place on the construction site, i.e. on EDEPC land.</p> <p>Public and Industry Relations will be maximized through open dialogue between EDEPC (through the Assistant Plant Manager who has direct responsibility for EHS Liaison) and local authority, public and industry representatives.</p>

Issue/Impact	Mitigation Measures
<p><b>Asbestos Control</b>  Potential health hazard due to asbestos contamination.</p>	<p>There is a potential for finding Asbestos Containing Materials (ACM) during dismantling and demolition processes. If found, standard good practice measures will be implemented as follows:</p> <ul style="list-style-type: none"> <li>• any ACM present in the stacks and superstructures shall be removed before commencement of the demolition works;</li> <li>• removal of asbestos materials in certain locations may run more smoothly if both asbestos contractors and civil demolition contractors work in tandem. This is due to the convenience of the main civil demolition contractor providing access (scaffolding etc.) to the ACM, for the asbestos contractor and avoiding duplication of effort;</li> <li>• work actually involving the removal of ACM, that involves the handling of the ACM shall be carried out by a Specialist Asbestos Contractor;</li> <li>• all remaining ACM on the site is not accessible to the general public.</li> </ul>

Issue/Impact	Mitigation Measures
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<b>Waste Management</b>	<p>Recycling, storage, transportation and disposal measures are recommended to avoid or minimize potential adverse impacts. The Contractor will incorporate these recommendations into a Waste Management Plan that incorporates site specific factors, such as the designation of areas for the segregation and temporary storage of reusable and recyclable materials.</p> <p>Good practice measures such as the following:</p> <ul style="list-style-type: none"> <li>• wastes should be handled and stored in a manner which ensures that they are held securely without loss or leakage thereby minimizing the potential for pollution;</li> <li>• only reputable waste collectors authorized to collect the specific category of waste concerned will be employed;</li> <li>• appropriate measures will be employed to minimize windblown litter and dust during transportation by either covering trucks or transporting wastes in enclosed containers;</li> <li>• necessary waste disposal permits will be obtained from the appropriate authorities, if they are required, in accordance with the Waste Disposal Regulation and the Government Land Ordinance;</li> <li>• collection of general refuse will be carried out frequently, preferably daily;</li> <li>• waste will only be disposed of at licensed sites and site staff and the civil engineering Contractor will develop procedures to ensure that illegal disposal of wastes does not occur;</li> <li>• waste storage areas will be well maintained and cleaned regularly;</li> <li>• records will be maintained of the quantities of wastes generated, recycled and disposed, determined by weighing each load.</li> </ul>
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<b>Issue/Impact</b>	<b>Mitigation Measures</b>
<b>Occupational Health &amp; Safety</b>	<p>Good local and international demolition/demolition practice in Environment, Health and Safety (EHS) will be applied at all times and account will be taken of local customs, practices and attitudes. Measures include:</p> <ul style="list-style-type: none"> <li>• implementation of EHS procedures as a condition of contract the contractor and subcontractors;</li> <li>• clear definition of the EHS roles and responsibilities of all demolition staff;</li> <li>• management, supervision, monitoring and record-keeping as set out in plant's operational manual;</li> <li>• pre- demolition assessment of the EHS risks and hazards;</li> <li>• completion and implementation of Fire Safety Plan prior to starting demolition to any part of the plant;</li> <li>• provision of appropriate training on EHS issues for all workers;</li> <li>• provision of health and safety information;</li> <li>• regular inspection, review and recording of EHS performance;</li> <li>• maintenance of a high standard of housekeeping at all times.</li> </ul>

**Table 2**

**Construction Impact Mitigation and Management Measures<sup>(\*)</sup>**

<b>Issue/Impact</b>	<b>Mitigation Measures</b>
<p><b>Air Quality</b> Dust emissions caused by construction activities, construction vehicle movements, and transport of friable construction materials</p>	<p>Implementation of good site practices including</p> <ul style="list-style-type: none"> <li>• appropriate siting and maintenance of stockpiles of friable materials so as to minimize dust blow;</li> <li>• minimizing drop heights for material transfer activities such as unloading of friable materials;</li> <li>• construction phase to begin with construction of access roads;</li> <li>• roads will be kept damp via a water bowser;</li> <li>• roads will be compacted and graveled if necessary;</li> <li>• site roads will be maintained in good order;</li> <li>• regulation of site access;</li> <li>• sheeting of lorries transporting friable construction materials and spoil;</li> <li>• enforcement of vehicle speed limits on unmetalled roads to &lt;35 km/h</li> </ul>

Issue/Impact	Mitigation Measures
<p><b><i>Aquatic Environment</i></b> Dredging and construction of the intake structure and water discharge structure.</p> <p>Increased suspended sediment and pollutant loads, permanent loss and disturbance to aquatic flora and fauna.</p>	<p>The following measures will be taken:</p> <ul style="list-style-type: none"> <li>• Construction Method Statement to be produced by the Contractor;</li> <li>• dredged areas limited to minimum area required;</li> <li>• disposal of dredged sediments to an agreed site;</li> <li>• all works will be made clearly visible using flags, beacons and/or signals;</li> <li>• shore area will be reinstated following construction.</li> </ul>

Issue/Impact	Mitigation Measures
<p>Contamination of the aquatic environment as a result of construction activities on land e.g. spillages, disposal of liquid wastes; surface run-off, exposure of contaminated soils (see also under “Soils and Hydrology”).</p>	<p>Mitigation activities will include the following</p> <ul style="list-style-type: none"> <li>• no discharge of effluents into the Suez Gulf - all effluents shall be collected and removed off site for treatment by approved firms;</li> <li>• development of a site drainage plan which reduces flow velocity and sediment load;</li> <li>• protection of temporary stockpiles of soil from erosion by using a reduced slope angle where practical, sheeting and by incorporating sediment traps in drainage ditches;</li> <li>• maintenance of well kept construction site.</li> </ul>

(\* Environmental regulations are to be included in all construction contracts.

Issue/Impact	Mitigation Measures
<p><b><i>Noise</i></b> Increased noise in the project area as a result of the use of noisy machinery and increased vehicle movements.</p>	<p>Implementation of good site practices including:</p> <ul style="list-style-type: none"> <li>• enforcement of vehicle speed limits;</li> <li>• strict controls of vehicle routing;</li> <li>• diesel engine construction plant equipment to be fitted with silencers;</li> <li>• limited noisy construction activities at night;</li> <li>• prohibition of heavy vehicle movements at night;</li> <li>• use of protective hearing equipment for workers.</li> </ul>

<p><i>Flora and Fauna</i> Site Clearance- Vegetation removal and habitat disturbance.</p>	<ul style="list-style-type: none"><li>• Good site management practices will be observed to ensure that disturbance of habitats off-site are minimized.</li><li>• Specific mitigation measures include restricting personnel and vehicles to within construction site boundaries, lay down areas and access roads.</li></ul>
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(\*) Environmental regulations are to be included in all construction contracts.

Issue/Impact	Mitigation Measures
<p><b><i>Soils and Hydrology</i></b>  Site clearance, excavation and disposal of material, exposure of potentially contaminated soils, spillage or leakage of substances on land, movement of equipment and vehicles on site.</p>	<p>The potential for impacts are largely dependent on management of the construction site and activities. The following mitigation measures will be implemented</p> <ul style="list-style-type: none"> <li>• development of effective site drainage systems;</li> <li>• restriction of access only to construction site areas;</li> <li>• monitoring and control of spoil;</li> <li>• disposal of waste materials unsuitable for reuse on-site, (e.g. for landscaping) at appropriately licensed sites;</li> <li>• provision of oil and suspended solid interceptors;</li> <li>• management of excavations during construction to avoid the generation of drainage pathways to underlying aquifers;</li> <li>• provision of impermeable bases in operational areas to prevent absorption of spillages.</li> </ul>

Issue/Impact	Mitigation Measures
<p><b><i>Traffic and Transport</i></b>  Disruption, noise and increased air pollution due to increased traffic, heavy loads and abnormal loads.</p>	<p>Standard good practice measures will be implemented as follows:</p> <ul style="list-style-type: none"> <li>• adherence of abnormal load movements to prescribed routes, outside peak hours and advance publication of movements if required;</li> <li>• construction shifts will be staggered;</li> <li>• scheduling of traffic to avoid peak hours on local roads;</li> <li>• transportation of construction workers by contract bus.</li> </ul>

(\*) Environmental regulations are to be included in all construction contracts.

**Table 2 (Contd.)**  
**Construction Impact Mitigation and Management Measures<sup>(\*)</sup>**

Issue/Impact	Mitigation Measures
<p><i>Socio-Economic Environment</i> Positive impacts identified.</p>	<p>All activities related to the construction of the new plant will take place within the area belonging to EDEPC, i.e. there will be no off-site activities or associated land acquisition during construction.</p> <p>The entire labor force will be daily commuters, thus no worker housing or associated facilities will be erected on site during construction.</p> <p>The contractors will be responsible for relevant temporary water / toilet facilities during construction and the need to provide appropriate services will be specified in their contracts.</p> <p>Public and Industry Relations will be maximized through open dialogue between EDEPC (through the Assistant Plant Manager who has direct responsibility for EHS Liaison) and local authority, public and industry representatives.</p>

Issue/Impact	Mitigation Measures
<p><i>Archaeology</i> Potential chance finds of archaeological remains during construction.</p>	<p>The project site does not lie on, or in the immediate vicinity of any known archaeological areas of interest.</p> <p>If remains are found EDEPC is committed to</p> <ul style="list-style-type: none"> <li>• cease activities and consult Antiquities authority;</li> <li>• protection in situ if possible;</li> <li>• excavation of areas where protection not feasible;</li> <li>• preparation of a Chance Finds Procedure and Method Statement.</li> </ul>
<p><i>Natural Disasters</i> Flash flooding.</p>	<p>Good engineering design will incorporate the following mitigation measures:</p> <ul style="list-style-type: none"> <li>• drainage system designed to direct flood water from main plant areas into the sea and direct potentially contaminated waters through the oil interceptor.</li> </ul>

(\*) Environmental regulations are to be included in all construction contracts.

**Table 2 (Contd.)**  
**Construction Impact Mitigation and Management Measures<sup>(\*)</sup>**

Issue/Impact	Mitigation Measures
<i>Solid Waste Management</i>	<p>Good practice measures such as the following:</p> <ul style="list-style-type: none"> <li>• all waste taken off-site will be undertaken by a licensed contractor and EDEPC will audit disposal procedure;</li> <li>• collection and segregation of wastes and safe storage;</li> <li>• recording of consignments for disposal;</li> <li>• prior agreement of standards for storage, management and disposal with relevant authorities.</li> </ul> <p><b>It is of highest importance that final disposal of wastes shall be strictly adhered to environment friendly disposal Contract.</b></p>

Issue/Impact	Mitigation Measures
<i>Occupational Health &amp; Safety</i>	<p>Good local and international construction practice in Environment, Health and Safety (EHS) will be applied at all times and account will be taken of local customs, practices and attitudes. Measures include:</p> <ul style="list-style-type: none"> <li>• implementation of EHS procedures as a condition of contract all contractors and sub-contractors;</li> <li>• clear definition of the EHS roles and responsibilities of all construction companies and staff;</li> <li>• management, supervision, monitoring and record-keeping as set out in plant's operational manual;</li> <li>• pre-construction and operation assessment of the EHS risks and hazards;</li> <li>• completion and implementation of Fire Safety Plan prior to commissioning any part of the plant;</li> <li>• provision of appropriate training on EHS issues for all workers;</li> <li>• provision of health and safety information;</li> <li>• regular inspection, review and recording of EHS performance; and</li> <li>• maintenance of a high standard of housekeeping at all times.</li> </ul>

(\*) Environmental regulations are to be included in all construction contracts.

**Table 3**

***Operational Impact Mitigation and Management***

Issue/Impact	Mitigation Measures
<p><i>Air Quality</i> Emissions from stack are not expected to exceed standards.</p> <p>Ambient air quality affected by emissions from the power plant.</p>	<p>Mitigation measures have already been included in the design of the plant and, given EDEPC/SPP/EMS's strict commitment to use mazout fuel oil for &lt;2% of operating time, no further mitigation measures are proposed.</p> <p>EDEPC/SPP/EMS will however demonstrate the validity of the conclusions drawn in the ESIA report.</p> <p>EDEPC/SPP/EMS will demonstrate the validity of the conclusions drawn in the ESIA report. If ground level concentrations are found to be above local and World Bank standards options for further mitigation will be discussed.</p>
Issue/Impact	Mitigation Measures
<p><i>Aquatic Environment</i> Discharge of process and cooling water.</p>	<p>The design of the intake and cooling water structures have already incorporated measures to reduce impacts. In addition, good site management practices including the following will be implemented:</p> <ul style="list-style-type: none"> <li>• neutralization, oil separation, flocculation and filtration of any contaminated water before discharge to either plantation irrigation network or Ataka sewer network (in the near future);</li> <li>• no disposal of solid wastes or waste water into the discharge structure;</li> <li>• regular maintenance of site drainage system to ensure efficient operation;</li> <li>• all discharges will comply with local Egyptian and World Bank guidelines.</li> </ul> <p>In addition, EDEPC/SPP/EMS will demonstrate the validity of the conclusions drawn in the ESIA report. If pollutant concentrations in the discharge or impacts to the surrounding aquatic environment are found to be above local and World Bank standards or unacceptable, options for further mitigation will be discussed.</p>
Issue/Impact	Mitigation Measures
<p><i>Noise</i></p>	<p>Specific design mitigation measures to minimize noise impacts include:</p> <ul style="list-style-type: none"> <li>• steam turbine generators; air compressors, pumps and emergency diesel engines are enclosed in buildings;</li> <li>• air compressors are equipped with silencers;</li> <li>• noisy outdoor equipment are designed to a noise limit of 90 dB (A) at 1 m.</li> </ul> <p>In addition, plant workers will be provided with protective wear in plant areas with high noise levels. The plant will operate in accordance with internationally accepted health and safety measures.</p>

Issue/Impact	Mitigation Measures
<p><b>Flora and Fauna</b> Disturbance to habitats as a result of noise, vehicle and personnel movements.</p>	<p>The following mitigation measures will be implemented:</p> <ul style="list-style-type: none"> <li>• restrict personnel and vehicle movements to access roads and within boundaries of site only; and</li> <li>• control of noise during operation.</li> </ul>
<p><b>Visual Impact</b> Visual image of power plant from surrounding areas.</p>	<p>The visual effect of the power plant will be improved through:</p> <ul style="list-style-type: none"> <li>• creation of landscaped boundary along the fence of the power plant.</li> <li>• <i>Ficus elastica var decora</i> and <i>Ficus nitida</i> will be propagated and the resulting plants will be used for decorating and landscaping the site when completing the new power plant. One may obtain 200-300 individual plants from a single tree.</li> </ul>
Issue/Impact	Mitigation Measures
<p><b>Soil and Hydrology</b> Spillage of oils, chemicals or fuels on site.</p>	<p>Good site management measures as described under Aquatic Environment will minimize any potential risks. As part of this, regular checks of bunds and drainage systems will be undertaken to ensure containment and efficient operation.</p>
<p><b>Solid Waste</b></p>	<p>Good practice measures <b>undertaken during the construction phase</b> will be continued into the operation phase (see Table 6).  It is of highest importance that final disposal of wastes shall be strictly adhered to environment friendly disposal Contract.</p>
Issue/Impact	Mitigation Measures
<p><b>Occupational Health and Safety, Risks and Hazards</b></p>	<p>Standard international practice on EHS issues shall be employed on site. The mitigation measures summarized in construction management Table apply.</p> <p>In addition, the following measures will be undertaken:</p> <ul style="list-style-type: none"> <li>• Provision of training in use of protection equipment and chemical handling.</li> <li>• Use of protective equipment.</li> <li>• Clear marking of work site hazards and training in recognition of hazard symbols.</li> <li>• Installation of vapour detection equipment and control systems.</li> <li>• Development of site emergency response plans.</li> </ul>

### *Summary of Implementation Cost of the ESMP*

No.	Phase of Implementation	Cost in US\$
		Measures and Monitoring
1	Demolition Phase	259 K (upper limit)
2	Construction Phase	1655 K (upper limit)
3	Operation Phase	included in operation cost
<b>Total</b>		<b>1914K</b>

6.25 The estimated total cost of implementing the environmental and mitigation measures is USD1.914 million. This, however, will further be assessed to determine its adequacy for a successful implementation of the demolition phase and implementation of the ESMP mitigation measures of the new plant including monitoring aspects in compliance with ADB Policies and Guidelines.

## **7. Environmental Hazard Management**

**7.1 Accident Response:** As part of the preparation of emergency procedures and the plans for accident response arrangements, the project company will carry out the following review industry-specific and Egyptian and World Bank standards and regulations; establish general guidelines on potential safety and accident risks; prepare job-specific operating instructions where appropriate; establish safety and security notices for hazardous materials; prepare specific emergency operating instructions; provide protective equipment (including clothing, air and ear protection etc.) as required; evaluate information and feedback from employees; and record and investigate all accidents, injuries and incidents.

7.2 Contingency plans and emergency procedures are being developed to cover events due to operational failures, natural causes and acts of third parties. The plans and procedures will cover, as a minimum, the following fire; explosion; bomb alerts; leaks and spills of hazardous materials; structure or equipment failures; injuries and illnesses; risk from natural disasters (wind, sandstorm, earthquake); and third-party risks (potential impacts of an accident occurring at another industrial facility which may impact upon the power plant).

**7.3 Oil Spill Contingency Plan:** As good practice and part of the ESMP, EDEPC/PMU/EMS will prepare an Oil Spill Contingency Plan to be ready for implementation by the start of construction activities. The plan will cover the following activities: delivery, handling, spills; and clean-up. The plan will detail procedures, responsibilities, chains of command, information flows, monitoring and documentation.

## **8. Monitoring Program**

**8.1 Stack Emissions:** Stack emissions will be monitored continuously during plant operation at a representative point in the stack. Operational monitoring of stack emissions shall comprise monitoring the levels of Oxides of Nitrogen; Sulfur Dioxide; Carbon

Monoxide; and Total Suspended Particles and PM<sub>10</sub>. The automatic monitoring system used will be linked to an alarm to warn when emission limits for each pollutant are being approached

8.2 Concentrations will be recorded as hourly rolling averages and reports on stack emissions monitoring will compare recorded emissions against predicted levels and Egyptian and WB guidelines (as given in Section 2). Reports will be submitted to the EEAA, the AfDB and any other concerned authority on an annual basis (or as required).

**8.3 *Ambient Air Quality - Validation of Modeling Predictions Using Continuous NO<sub>x</sub>, SO<sub>2</sub> and TSP Analyzer:*** The use of a continuous NO<sub>x</sub>, SO<sub>2</sub>, CO and TSP analyzer allows for baseline air quality monitoring on a continuous basis. The provision of two continuous monitors (or three: one at the site, one upwind and the third downwind) will provide the basis for “validating” the predictions made in the ESIA. The monitors will also include a weather station providing data on air temperature, wind speed, wind direction and mixing heights on a continuous basis

**8.4 *Aquatic Environment:*** Monitoring of impacts of the power plant on the aquatic environment will include a survey and monitoring of the quality of the discharge water, river bank and benthic sediments, ambient water quality and the impact on aquatic flora and fauna

8.5 Monitoring data will be analyzed and reviewed at regular intervals and compared with Egyptian and World Bank guidelines. Records of monitoring results will be kept in a suitable format and will be reported (in summary format with any exceptions identified) to the responsible government authorities and the AfDB or any other concerned authority as required.

**8.6 *Waste Monitoring:*** Wastes generated on site and collected for disposal by skilled firms will be referenced, weighed and recorded. Environmental audits will be undertaken which will assess the quality and suitability of on- and off-site waste management procedures

## **9. Public Consultations and Public Disclosure**

9.1 Public consultations have been carried out and still undergoing according to the EEAA guidelines which require coordination with other government agencies involved in the EIA, obtaining views of local people and affected groups. These consultations have been undertaken as part of the Environmental Impact Assessment process.

9.2 The consultations comprised of four elements, namely in Phase I discussions with local stakeholders and interested parties on the environmental documents for local permitting requirements; and during scoping and preparation of this ESIA-Report; and in Phase organized a Public Meeting in the Suez Governorate, and will maintain on-going consultations through an “open-door” policy during construction and operation of the power plant. These stakeholders included the Egyptian Electricity Holding Company (EEHC), East Delta Electricity Production Company (EDEPC), Egyptian Environmental Affairs Agency (EEAA), the Suez Governorate and the District Council of Suez Zone, Egyptian General Authority for Shore Protection, Hydraulics Research Institute and local population leaders.

9.3 As far as public disclosure is concerned, major initiatives to inform the public and interested parties about the new Suez Power project included the following (i) press advertisement describing the project and inviting interested parties to attend the public meeting and review the Draft Final ESIA Report; (ii) distribution of an invitation and Arabic copy of the Non Technical Summary describing the context of the power plant, the technology employed, the impact on the environment, the mitigation measures and the ESMP; and (iii) disclosure of the Draft Final ESIA Report locally and the Executive Summary, including ESMP via the Infoshop.

9.4 Mini-meetings were held with fishermen on the Adabyyah fishing port in Suez, the Suez Canal University, Suez District Administration, Old Suez power project staff, General Authority for Fishery Development and two active NGOs in Suez zone.

### ***Ongoing Consultation and Disclosure***

9.5 SPP's Assistant Plant Manager will have full responsibility for implementing and supervising the ESMP. This role includes ongoing communication with local industrial and commercial interests, local authorities and other interested parties. An "open door" policy will be adopted to allow stakeholders to voice ongoing concerns. All issues have been taken into account and addressed in the ESIA through assessment and the inclusion of mitigation, management and monitoring requirements which are detailed within the ESMP.

## **10. Complementary Initiatives**

10.1 The project will include as complementary initiatives Environmental Training. All staff employed at the plant will be trained in environmental and safety matters. Special environmental training will be given to the staff employed for the EMU in day-to-day monitoring activities; monitoring the stack emissions; collection and analysis of air quality data; monitoring the water effluents; collection and analysis of water quality information; use of monitoring equipment, operation and maintenance; industrial hygiene; occupational health and safety; and emergency and contingency procedures.

## **11. Conclusion**

11.1 The Project Company proposes to develop a new thermal power plant of total capacity 1x650 MWe at the area of the existing Suez Power Plant on land owned by the EDEPC Company. The existing old Suez power plant will first be dismantled and demolished. The site is an Industrial Setting and does not contain significant residential or environmental sensitivity of importance. The key environmental issues associated with the power plant are as follows: emission of oxides of nitrogen to the air; generation and disposal of liquid effluents including cooling water; emission of noise; and socio-economic impacts.

11.2 The Environmental and Social Impact Assessment has evaluated the potential environmental impacts during construction and operation of the proposed power plant. In particular, the potential impacts of the flue gas emissions to the air, generation and disposal of liquid effluents including cooling water; and the emissions of noise have been assessed using sophisticated modeling techniques, which include consideration of the ambient background environment and the characteristics of the releases or emissions, and predicts the potential impacts which may occur.

11.3 It is anticipated that the power plant will provide a net positive socio-economic impact through the provision of employment opportunities and attraction of economic investment into the area. In addition, the use of local labor (95% during construction), will maximize these positive impacts through the development of the local skill base and will also generate increased demand for local services, materials and products. Land expropriation is not likely for the sub-projects, including interconnecting transmission lines and gas pipeline.

11.4 The assessment indicates that no significant environmental and social impacts will occur as a result of the construction or operation of the power plant and, when taken together, the overall environmental and social impact will not be significant.

11.5 It is however recognized that in the interest of Egypt's social and economic development, many more projects of this nature will be designed and implemented; all this on top of other interventions and explorations which may result in potential and actual impacts on the marine life. The ADB will, in the context of preparing this project, discuss with the Egyptian Authorities to consider carrying out a global Strategic Environmental Assessment in due course.

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## 12. Contacts

**Key persons contacted for comments or further information include the following:**

- Chairman of the EEHC: **Dr. Mohamed Awad**
- Executive Board Member for Planning, Research and Service Companies Affairs: **Dr. Kamel Yassin**
- Chairman of EDEPC: **Eng. Mahmoud Saad Balbaa**
- Counsellor for Environmental Management and Studies Sector; EEHC: **Eng. Maher Aziz Bedrous**
- General Manager of PGESCo: **Dr. Asem El-Gawhary**

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