











1.5 Million Natural Gas Connections Project in 11 Governorates

Site-Specific Environmental and Social Impact Assessment

Qantra Shark
Pressure Reduction Station
Ismailia Governorate

EGAS
Egyptian Natural Gas Holding Company

Executive Summary
November 2018

Developed by

EcoConServ Environmental Solutions

Petrosafe
Petroleum Safety & Environmental Services Company

List of Acronyms and Abbreviations

AFD	Agence Française de Développement (French Agency for Development)
ALARP	Stands for "As Low As Reasonably Practicable", and is a term often used in the milieu of safety-critical and safety-involved systems. The ALARP principle is that the residual risk shall be as low as reasonably practicable.
BUTAGASCO	The Egyptian Company for LPG distribution
CAPMAS	Central Agency for Public Mobilization and Statistics
CDA	Community Development Association
CO	Carbon monoxide
CRN	Customer Reference Number
CULTNAT	Center for Documentation Of Cultural and Natural Heritage
EEAA	Egyptian Environmental Affairs Agency
EGAS	Egyptian Natural Gas Holding Company
EGP	Egyptian Pound
EHDR	Egyptian Human Development Report 2010
EIA	Environmental Impact Assessment
ER	Executive Regulation
E&S	Environmental and Social
ESIA	Environmental and Social Impact Assessment
ESIAF	Environmental and Social Impact Assessment Framework
ESM	Environmental and Social Management
ESMF	Environmental and Social Management framework
ESMP	Environmental and Social Management Plan
FGD	Focus Group Discussion
GAC	governance and anticorruption
GDP	Gross Domestic Product
GIS	Global Information Systems
GoE	Government of Egypt
GPS	Global Positioning System
GRM	Grievance redress mechanisms
HH	Households
HHH	Head of the Household
hr	hour
HSE	Health Safety and Environment
IBA	Important Bird Areas
IDSC	Information and Decision Support Center
IFC	International Finance Corporation
IGE/SR	Institute of Gas Engineers/Safety Recommendations
LDCs	Local Distribution Companies
LGU	Local Governmental Unit
LPG	Liquefied Petroleum Gas
mBar	milliBar
MDG	Millennium Development Goal
MOP	Maximum operating pressure
MP	Management Plan

MTO	Material take-off
NG	Natural Gas
NGO	Non-Governmental Organizations
NO_2	Nitrogen dioxide
OSH	Occupational Safety and Health
P&A	Property and Appliance Survey
PAP	Project Affected Persons
PE	Poly Ethylene
PM_{10}	Particulate matter
PPM	Parts Per Million
PRS	Pressure Reduction Station
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SDO	Social Development Officer
SIA	Social Impact Assessment
SO_2	Sulphur dioxide
SSIAF	Supplementary Social Impact Assessment Framework
SYB	Statistical Year Book
T.S.P	Total Suspended Particulates
Town Gas	The Egyptian Company for Natural Gas Distribution for Cities
WB	The World Bank
WHO	World Health Organization
$	United States Dollars
€	Euros

Exchange Rate: US$ = 17.96 EGP as of November, 2018
Exchange Rate: € = 20.5 EGP as of November 2018

Executive Summary

Introduction

Aiming at installing the NG to about 3,630 clients in Qantra Shark City, the Local Distribution Company Sinai Gas will decommission the current rented PRS and install a new 5000 m^3/h PRS

The objective of the proposed project is to increase the capacity of the existing PRS in order to install the NG to wider segment of clients. This will enable achieving reduction of leakage; reduction of subsidy allocated for the butane gas and reducing dependence of imported fuel.

The ESIA has been prepared by Petrosafe (Petroleum Safety & Environmental Services Company) and EcoConServ Environmental Solutions (Cairo, Egypt) with collaboration and facilitation from EGAS, Egypt Gas, Sinai Gas HSE and Engineering Departments. The names of the Petrosafe and EcoConServ experts who have participated in the preparation of the ESIA study are listed in Annex 1 of this report.

Project Description

The already existing PRS in Qantra Shark is a twin stream regulator with a capacity of 5000 m3/h. The PRS is currently being rented from Egypt Gas for one year. The PRS consists of the following components: an inlet unit (isolated cathodic system), a liquid separation unit, a filtration unit, and a pressure and temperature gauge. Other components include auxiliary devices such as a safety valve (Slam Shut), relief valves, an odorizing unit, ventilation equipment, as well as diesel and jockey pumps

Utilities existing in a PRS include a control room, a firefighting system (firefighting water tank, firefighting valve), a staff bathroom, and a storage area and entrance room located adjacent to the entrance gate.

New components, processors and units in PRS will be installed to reduce an inlet pressure of 25-70 bar to an outlet pressure of 4-7 bar at a flow rate of 5,000 m3/h

Operation of the PRS involves operation of the various components outlined in the construction phase. Risks associated with those activities are further addressed separately in a Quantitative Risk Assessment (QRA) (Refer to Annex 9 Quantitative Risk Assessment).

Legislative and Regulatory Framework

The project will adhere to the Egyptian legislations, WB operational policies and IFC performance standards.

Applicable Environmental and Social Legislation in the Egypt legislations:

- Law 217/1980 for Natural Gas
- Law 4/1994 for the environmental protection, amended by Laws 9/2009 and 105/2015. Executive Regulation(ER) No 338/1995 and the amended ER No. 1741/2005, amended with ministerial Decrees No. 1095/2011, 710/2012, 964/2015, and 26/2016
- Law 38/1967 for General Cleanliness
- Law 93/1962 for Wastewater
- Law 117/1983 for Protection of Antiquities
- Traffic Law 66/1973, amended by Law 121/2008 traffic planning

- Law 12/2003 on Labor and Workforce Safety

World Bank Safeguard Policies

Three policies are triggered for the project as a whole: Environmental Assessment (OP/BP 4.01), Physical Cultural Resources (OP/BP 4.11), and Involuntary Resettlement (OP/BP 4.12). However, OP/BP4.11 will not be applicable in Qantra Shark. In case of finding any objects of cultural value OP 4.11 will be applicable.

OP/BP 4.12 will not be applicable to the land obtained in Qantra Shark as the process of obtaining the land for the pressure reduction station was based on a transfer of ownership decree number 2835 of year 2015. The off take is inside the current PRS.

World Bank Group General Environmental, Health, and Safety Guidelines & WBG Environmental, Health and Safety Guidelines for Gas Distribution Systems- IFC Guideline.

The General Environmental, Health, and Safety Guidelines (EHS) are designed to be used together with the relevant Industry Sector EHS guidelines, which provide guidance to users on EHS issues in specific industry sectors. Gas distribution system – Health and Safety Guideline are applicable to the project.

Gaps between requirements outlined by WBG guidelines and actions detailed by the ESIA have been analyzed. There are no significant differences between the requirements outlined by the WBG EHS guidelines on Gas distribution systems and the management and monitoring actions outlined by the ESIA.

In addition to the above mentioned safeguards policies, the Directive and Procedure on Access to Information[1] will be followed by the Project.

Environmental and Social Baseline

A. Environmental baseline

Ismailia Governorate is one of the 27 Egyptian governorates, situated in the north-eastern part of Egypt. The capital city of this governorate is Ismailia; Fayed, Tel-el-Kabeer and El-Qantra Shark are the other major cities of this Egyptian governorate. This governorate covers an area of 1,442 Km2, with a population of over 1 million.

- **Climate**

  The climate in Qantra Shark is classified as a desert climate. There is virtually no rainfall all year long in Qantra Shark . This location is classified as BWh by Köppen and Geiger. In Qantra Shark , the average annual temperature is 21.6 °C. Precipitation here averages 50 mm.
  Between the driest and wettest months, the difference in precipitation is 10 mm. The variation in annual temperature is around 14.4 °C.

  - Site-Specific Ambient Air Quality
  - The concentrations of measured air pollutants are below national and WB guidelines. All the measurements for the gaseous pollutants were complying with the maximum allowable limits according to law 4/1994 for Environment protection and its amendments by law No.9/2009

[1] https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=3694

and the executive regulation issued in 1995 and its amendments no. 710 in 2012 and 964 in April 2015".

Construction engines are certified, i.e., exhaust is below permissible levels. Ambient concentrations of gaseous pollutants, NOx, SOx and CO are unlikely to surpass permissible levels due to operation of construction equipment. Management and mitigation plans for ambient air pollution are further addressed in chapters 5 and 7.

Site specific Noise Measurements

Typically due to noise from passing traffic on the road near the measurement locations, baseline ambient noise levels are marginally higher than the national (Sensitive Area: Rural Area for PRS), World Bank permissible limits and higher than national permissible limits for sensitive receptors..

Management and mitigation plans for noise levels beyond permissible levels are further addressed in chapters 5 and 7.

- **Geology**

  Soil composition in Ismailia varies from clayey soil to sandy soil . The topography in the study area is nearly flat with ripple marks. It is covered by extensive sedimentary clastic and nonclastic accumulation, alluvial deposits ranging from Oligocene to Quaternary age.

  The surrounding area of the PRS is characterized as desert and Sabkha (saltmarshes).

Water resources

- Surface water

  Ismailia governorate depends on Ismailia fresh water canal as a main water source for irrigation and drinking.

  There are no canals or drainages in the surroundings of Qantra Shark's PRS
- Groundwater

  There are no wells of underground fresh water in Ismailia governorate, but there are 354 wells used in irrigation of agriculture lands according to the information of General Department of Irrigation in Ismailia..

- **Terrestrial environment**

Qantra Shark is located in arid coastal zone of Sinai Desert. Present, scarce water resources are rainfall (below 100 mm/year) and groundwater. Groundwater is available in limited quantities in shallow and deep aquifers and is often saline (2000-8000 ppm). The flow of the shallow aquifer is towards the north in the direction of Lake Bardawil and the coast.

With respect to significance flora, none were encountered in the project areas, where the PRS will be installed. Typical urban areas are free of significant vegetation. Planned off-take from national grid to the PRS shall not come into contact with palm trees alongside the road.

The PRS area was surveyed using walkover methodology, few avifauna species were recorded during the survey closed to the Sebkha area, the PRS site is surrounded by desert and Sebkha with very limited biodiversity species, but there are no evidence for resident mammal species in the area.

Very confined species have been recorded in the project site area in Qantra Shark. Bubulcus ibis (white erget bird) were recorded in moderate numbers in the project site area.

The nearest Important Bird Area (IBA) and protected area to the Qantra Shark is Ashtum El-Gamil protected area 39 km north-west of Qantra Shark. Zaranik, a nationally declared protected area is located approximately 96 km to the north-east of Qanatara Shark. Zaranik is a part of Lake Bardawil, an IBA.

- **Solid waste management**

  Solid waste management in Qantra Shark is planned, operated and monitored by the local municipality. Primary waste collection is handled using old trucks and tools. There is a remarkable gap in waste collection efficiency as the allocated resources are limited.

  The local units in the governorate collect the solid waste in small containers in the streets and there are also manual tools and some modern equipment such as tractors and trailers. The collected solid waste is transferred into other trucks and transported to the public landfill in the desert near Ismailia city.

- **Physical cultural resources**

  There are no significant physical cultural resources that exist in Qantra Shark, except for mosques and churches.

  No archeological sites or sites that bear any significant historical or cultural value were identified in the project area of Qantra Shark. However, in case of any unanticipated archeological discoveries; Annex 5, titled 'Chance Find Procedures,' outlines the set of measures and procedures to be followed in such cases.

- **Traffic profile**

  The project is located on Ras Sedr Qantra Shark road. The figure below shows the roads surrounding the PRS. Ras Sedr -Qantra Shark road contains one lane.

B. **Socio-economic Baseline**

- **Administrative affiliation**

  Qantra Shark City lies within the jurisdiction of the Qantra Shark Markaz. It is subdivided into three cities: the old city, the middle region and the new city. The total area of Qantra Shark city is 197.75 km^2, according to the Information Center in Qantra Shark Markaz.

- **Demographic characteristics**

  According to CAPMAS poverty mapping data 2013, the total population of Qantra Shark City is 24193 people.

- **Living conditions**

  According to CAPMAS figures, the average size of households in Qantra Shark city stands around 4.43 individuals.

- **Access to basic services**

  The number of subscribers in Ismailia Governorate is 381.83. The total consumption of electricity stood at 1091.10 k.w/h annually, which include lighting usage (954.10 k.w/h) and industrial usage (137.00 k.w./h).

  According to CAPMAS poverty mapping data of 2013, 100% of Qantra Shark City's residents have access to electricity

  Accessibility to water network is widespread in Qantra Shark city, as 100% of individuals have access to the public water network, and have also tap water inside their houses, according to CAPMAS poverty mapping data of 2013.

  However, the coverage of the public sanitation network stands at 24.71 %, according to CAPMAS poverty mapping 2013.

- **Human development profile**

  The percentage of manpower which joined labor force at the age of 15 years old and above is 50.55%. Manpower at the age of 24 years old and above is 55%. The percentage of agriculture workers from total employed persons is 7.76%. The unemployment rate in Qantra Shark city stands high at 18%.

The formal Statistics obtained from the Poverty Mapping Data 2013 regarding manpower reflected that the age of starting work is 15 years old.[2] Both the Child Law and the Labor Law state that children shall not be employed before they complete 14 years old, nor shall they be provided with training before they reach 12 years old; however children between 12 and 14 years old are permitted to work as trainees.

- **Health facilities**
  Qantra Shark markaz has one public and central hospital; in addition to one urban medical unit, 5 rural medical units, and 6 ambulance centers.

- **Human activities in the project areas**
  The size of agriculture activities are very slim; as it encompasses only 7.76% of total employed individuals living inside Qantra Shark city. There are a number of maintenance workshops and small businesses in the city. Focus group discussions revealed that the majority of the people work as employees; and the remainder work as drivers, or work involved in small commercial activities. The majority of employees work for the government/public sector at 56.75%, while 22.5% work for the private sector. The work force in Qantra Shark city is divided into government employees, professionals, service workers, and laborers. The city is considered as underdeveloped; however, it lies within the government vision of Suez Canal Axis Development plan.

Environmental and Social Impacts

The environmental and social impact assessment (ESIA) is a process used to identify and evaluate the significance of potential impacts on various environmental and social receptors as a result of planned activities during (construction and operation) phases of the Project. Furthermore, the analysis of environmental and social impacts is important to detail an effective management and monitoring plan which will minimize negative impacts and maximize positives.

A. Potential positive impacts

- **Positive impacts during construction**
  - Impacts related to employment

Provide direct job opportunities to skilled and semi-skilled laborers

The construction of Qantra Shark's PRS is expected to result in the creation of job opportunities, both directly and indirectly. Based on similar projects implemented recently by EGAS and the local distribution company, the daily average number of workers during the peak time will be about 12 workers. Including engineers, technicians and guards.

Create indirect opportunities

As part of the construction stage, a lot of indirect benefits are expected to be sensed in the targeted areas due to the need for more supporting services to the workers and contractors who will be working in the various locations. This could include, but will not be limited to accommodation, food supply, transport, trade, security, manufacturing, etc.

[2] Based on Labor law number 12 of year 2003 and The Child Law (No. 12, 1996). There are certain critical obligations to recruit children below 15 years old. Article 98-103 of Labor law put limitations related to age, type of occupation, hazards work…etc

- **Positive impacts during operation**
  - Impacts related to employment

Provide direct job opportunities to skilled and semi-skilled laborers

The operation of Qantra Shark is expected to result in the creation of job opportunities, both directly and indirectly. The average number of workers during operation of the PRS will be about 17 workers from the permanent workers of the LDC. They are segregated as follows 6 technicians, 2 foremen, 2 maintenance (one engineer and one engineer's assistance) and 3 security. With regards to health and safety, one person will be assigned from the staff of Sinai Gas. All above mentioned workers are already working in the PRS now. Therefore, there is no probability to add any additional staff. However, such opportunities are enabled for the permenant staff.

Create indirect opportunities

As part of the operation stage, a lot of indirect benefits are expected to be sensed in the targeted areas due to the need for more supporting services to the workers and contractors who will be working in the project site in Qantra Shark City. This could include, but will not be limited to, provision of waste disposal services and septic tanks evacuation.

B. Potential negative impacts

Various impacts were assessed in accordance with the impact assessment methodology in section 5 of this report. Given the fact that the new PRS will be constructed in the current PRS site, most of environmental and social impacts tend to be of no significance. The table below presents a summary of potential negative impacts.

Regarding to the Quantitative Risk Assessment Study (QRA), which demonstrate on the following hazards:

- Gas Release
- Fires (Heat Radiation)
- Explosion (Overpressure Waves)
- Suffocation (Odorant Leak)

And referring to the risk calculations determined in Qantra Shark QRA study, the individual risk level to the exposed workers / public based on the risk tolerability criterion have been identified in ALARP (Below the Upper Tolerability Limit[3]) region. So there are some points (Study Recommendations) need to be considered to keep the risk tolerability, and this will be describe under item (7.7) (for more details refer to the QRA Study under Annex-9)

[3] ***Below the Upper Tolerability Limit***

The risk is only tolerable if it is ALARP. This means that all practicable risk reduction measures must be identified and those that are reasonably practicable implemented. The term reasonably practicable indicates a narrower range than all physically possible risk reduction measures. If the cost of a risk reduction measure, whether in terms of money, time or trouble, can be demonstrated to be grossly disproportionate to the risk reduction gained from the measure, taking account of the likelihood and degree of harm presented by the hazard, then implementation of the measure may not be required.

Summary of potential negative impacts

Potential Impact Significance (Duration, Difficulty to mitigate)													
Activity	**Air emissions**	**Noise**	**Ecology**	**Surface Water**	**Solid, Hazardous Wastes and Liquid Waste**	**Community health and safety**	**Occupational health and safety**	**Child labor**	**Soil**	**Traffic**	**Land acquisition**	**Labor influx**	**Visual intrusion**
Potential negative impacts during construction phase													
Mobilization	N/A	N/A	N/A	N/A	Temporary, low	N/A	Temporary, medium	Temporary, medium	N/A	Temporary, low	No land needed	N/A	N/A
Excavation	N/A	N/A	N/A	N/A	Temporary, low	N/A	Temporary, medium	Temporary, medium	N/A	Temporary, low	No land needed	N/A	N/A
PE Pipe laying	N/A	N/A	N/A	N/A	N/A	N/A	Temporary, medium	Temporary, low	N/A	N/A	No land needed	N/A	N/A
Leakage testing	N/A	N/A	N/A	N/A	N/A	N/A	Temporary, medium	Temporary, low	N/A	N/A	No land needed	N/A	N/A
PRS construction work	N/A	N/A	N/A	N/A	Temporary, low	N/A	Temporary, medium	Temporary, low	N/A	Temporary, low	No land needed	N/A	N/A
Impact Assessment	No impact	No impact	Irrelevant	No impact	Minor	No impact	Medium	Low - Medium	Irrelevant	Minor	Irrelevant	Irrelevant	Irrelevant
Potential negative impacts during operation phase													
PRS operation	N/A	Permanent low	N/A	N/A	Permanent medium	N/A	Permanent medium	N/A	N/A	N/A	N/A	N/A	N/A
Repairs	N/A	Permanent low	N/A	N/A	Permanent medium	N/A	Permanent medium	N/A	N/A	N/A	N/A	N/A	N/A
Impact Assessment	No impact	Minor	No impact	No impact	Medium	No impact	Medium	Irrelevant	Irrelevant	Irrelevant	Irrelevant	Irrelevant	Irrelevant

Analysis of Alternatives

- **Technology Alternatives**
  - **Outlet pressure**

    The PRS reduces the pressure from a high transportation pressure 30-70 bar to a lower pressure 4 or 7 bar suitable for distribution or use in domestic or industrial applications. QS PRS will produce 4:7 bar outlet pressure for the local distribution network (intermediate pressure). The LDC choose to produce 4:7 Bar instead of 2:4 bar due to high consumption rate excepted at Qantra Shark city and it is designed for future extension to the distribution network (intermediate pressure) will feed other city and/ or village in the district.

  - **Environment and Safety**

    Environmental and safety control considerations and measures are integrated into the selected technology design. For example, in order to reduce emissions from the Odorant unit, the Odorants unit will be automatically added not manually wise or by using plunger pump. Automatically and sophisticated unit management systems ensure safe and easy operation and can encompass complete remote operation of the units.

Environmental and Social Management & Monitoring Plan

The objective of the Environmental and Social Management and Monitoring Plan (ESMMP) is to outline actions for minimizing or eliminating potential negative impacts and monitor the application and performance of mitigation measures. The ESMMP identifies roles and responsibilities for different stakeholders for implementation and monitoring of mitigations. This section also presents an assessment of the institutional capacity and institutional responsibilities for implementing the ESMMP. Full ESMMP is presented in section 7 of this report. Special attention was given to the quantitative risk assessment recommendation illustrated in section 7.5 of this report.

Stakeholder Engagement and Public Consultation

The consultation activities were conducted in full compliance with the following legislations:

- WB policies and directives related to disclosure and public consultation, namely,
  - Directive and Procedure
  - Access to Information
  - World Bank Operational Policy (OP 4.01)
- Egyptian regulations related to public consultation,
  - Environmental law No 4/1994 modified by Law 9/2009 modified with ministerial decrees no. 1095/2011 and no. 710/2012

For the purpose of the PRS-related ESIA; qualitative information and data were collected through identifying Project Affected Peoples (PAPs) residing in the areas

surrounding the PRS station, and recognize their views and concerns about the project. The aim of this endeavor is to ensure a well-integrated and inclusive public review of the project.

Key groups of relevance include: ordinary citizens, community leaderships, officials and government representatives, potential, local Non-Governmental Organizations (NGOs) and Community Development Associations (CDAs). In this regard, key groups of relevance in Qantra Shark were approached and consulted using various tools (i.e. in-depth interviews, focus group, meetings, Panel meeting and public consultation sessions). Stakeholder engagement and public consultation activities encompassed a gender aspect that women's views and concerns were taken into account, and were well-documented.

The total number of participants attended the first public consultation session conducted in December 2013 were 79 persons. The total number of stakeholders attended the public hearing conducted in April 2017 were 57 people.

- **Consultation Methodology and Activities**

The consultation process was a dynamic and evolving process which adapted with the nature and expectations of the host community. In order to establish a more profound understanding of the local communities' perceptions and perspectives of the project, stakeholders' engagement and public consultation activities involved a broad base of community members; especially people residing in the areas surrounding the PRS station.

The first step was to collect the responses and feedbacks of the local communities through conducting Focus Group Discussions (FGDs), structured questionnaires, panel meeting and public consultation sessions. The second step was to analyze these qualitative data in order to reach a conclusion regarding the general stance and attitudes of the local communities towards the project. Various NGOs participated actively in the preparation of the FGDs and providing data collectors to assist the team in collecting the data.

- **Summary of consultation activities**

- Stakeholders' engagement and public consultation activities were conducted in order to ensure that the views and concerns of the local communities are integrated, and guarantee that they are taken into account by the different parties in charge of implementing the project. The views and concerns of local communities are an integral part of the project, and they are to be thoroughly taken into account throughout the different phases of the project.
- The field research team commissioned by EcoConServ engaged in a number of social activities. These activities include focus group discussions with potential beneficiaries; in-depth discussions with government officials, representatives of civil society, and community leaders. A panel meeting was held at Qantra Shark LGU headquarters, where the public officials of the LGU stressed on expediting the implementation of the project in their city.

- It was notable that the reactions and attitudes of the local communities towards the project are neutral. The field research team noted no interest or concerns due to having the PRS in place. The majority of consulted group had almost no idea about the PRS.

  Throughout the discussions interviewees were asked about three main points:

  - The safety of the high-pressure pipelines.
  - Safety procedures during operations
  - Job opportunities

  The surrounding areas of the PRS were almost vacant lands. Therefore, there were no concerns raised by the surrounding areas. Additionally some people from Qantra Shark expressed their satisfaction with the PRS as they benefit from supplies they offer to the PRS staff.

- **ESIA disclosure**
  As soon as the site-specific ESIA for Qantra Shark gets approved by the World Bank and EEAA, a final report will be translated into Arabic and published on the WB, EGAS and Sinai Gas websites. An executive summary in Arabic will be published on EGAS website. A copy of the ESIA report in English and a Summary in Arabic will be made available in the customer service office. Additionally, an Arabic summary will be made available in the contracting offices. An A3 poster will be installed in the contracting office informing about the results of the ESIA and the website link for the full ESIA study.