Environmental and Social Review Summary

Befesa Seawater Desalination Project – Ghana

This Environmental and Social Review Summary (ESRS) is prepared by MIGA staff and disclosed in advance of the MIGA Board consideration of the proposed issuance of a Contract of Guarantee. Its purpose is to enhance the transparency of MIGA’s activities. This document should not be construed as presuming the outcome of the decision by the MIGA Board of Directors. Board dates are estimates only.

Any documentation which is attached to this ESRS has been prepared by the project sponsor, and authorization has been given for public release. MIGA has reviewed the attached documentation as provided by the applicant, and considers it of adequate quality to be released to the public, but does not endorse the content.

Country: Ghana
Sector: Infrastructure
Project Enterprise: Befesa Desalination Developments Ghana Limited
Environmental Category: B
Date ESRS Disclosed: June 17, 2011 (Updated August 6, 2012)
Status: Due Diligence

A. Project Description

The proposed project involves the construction and operation of a 60,000 m³/day seawater reverse osmosis desalination plant at Nungua in the Kpeshie district, 12 km east of Accra, Ghana. The 6.1 acre project site is situated at the beachfront, 400 m west of the Nungua fish landing site. The site is bordered on the north by Nungua Township, south by the sea, west by undeveloped land, and the east by a residential building. The potable product water is expected to be distributed to the residents and businesses in the Teshie-Nungua area through a Water Purchase Agreement with the Ghana Water Company Limited (“GWCL”), a state owned utility. The water will be delivered to a GWCL connection point by the project enterprise, Befesa Desalination Developments Ghana Limited (“Befesa Ghana”), via product pipes. Other facilities expected to be developed at the site include the desalination plant, intake pipe, outfall pipe and a parking lot.

The desalination plant is designed to include four trains fed by two high pressure pumps, plus one in standby, and twelve energy recovery systems per train. The system converts roughly half of the intake seawater into potable produce water, the remainder is discharged via an outfall as brine. Overall, the desalination plant will utilize 146,400 m³/day of raw intake water to produce 60,000 m³/day of potable product water, and 70,000 m³/day of rejected brine water. The 150 m outfall will be buried in a covered trench to protect it from waves through the intertidal zone and will feature 4 diffusers separated by 4 m intervals at its terminus.

B. Environmental and Social Categorization
This project is categorized B under MIGA’s Policy on Social and Environmental Sustainability because the potential risks and impacts are limited, few in number, site-specific, largely reversible and readily addressed through mitigation measures. Key expected social and environmental risks and impacts include community and occupational health and safety, solid waste, hazardous waste, sludge and wastewater, soil erosion and runoff and marine habitat. These risks and impacts are expected to be mitigated through design specifications and implementation of a social and environmental management system during construction and operation of the desalination plant.

C. Applicable Standards

While all Performance Standards are applicable, based on current information it is expected that the project will have impacts that must be managed in a manner consistent with the following Performance Standards:

§ PS1: Social and Environmental Assessment and Management System  
§ PS2: Labor and Working Conditions  
§ PS3: Pollution Prevention and Abatement  
§ PS4: Community Health, Safety and Security  
§ PS6: Biodiversity Conservation and Sustainable Natural Resource Management

All land was acquired through willing seller, willing buyer transactions or transferred from the government of Ghana. No involuntary resettlement was required and no impacts are expected to indigenous peoples within the project’s area of influence, therefore PS5: Land Acquisition & Involuntary Resettlement and PS7: Indigenous Peoples do not apply for the purpose of MIGA’s review of this project. Although no adverse impacts are expected to cultural resources, a “chance finds” procedure will be implemented consistent with PS8: Cultural Heritage.

In addition, the following IFC Environmental, Health and Safety (“EHS”) Guidelines are applicable to this project:

§ General EHS Guidelines  
§ Industry Sector EHS Guidelines for Water and Sanitation

D. Key Documents and Scope of MIGA Review

Documents reviewed by MIGA include:

§ Marine Works Bathymetry, Longitudinal Profile, Diffuser Definition and Arrangement Plan (April 2011), Befesa Water Projects SL.  
§ Outfall Technical Description and Environmental and Social Risks Summary
E. Key Issues and Mitigation

PS1: Social and Environmental Assessment and Management Systems

The project sponsor engaged consultants to prepare the Environmental Impact Statement (“ESIA”) that assessed the impacts of the construction and operation of the project. In addition, the sponsor provided MIGA supplementary documentation on the marine works, including a Marine Works Bathymetry, Longitudinal Profile, Diffuser Definition and Arrangement Plan and an Outfall Technical Description and Environmental and Social Risks Summary that detailed the physical characteristics of the marine environment and intertidal zone, the technical design and specifications of the outfall and diffusers, and an identification and evaluation of the environmental and social risks and impacts of the construction and operation of the outfall.

A Quality and Environmental (“Q&E Plan”) and Health and Safety Plan (“H&S Plan”) were prepared for both construction and operation of the desalination plant, that identify measures to mitigate risks and impacts identified in the ESIA, including environmental, social, occupational health and safety, emergency preparedness and response, training, monitoring and reporting.

The Q&E Plan and H&S Plan prepared by the EPC contractor for implementation during construction requires validation by the project sponsor prior to the start of physical works. The EPC contractor will have primary responsibility for implementing the Q&E Plan and H&S Plan during construction, with oversight from the sponsor. The sponsor’s Project Manager is responsible for the application of the Q&E Plan with a Quality and Environmental Coordinator expected to be appointed with primary responsibility for
implementation and management of the plan in coordination with the Construction Manager and Quality Supervisor.

During operation, a Quality Assurance/Quality Control and EHS Manager will be appointed. Implementation of the methods envisaged for the identification, handling and resolution of non-compliance with the Q&E Plan will be managed using computer software stored in the servers of the company’s computer network. Software will also be used to identify and monitor implementation of corrective and preventative actions.

The Q&E Plan was developed based on ISO 14001 Environmental Management Systems and ISO 9001 Quality Management Systems standards. It provides a comprehensive framework for managing risks and impacts related to solid wastes, hazardous wastes, construction wastes, air emissions, noise, liquid and sanitary wastewater and natural resource consumption.

**PS2: Labor and Working Conditions**

During construction, 55 direct hire workers are expected to be employed, with 40 local hires and 15 expatriate staff. Befesa Ghana may also engage local sub-contractors. The project sponsor will ensure relevant requirements of PS2 will be applied to both direct hire and non-employee workers. During operation, the desalination plant is expected to employ 52 workers, with 40 local hires and 12 expatriate staff. The project sponsor expects local workers to be paid 20-25% above the market average.

The sponsor’s H&S Plan applies to all permanent direct hire workers, temporary workers and any other subcontractor. Worker health and safety during the construction phase is expected to be managed by the sponsor through a site safety committee comprising of the Site Manager, Health and Safety Site Supervisor, subcontractor Site Manager, subcontractor Health and Safety Supervisor and other site supervisors responsible for construction works. The safety committee will meet periodically and review safety site status, matters referred to by the safety officer, serious accident during the month, and any other important matters that may be raised by the committee members. Safety audits and inspections are expected to be conducted to monitor compliance with the plan. Penalties are expected to be implemented for non-compliance. Every worker is expected to receive instruction and training regarding the general safety and health measures common to the work place to educate on various hazards associated with the job and workplace, as well as respective preventive and mitigation measures to avoid incidents.

The H&S Plan for construction will be implemented by the EPC contractor. The plan is consistent with the requirements of Performance Standard (“PS”) 2, including: a health and safety policy; objectives and targets; organization, roles and responsibilities; hazard identification and risk analysis; detailed health and safety prevention instructions for specific identified activities; management of sub-contractors; record keeping and reporting; emergency management and response; and auditing and management review.
The sponsor will develop a Human Resources policy consistent with PS 2 that will reflect transparent worker relations, terms of employment, non-discrimination, retrenchment and a grievance mechanism.

PS3: Pollution Prevention and Abatement

Key risks and impacts related to the construction and operation of the desalination plant are expected from soil erosion and runoff, wastewater, solid and hazardous wastes, and dust adversely affecting water quality, soil and air quality. These impacts will be avoided, reduced or mitigated through compliance with national laws, implementation of the Q&E Plan and compliance with PS3 and the environmental health and safety guidelines.

Soil erosion and runoff: Construction of the desalination plant and outfall is expected to impact surface water quality, particularly seawater. These impacts will be mitigated through implementation of the H&S Plan for construction and the Environmental and Social Action Plan (“ESAP”). Land clearing, grading and earth works are expected to increase the risk of soil erosion and runoff from the project site. These construction activities will be scheduled during typically dry periods for optimal conditions to avoid or reduce this impact. Seawater monitoring will be conducted throughout construction and operation.

Wastewater: Sanitary wastewater is expected to be generated in both the construction and operation phases. Measures to mitigate sanitary wastewater risks and impacts will be carried out by means of a septic tank as provided for in the Q&E Plan.

The concentrated brine produced during operation will be discharged via an ocean outfall. The outfall is will extend 150 m along the sea floor and terminate with 4 diffusers separated at 4 m intervals. Although the ESIA did not identify brine discharge as a significant risk or impact, the sponsor conducted a brine dispersion study using a dilution model incorporating currents, tides and flows. The brine discharge will have higher concentration of dissolved salts and higher temperature (1.5–2° C) than seawater in the vicinity of the desalination plant, however no impacts to marine fauna or flora are expected. Seawater monitoring will be conducted throughout construction and operation.

Solid and hazardous waste: Construction waste, solid waste and hazardous waste are expected to be generated through construction and operation phases. Construction waste is expected to include building materials debris, soil and plant debris. The Q&E Plan for construction includes a waste management plan that details best practice control measures for the storage, transport and disposal of each waste type. An independent storage area for each type of construction waste is expected on-site and the management of each of these types of waste is expected to be carried out according to the local legislation, PS3 and the EHS Guidelines, giving priority when possible to re-use. Solid wastes expected to be generated during operation include: mixed domestic waste, plastics, cables, paper, wood, toners, metals and containers. The ESIA did not consider sludge a significant adverse risk or impact, with proposed disposal through dilution and
discharge out the outfall. These wastes are expected to be selectively collected, sorted and treated according to local legislation, as well as PS3 and the EHS Guidelines.

Hazardous wastes expected to be generated during project construction and operation include: used oil, batteries, ink cartridges, fluorescent tubes, containers and chemical substances. The Quality and Environmental Coordinator is expected to provide guidance on avoiding production of hazardous waste streams. All hazardous wastes is expected to be collected and disposed according to the local legislation, PS3 and the EHS Guidelines. Befesa Ghana is expected to maintain manifests of all hazardous waste shipments documenting acceptance of the material by the agent, with control and monitoring documents maintained for the legally required period.

*Air emissions:* Ambient air quality is expected to be impacted as a result of dust emissions from construction activities. The major expected sources of dust emissions during construction are: grading, excavation and earthworks; loading/unloading, handling, storage and transport of materials or wastes; and vehicle movements. Dust suppression through water spraying is expected to mitigate this impact to comply with local legislation, PS3 and the EHS Guidelines. Air emissions will be monitoring during construction.

**PS4: Community Health and Safety**

*Traffic:* Construction is expected to cause a high level of traffic, with associated risks and impacts including additional wear and tear to the local road networks and accidents. Procedures for minimizing the risks and impacts of increased traffic include careful planning of routes and restriction on movements for construction vehicles and equipment.

*Noise:* Construction and operation activities are expected to generate noise impacts to adjacent communities. The noise emissions are expected to be controlled and of short duration, complying with local legislation, PS4 and the EHS Guidelines. Noise will be monitored during construction.

*Emergency response:* Accidents and emergency situations during both construction and operation, whether real or potential and in normal or abnormal conditions, that lead to or could lead to uncontrolled adverse environmental and social risks and impacts will be prevented, minimized or eliminated through the development and implementation of a emergency response plan consistent with PS4. The Q&E Plan for construction includes contingency plans environmental accidents and emergency situations. Befesa Ghana has also established a method for examining and reviewing the current and future plans for responding to environmental accidents, should these impacts occur. This review is carried out on a regular basis and after any accidents or emergency situations that occur. Periodic inspections will be conducted during construction and operation to ensure that practices are consistent with procedures.

*Spills:* Spills of hazardous materials are expected from on-site vehicles or equipment, as well as hazardous material storage areas. Avoidance of spills is expected through
adopting appropriate mitigation measures and performing periodic inspections of vehicles, machinery and parking areas. Befesa Ghana is expected to develop spill response procedures consistent with the Performance Standards and EHS Guidelines.

PS6: Biodiversity Conservation and Sustainable Natural Resource Management

The ESIA and supplemental reports include an assessment of potential impacts to marine habitat, including fish, aquatic organisms, seagrass and benthos. No sensitive, protected or critical habitat was identified in the project-affected area. Construction of the outfall will involve installation of a temporary marine breakwater, mechanical fracturing of rock in the intertidal zone and excavation and trenching, which present a risk of increasing seawater turbidity in the immediate vicinity of the plant site. The risk of this impact will be of a limited duration during the marine works, approx. 6 months. This risk will be avoided or reduced through scheduling of marine works during optimal conditions and, the sponsor will consult the suppliers of marine work and equipment and implement their recommendations regarding best practice. Seawater monitoring will be conducted throughout construction and operation.

F. Environmental Permitting Process and Community Engagement

The Environmental Permit was issued by the Ghana Environmental Protection Agency (“Ghana EPA”) in January 2012, in accordance with the requirements in EPA Act, (Act 490) and the Environmental Assessment Regulations, 1999 (LI 1652). This legislation requires Befesa Ghana to undertake an assessment of the risks and impacts of the proposed project, prepare and submit a draft ESIA and prepare and submit a final ESIA after review by Ghana EPA.

In preparing the ESIA, the methodology employed included: discussions with project management; field visits by experts and stakeholders to acquaint with project environment; collection of baseline data on flora, fauna, hydro-geological, socioeconomic and cultural values in area; and consultations with key stakeholders including GWCL, Accra Metropolitan Assembly, Electricity Corporation of Ghana, Ghana Standards Board, Ghana National Fire Service and communities. Additional consultation was conducted in Nungua with the local community and fishermen in November and December 2011, respectively.

G. Availability of Documentation

The following documentation is available electronically as PDF attachments to this ESRS at www.MIGA.org.


Project related inquiries may be addressed to:
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