Environmental and Social Review Summary

AS Samra Wastewater Treatment Expansion Project

This Environmental and Social Review Summary (ESRS) is prepared by MIGA staff and disclosed prior to the date on which MIGA’s Board of Directors considers 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 MIGA’s Board of Directors. Board dates are estimates only.

Any documentation that 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: Jordan
Sector: Infrastructure
Project Enterprise: AS Samra Wastewater Treatment Plant Company, Ltd.
Environmental Category: B
Date ESRS Disclosed: 7 May 2013
Status: Due Diligence

A. Project Description

The proposed Project is the expansion and operation of the AS Samra Wastewater Treatment Plant (“Samra WWTP”) from 267,000 m³/day to 365,000 m³/day in flows along with an increase by 80% for the sludge treatment capacity. The expansion also includes the installation of a mechanical dewatering facility for both phase I and Phase II. It is developed on an extended 25-year build-operate-transfer (“BOT”) basis. MIGA is currently covering Phase I construction and operation of the existing 267,000 m³/day Samra WWTP, West Zarqa and Hasimiyya pumping stations, Ain Ghazal pre-treatment plant, and conveyor lines to the Project from these facilities, for which a 15 year guarantee was signed in May 2006 with Suez Environnement SAS (“Suez”) of France and Infilco Degremont Inc. (“IDI”) of the USA. For the Phase II expansion to 365,000 m³/day, MIGA has been asked to provide guarantees to the Project sponsors’ consortium Suez, IDI, and the Morganti Group, Inc (“Morganti”) for a period of up to 20 years against the risk of Breach of Contract. Phase I and II were supported by United States government grant funds from the U.S. Agency for International Development (“USAID”) and the U.S. Millennium Challenge Corporation (“MCC”) respectively.

Phase I commercial operations began in April 2008. Construction of Phase II began in the second half of 2012 and is expected to be complete in 36 months under a turnkey EPC contract with an unincorporated joint venture composed of affiliates of the Project sponsors’ consortium (Degremont and Morganti). Degremont will be responsible for the process engineering and supplying and commission the process equipment. Morganti will be responsible for the civil works and the mechanical and electrical erection. Operation and maintenance of the Phase II expansion will continue under contract with the Samra Plant Operation and Maintenance Company Ltd, a Jordan registered company owned by affiliates of the Project sponsors’ consortium who have been operating Phase I.
The Samra WWTP services a population of approximately 2.265 million people mainly in Amman and Zarqa; and is located in Al Khirbeh As-Samra in the Zarqa Valley, approximately 13 km north of Zarqa and 40 km northeast of Amman. The approximately 100 ha Project site is located in close proximity to major industrial facilities, including a refinery and thermal power plant. Approximately 35,000 people live within a 5 km radius from the Samra WWTP in the nearby communities of Khirbet Samra, Marzaa, and Hasmiyya located southwest of the Project between the Project, refinery and thermal power plant.

Phase I consists of four parallel treatment lines with a combined inflow capacity of 267,000 m³/day. Inflow passes through the inlet structure, including Pelton Turbines, where pre-treatment consists of two 4,100 m³ tanks to remove grit, oil, scum and hydrogen sulphide gas. Downstream the pre-treatment units, flow is diverted to four separate wastewater lines which start with primary sedimentation tanks which separate wastewater and sludge by gravity, and scum is skimmed and collected. The hydrogen sulphide gas and foul air is diverted to the odor control system for de-sulphurization and biological odor control. Secondary treatment consists of a low load activated sludge biological treatment process along four treatment lines, with each line consisting of two 26,200 m³ capacity aeration tanks and two 54 m diameter suction-type clarifiers. The 267,000 m³/day capacity of treated wastewater is disinfected in two 3,500 m³ capacity chlorination tanks to meet Jordanian standards at the outlet, where it passes through Francis Turbines, prior to discharge to Wadi Dhuleil which then flows into the Zarqa River and is collected in the King Talal Reservoir approximately 32 km west of the Project to support irrigation water supplies in the Jordan Valley and cogenerates power. Approximately 118 tons/day of primary and secondary sludge is generated, which is thickened, mixed and pumped into four 15,000 m³ capacity anaerobic sludge digester units to reduce volatile solids and organic matter, as well as produce approximately 50,000-60,000 Nm³/day of biogas. The digested sludge is transferred to 18 drying lagoons with a total volume of 960,825 m³ for a one year residence period prior to transfer to the bio-solids (dry sludge) storage area, which consists of six lagoons with a total volume of 447,600 m³. Biogas is stored in two gas holders and undergoes hydrogen sulphide removal prior to combustion for power generation in five 1,070 kW capacity biogas generators. Total power generation capacity from the biogas generators, inlet and outlet turbines is 8.725 MW.

Phase II will expand the plant capacity to 365,000 m³/day within the boundary of the existing site through addition of one primary settling tank, three biological tanks, three secondary clarifiers, three primary sludge thickeners, two dissolved sludge activation units, three digesters, one Francis Turbine, one digested sludge storage tank and one mechanical sludge dewatering facility. Sludge volumes are expected to increase to 217 tons/day, biogas to increase to 115,500 Nm³/day and power generation capacity to increase to 14 MW.

B. Environmental and Social Categorization

The project is Category B under MIGA's Policy on Social and Environmental Sustainability. Key environmental and social risks and impacts include air emissions, dust, traffic, temporary shutdowns, effluent quality and quantity, sludge management, biodiversity, odors, pests, and occupational health and safety. These risks and impacts are expected to be few in number, generally site-specific, largely reversible and readily addressed through mitigation measures.

C. Applicable Standards
While all Performance Standards are applicable to this investment, based on our current information indicates that the investment will have impacts which must be managed in a manner consistent with the following Performance Standards:

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

The Project is located within the premises of the existing operational Samra WWTP facilities, therefore physical and economic displacement (PS5), impacts on indigenous people (PS7) or cultural heritage (PS8) are not expected. A Chance Finds Procedure for construction is required consistent with PS8.

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

- General EHS Guidelines
- Industry Sector EHS Guidelines for Construction Materials Extraction

D. Key Documents and Scope of MIGA Review

A MIGA Environmental Specialist visited the project in March 2012, as part of MIGA’s environmental and social monitoring of the existing Phase I guarantee.

The following documents were reviewed by MIGA:


E. Key Issues and Mitigation

PS1: Social and Environmental Assessment and Management Systems
An environmental and social impact assessment ("ESIA") was prepared in January 2012 for the Samra WWTP expansion. The ESIA identified and evaluated risks and impacts related to Phase II construction and operation of the Project, particularly related to generation of dust, noise and vibration; increased truck traffic movements; storm water management and sediment control; handling and storage of hazardous materials; disruption of Phase I operations during Phase II construction; occupational health and safety; odor; temporary bypass of the treatment process; treated effluent quality; gaseous air emissions; flora and fauna habitat; pest nuisance; and public health. Anticipated significant impacts identified during construction and operations are related to air quality and noise, land use and landscape, pest nuisance, and water quality and quantity. The ESIA includes an environmental and social management plan ("ESMP") that identifies measures to mitigate risks and impacts.

The Project sponsors’ consortium has prepared a health, safety and environment ("HSE") management plan consistent with PS1 to mitigate environmental and social risks and impacts of Phase II construction. The construction HSE management plan includes: HSE policies of Suez, IDI and Morganti individually and as a consortium; consortium HSE organization during construction and commissioning; defined roles and responsibilities; weekly and monthly safety meetings; monthly safety reporting; daily, weekly and monthly inspections; annual HSE management reviews; applicable regulations and standards, including Jordanian regulatory requirements, WBG EHS Guidelines, ISO 14001, OHSAS 18001, and Samra Plant Operation and Maintenance Company Ltd HSE requirements; risk assessment procedures; safety control measures; worker HSE induction training and accreditation; permit to work system; lock out/tag out procedures; area ownership; work specific standards and procedures; personal protective equipment ("PPE") standards; management of subcontractors; worker health control and monitoring; environmental control measures; and emergency management and spill response procedures. An Authority Engineer, Fichtner Water and Transportation, has been contracted by the Ministry of Water and irrigation ("MWI") jointly with the Jordanian project management unit ("MCA-Jordan") for the MCC grant to provide daily on-site supervision of construction, including monitoring and supervision of HSE performance. MCC additionally conducts quarterly environmental and social supervision site visits during the construction period.

During operations, environmental and social risks and impacts are managed by the Samra Plant Operation and Maintenance Company Ltd quality, occupational health, safety and environment ("QHSE") management system. The operations QHSE management system includes a QHSE policy and objectives; an HSE plan that details HSE organization and responsibilities, daily, weekly, month and annual HSE review meetings, incident reporting, internal audits and inspections with reference to Jordanian labor law, ISO 14001 and OHSAS 18001; procedures for document control, management review, internal audit, corrective and preventative actions, control of non-conformance, recruitment and training, maintenance and equipment monitoring, quality control, subcontractors, and grievances; standard operating procedures for working in hot weather, crisis and emergency management, worker health monitoring, safety risk identification, odor observation, sludge storage, testing and removal, environmental impact evaluation, noise management, hazardous materials, hazardous waste management, and spill response. Annual environmental and social monitoring reports will be prepared and submitted to MIGA as a condition of the guarantee.
PS2: Labor and Working Conditions

Samra WWTP currently employs approximately 179 direct hire workers, of which approximately 70 are skilled and the rest are unskilled. Following expansion, the number of workers is expected to increase by 12%. During peak Phase II construction, approximately 800 temporary skilled and unskilled construction workers are expected to be employed by the EPC contractor and subcontractors. All new Samra WWTP direct hire workers receive mandatory orientation from the company’s Human Resources (“HR”) Department. Samra WWTP has a HR policy consistent with Jordanian labor law and PS2, including terms of employment, workers organizations, non-discrimination, retrenchment and grievance mechanism. It is the recruitment policy of the EPC contractor to hire skilled and unskilled temporary construction workers from the communities adjacent the Project. The EPC contractor has an HR policy that follows Project sponsors’ consortium partners IDI and Suez, and is consistent with Jordanian labor law, MCC requirements and PS2. All temporary construction workers will be directly recruited by the EPC contractor and have a written contract stating duties, responsibilities, working hours, privileges and tasks, and payment terms.

Occupational health and safety risks during construction and operations are related to accident risks, noise, and hazardous materials. The EPC contractor and Samra WWTP have HSE management systems in place with procedures to conduct identify, assess and prevent or mitigate risks to worker health and safety consistent with the Jordanian labor law, WBG EHS Guidelines, and OSHAS 18001 standards. Procedures include worker health monitoring, safety risks identification, job hazard assessment, PPE standards, worker HSE training and accreditation, daily, weekly and monthly safety meetings, incident and near miss identification and reporting, lock out/tag out, permit to work, safety in confined spaces and explosive atmospheres, manual handling, and emergency response.

PS3: Pollution Prevention and Abatement

Risks and impacts identified and evaluated in the ESIA for construction and operation of the Phase II expansion are related to air emissions, dust, odors, temporary shutdowns, effluent quality and quantity, and sludge management. These risks and impacts are expected to be managed through Project design and mitigation measures provided in the ESMP and Q/HSE management system.

Air emissions, odor and dust: During construction, fugitive dust will be generated during construction activities and is expected to be mitigated through dust control measures, including periodic watering or treatment of exposed surfaces, as provided in the ESMP. Odor causing air emissions of ammonia, hydrogen sulphide and mercaptans are expected to be generated during Project operations. Impacts will be mitigated through the Ventilation Air Treatment System, which is monitored at the inlet and outlet to ensure 95% reduction in hydrogen sulphide concentration. Samra WWTP measures concentrations of ammonia, hydrogen sulphide and mercaptans on a weekly basis and the Royal Scientific Society conducts third-party monitoring on a quarterly basis. Additional odor monitoring is conducted by a five member Odor Group, which consists of two representatives from Samra WWTP, two representatives from the Ministry of Water and Irrigation (“MWI”) and one community representative, which conducts quarterly monitoring of odor. Samra WWTP has procedures in place to odors are consistent with European standards.
Temporary shutdown: The Phase I plant will continue to be operated by the Samra Plant Operation and Maintenance Company Ltd during Phase II construction, with operations related risks and impacts mitigated through the QHSE management system. Periods of temporary disruption to operations are expected to occur during Phase II construction to accommodate construction needs, resulting in partial treatment of raw sewage during two separate 12 hour events and partial treatment of odors during a four week period. Risks and impacts identified and evaluated in the ESIA related to the partial treatment of raw sewage and odors include groundwater infiltration, pest nuisance, effluent quality and odors. Measures to mitigate these risks and impacts are provided in the ESMP, including conducting temporary shutdowns during low flow periods at night and during winter to minimize the volume of water that will go untreated, maximizing temporary storage of raw sewage at the Ain Ghazal pre-treatment facility and existing structures at the Samra WWTP, conducting community awareness campaigns with nearby communities two weeks in advance of potential odor nuisances, full treatment of raw sewage diverted to storage in lagoons, increased frequency of insect control program, and reduced work duration in exposed locations of facility.

Effluent quality and quantity: During normal operations, the risk of discharge of substandard effluent is mitigated through Project design. Daily monitoring of effluent quality has been conducted since the start of operations in 2008 and Samra WWTP has always met acceptable effluent standards. Mitigation measures to avoid discharges of substandard effluent are described in the ESMP, including that the Samra WWTP is designed to operate below full hydraulic capacity to allow for modulating flows, supervision of operations by the QHSE Department who monitor health, safety and environmental issues, detailed operational procedures to respond to incidents in the treatment process, including a crisis manual that provides for coordination with the Ain Ghazal pre-treatment facility and Hashimiyya and Zarqa pumping stations, and standard operating procedures and working instruction for a water quality monitoring program and QA/QC requirements.

Sludge management: Under the terms of the Project agreement, Samra WWTP is responsible for the on-site management of sludge and bio-solids for three years after generation, following which MWI takes ownership and responsibility for sludge management and disposal. Risks and impacts related to sludge identified and evaluated in the ESIA are related to pest nuisance. The sludge drying lagoons and bio-solid storage lagoons provide a good environment for mosquito, fly and insect growth. Risks and impacts related to groundwater infiltration were not assessed as significant due to the physical characteristics of the sludge and 80 m deep groundwater table. The QHSE management system includes procedures for testing the sludge for heavy metals and other contaminants. A sludge management plan will be prepared jointly between Samra WWTP and the MWI to establish appropriate environmental, health and safety procedures for the construction, operation and closure of sludge facilities. MWI, with support from USAID, is currently preparing a feasibility study to identify and assess sludge disposal and reuse options.

PS4: Community Health, Safety & Security

Risks and impacts identified and evaluated in the ESIA for construction and operation of the Phase II expansion are related to odors (discussed in PS3), traffic and pest nuisance. These risks and impacts are expected to be managed through Project design and mitigation measures provided in the ESMP and Q/HSE management system.
Traffic: Heavy traffic, estimates in the ESIA to be an additional 78 vehicles per day, is expected during Phase II construction for materials and workers transport. The construction traffic presents increased risk of accidents in neighboring communities. Mitigation of traffic impacts are provided in the ESMP and include implementation of a traffic management plan that requires all trucks and staff vehicles to use access roads that don’t pass through residential areas, coordination of oversize vehicles and loads with the Traffic Department, on-site installation of a batching plant for concrete mixing, storing all construction machinery on-site, using buses to transport workers to the Project site, and maintaining a speed limit of 15 km/hour within the Project site.

Pest nuisance: Large populations of insects, including flies and mosquitoes, are found in neighboring communities. Community members, through consultation with Samra WWTP, believe that these populations originate from the facility. The ESIA states that only 15% of flies that originate at the Project reach the nearest residential areas and identifies other potential sources including agriculture, livestock, household waste and sanitation. Measures to mitigate pests on site and in neighboring communities, are provided in the ESMP, a continuation of the Phase I fly abatement plan which includes establishment of a committee between Samra WWTP QHSE Department, Hashimiyya Municipality, and key local stakeholders to coordinate abatement programs. The QHSE Department is responsible for implementing and monitoring the mitigation plan in cooperation with the committee, which meets on a monthly basis. Specific mitigation actions include fumigation, intensification of sludge mixing, and fly traps within the facility. All insecticides used are approved by Jordanian regulation.

Security Arrangements: The facility fenced with a gated entrance. Samra WWTP employs direct hire unarmed security guards to man the gate.

PS6: Biodiversity Conservation & Sustainable Natural Resource Management

The Phase II expansion Project is wholly within the boundary of an existing industrial site that has been used for wastewater treatment since 1985. The habitat at the Project site is significantly modified, however BirdLife International has designated the Samra WWTP an Important Bird Area because in history of the site, the 93 ha sludge drying and bio-solid storage lagoon areas are former stabilization ponds that attracted migratory and wading birds, most prominently the White Stork (Ciconia ciconia) which is classified as a Least Concern species in the IUCN Red List of Threatened Species. Both the ESIA and BirdLife International identify migratory and wading bird species at the Samra WWTP, however are classified in the IUCN Red List of Threatened Species as Endangered or Critically Endangered, therefore the Project site is not critical habitat. Additionally, the Phase II expansion will have no significant adverse impact during construction or operation on the sludge drying and bio-solid storage lagoons.

F. Environmental Permitting Process and Community Engagement

A public consultation session was held on January 4, 2012 in Zarqa Governate attended by representatives of Samra WWTP, MWI, Ministry of Environment, MCA-Jordan and 59 representatives (20 women, 39 men) of Project stakeholder groups including NGO’s, private sector and local communities. The purpose of the public consultation session was to present the results of the ESIA, highlight components of the ESMP, enhance job opportunities at the Project
for women and elicit feedback from Project stakeholders. A summary of the public consultation session was included in the ESIA.

Women’s associations were contacted directly to encourage the participation of women in the public consultation session, and a questionnaire designed to analyze the barriers of women employment at the Samra WWTP was distributed during the session. Comments received during the session were regarding the following concerns: potential discharge of untreated raw sewage to Wadi Dhuleil during temporary shutdowns, a viable final solution for sludge, vulnerability of groundwater to contamination, pests, availability of irrigation water for nearby communities and job opportunities.

G. Availability of Documentation


The above listed documentation is available electronically as PDF attachments to this ESRS at www.miga.org.