Multilateral Investment Guarantee Agency
World Bank Group

Environmental and Social Review Summary

Apache Egypt Companies

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 a Contract of Reinsurance. 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:	Arab Republic of Egypt
Sector:	Oil, Gas, Mining, Chemicals, and Energy
Project Enterprise:	Apache Egypt Companies
Environmental Category:	A
Date ESRS Disclosed:	11 April 2012
Status:	Due Diligence

A. Project Description

MIGA has been asked by the Overseas Private Investment Corporation (OPIC), an Agency of the United States Government, to provide re-insurance for Apache's investments in Egypt. OPIC has been providing coverage to Apache's investments in Egypt since 2004. Oil and gas activities in environmentally protected areas such as national parks have been excluded from OPIC's coverage[1]. Apache has been active in Egypt since 1994.

The project covered by OPIC involves existing and future onshore exploration, development and production of crude oil, natural gas and condensate for which multiple concessions have been granted by the Government of Egypt. Pursuant to the terms of the concession agreements, Khalda Petroleum Company (KPC) and Qarun Petroleum Company (QPC) have been formed as joint venture companies (JVs) between Apache (through multiple subsidiaries) and the Egyptian General Petroleum Corporation (EGPC), the state-owned petroleum company. Apache Egypt conducts oil and gas exploration activities and the JVs conduct development / production activities in each concession. Development leases within concessions generally have a 25-year life, with extensions possible for additional commercial discoveries or on a negotiated basis, and currently have expiration dates ranging from 10 to 25 years.

Existing Concessions in Egypt Covered by OPIC

Apache's Egypt operations currently include twenty three exploration concessions (of which 11 are development concessions) and the majority is located in remote areas within the Western Desert, with a small number located in populated agricultural lands, as summarized as follows:

[1] Apache's Wadi El Rayan in Egypt has been excluded from OPIC coverage as it overlaps with a national park.

Khalda Petroleum Company (KPC) Concessions

- *Western Desert:* remote locations in desert setting with no nearby population centers, and primarily oil and gas producing areas. There are no surface water resources, and groundwater resources are very deep and largely saline. There are no potable aquifers in the areas where Apache Egypt and its JV operate.
    - Khalda, Matruh Onshore (WD-4), Ras El Hekma, South Umbarka, Umbarka, West Kalabsha, West Kanayis, Ras Kanayis, North Tarek, Sallum, West Ghazalat, El Diyur, North El Diyur, , East Badr El Din (exploration), Shushan, Siwa, W. Mediterranean (Block I - onshore), Northeast Abu Gharadig, North Ras Qattara, Khalda Offset.

Qarun Petroleum Company (QPC) Concessions

- *Western Desert:* remote locations in desert setting with no nearby population centers, and primarily an oil producing area. There are no surface water resources, and groundwater resources are very deep and largely saline. There are no potable aquifers in the areas where Apache Egypt and its JV operate.
    - East Bahariya
- *Fayoum Depression / Nile Valley:* a natural depression which is a productive agricultural region due to the use of the Nile River water and its tributaries. Apache Egypt and its JV operations are located far from surface waters (i.e., Lake Qarun) and groundwater resources are largely saline and deep. A semi-confined Pleistocene groundwater aquifer connects to the Nile valley with negligible water recharge. In the Nile Valley, agricultural activities and other industries such as quarrying have developed in this region over the past several years.
    - Qarun and East Beni Suef

Groundwater in the Western Desert and Fayoum Depression / Nile Valley is found in the Moghra formation, which is an Early Miocene interbedded sand and silt interval. The Moghra aquifer ranges in thickness from 50m in the western Nile Delta to over 1000m thick in the Qattara Depression and the Sidi Barrani areas. The groundwater flow is general directed westward, towards the Qattara Depression. The depth to water in this aquifer varies from 49m to ~150m in high topographic areas in the west. The aquifer is recharged from surface water, particularly in the east and also is hydrologically connected to deeper aquifers. Salinity increases towards the west, away from the areas of major recharge around the Nile.

Existing Assets Being Added to OPIC's Coverage

The most recent acquisition by Apache Corporation occurred in November 2010. The acquisition included BP's Egypt interests in four development licenses and one exploration concession geographically located in the Western Desert; Merged Concession Agreement (Abu Gahradig, WDE 33; Razzak WD 349, 350; South Razzak WD 351; Abu Gharig WC 9, 30). The acquisition also included BP's interests in 65 active wells, a 24-inch 260 km gas line from Abu Gharadig to Dahshour, a liquefied petroleum gas plant in Dahshour (an asset located on the edge of the Nile Valley), a gas processing plant in Abu Gharadig and a portion of a 12-inch oil export line to the Alamein Terminal on the Mediterranean Sea. These investments are in the process of being added to OPIC's coverage (and if added, would also be covered as part of MIGA's re-insurance).

Project Context

Apache Egypt is the largest producer of liquid hydrocarbons and natural gas in the Western Desert and the second largest in Egypt. Apache is known for increasing production from mature assets by employing enhanced recovery techniques which includes water flooding (this method increases the pressure and thereby promotes production). As of April 2012, the Apache Egypt companies have no plans to utilize shale fracking to exploit oil and gas recovery. At the end of 2011, the Apache Egypt Companies were producing 217,222 barrels per day (total oil + condensate; gross production) and 865.43 million standard (MM) cubic feet of gas per day.

Given the remote locations of the field activities, on-site infrastructure is required, including workers' camps, water supply, power generation (most less than 50 MW except at Kalabsha and Salam), electricity transmission lines, and access roads. Apache Egypt's main activities are related to carrying out seismic surveys, drilling wells (exploratory and development), and operating onshore oil and gas plants and pipelines. As of December 31, 2011, Apache Egypt's activities include a total active well count of 1316 wells comprising of:

- 780 producing oil wells of which 31 were natural flowing wells, 398 with electric submersible pumps, and 351 with sucker rod pumps
- 61 producing gas wells,
- 422 water injection wells,
- 40 water source wells, and
- 13 gas lift wells.

Oil and Gas Processing Facilities

KPC oil processing facilities include Salam, Kalabsha, South Umbarka, and Umbarka oil processing plants. Oil conditioning consists of oil, water and gas separation. Oil is sold directly into existing third party collector pipeline networks, a third party refinery, or delivered to a third party export terminal for export sales to third parties. Condensate produced by the oil conditioning is also shipped via the same pipelines.

KPC gas plants are located at Salam (where two new gas trains were recently commissioned in 2010), Tarek, Obaiyed, and South Umbarka. Gas is sold primarily to third parties (Gasco, and Dahshour LPG is sold to PetroGas).

The Qarun concession oil treating facility consists of oil, water, and gas separation, with oil being shipped via pipeline to 350,000 barrels (BBL) floating roof tanks at Dahshour Plant. The minimal volume of gas is separated during the processing and then flared at the Dahshour Plant. Historically, most of the oil produced in the QPC has been trucked to the main treatment facility; this practice is gradually being replaced by pipelines.

B. Environmental and Social Categorization

Apache and its joint venture operations in Egypt are considered a Category A project under MIGA's Policy on Social and Environmental Sustainability. Key environmental and social issues related to on-shore oil and gas development include potential adverse impacts on air quality, on surface water, ground water and soils from oil spills; potential adverse impacts from produced water and sand disposal as well as wastes from phase separation; control of oil spills; prevention of fires and explosions; adequacy of worker occupational health and safety protection (including radiation); community health, safety and security; and land acquisition and livelihood impacts.

Future activities will be assessed by Apache Egypt and its JVs on a case by case basis before the activities begin, and environmental and social management measures commensurate with the identified impacts and risks will be developed and implemented by Apache Egypt (and its JVs) where necessary.

C. Applicable Standards

While all Performance Standards are applicable to this investment, our current information indicates that the investment may have the following potential impacts which must be managed in a manner consistent with the following Performance Standards (PSs):

- PS 1: Social and Environmental Assessment and Management Systems
- PS 2: Labor and Working Conditions
- PS 3: Pollution Prevention and Abatement
- PS 4: Community Health, Safety & Security
- PS5: Land Acquisition & Involuntary Resettlement.

Based on current activities, Performance Standards 6 (Biodiversity Conservation and Sustainable Natural Resources Management), and 8 (Cultural Heritage) are not applicable, except for a chance finds procedure as part of its operating procedures. The Dahshour gas plant (commissioned in the 1970s) is situated in close proximity, less than 2 km, to the Pyramids of Dahshour, designated as a World Heritage Site in 1979; however no adverse impacts to the Pyramids have been identified to date.

Based on available information, there are no communities in the areas in which Apache Egypt and its JVs operate which can be considered indigenous under PS 7. Bedouin groups exist in the area, but Bedouins in the Western Desert are considered to be ethnic groups, not Indigenous Peoples for the purpose of Performance Standard 7. They do not differ from the rest of the Arab population in terms of religion, language, or economic activities (e.g., they are employed by the project), and day-to-day practices (e.g., attending the same community schools where other Arab children may also attend). As such PS 7 does not apply to this project. However, Bedouins' ethnic, cultural characteristics as well as vulnerable aspects are considered in the context of community consultations and the sharing of project benefits (income opportunities).

As new activities are undertaken by Apache Egypt (and its JVs), its environmental and social management system will identify applicable issues covered under all of MIGA's Performance Standards to ensure appropriate assessment, mitigation, and monitoring procedures are incorporated into the project's management program. Apache Egypt (and its JVs) will carry out environmental and social impact assessments in compliance with Egyptian Law, and consistent with MIGA's Performance Standards, and appropriate mitigation measures will be developed in accordance with the provisions of PSs and guidelines.

The World Bank Group General Environmental, Health and Safety (EHS) Guidelines; EHS Guidelines for Onshore Oil and Gas Development; and EHS Guidelines for Thermal Power are applicable to this project.

D. Key Documents and Scope of MIGA Review

As part of due diligence, MIGA's environmental specialist visited the project site in November 2011. In addition to carrying out interviews with Apache Egypt's onsite EHS key staff and

conducting site visits to representative field activities, MIGA's due diligence of this project also included review of project-related environmental and social information. The objective of MIGA's due diligence was to review the social and environmental management capacity of the project enterprise to ensure that operations are (and will be) carried out in compliance with MIGA's Performance Standards. Key environmental and social documents reviewed by MIGA include:

- Baseline Audit Report: Apache Egypt Western Desert Assets (acquired 2010), prepared by ERM, 15 March 2012
- Examples of recent environmental assessment documentation prepared for the local regulatory authorities (Form B for a new well, and an EIA for a major oil plant expansion)
- Human Resources Policies
- Annual Environmental Self-monitoring Reports for 2006-2011 reporting periods
- Health, Safety and Environmental Management System Manual Selected Elements for the Khalda Petroleum Company: Hazards Identification and Risk Assessment Procedures Guide, Incident Reporting and Investigation, Permit to Work System Guidelines, Personnel Protective Equipment Procedures, Contractor HSE Requirement, Khalda Emergency Response Plan (January 2011)
- Health, Safety and Environmental Management System Manual, Qarun Petroleum Company, January 2009
- Oil spill contingency plan, October 2011
- Environmental Impact Assessment (EIA) Pre-Seismic and Drilling Activities for Tharwa (Siwa, Sallum, West Ghazalat, Farafra) and East Ras Budran Concession Areas, prepared by EPSCO, 2008
- Final Report Siwa Sallum 3D HPVA Vibroseis from June 2007 to September 2007, prepared by CGG Ardiseis (Compagnie Generale de Geophysicque) (included as part of the 2008 EIA)
- Review of Apache's Operations in Egypt (2005 & 2006): Environmental Monitoring and Waste management, prepared by ERM, 2007 (included as part of the 2008 EIA)
- Environmental Impact Assessment (EIA) for Egyptian Oil & Gas Activities (Apache Egypt Companies), prepared by Firebird Development Inc., November 2005
- Environmental Impact Assessment (EIA) for Egyptian Oil & Gas Activities (Apache Egypt Companies), prepared by Firebird Development Inc., February 2004.

MIGA's review of this project also comprised of email exchanges with Apache and OPIC on various environmental and social management topics including site security arrangements and stakeholder engagement, of concession maps and facility layouts, and of material in PowerPoint presentations.

E. Key Issues and Mitigation

Key environmental and social issues relating to the project are summarized below along with specific information on how potential impacts are addressed by Apache.

PS1: Social and Environmental Assessment and Management Systems

Social and Environmental Assessment: Apache's corporate Environmental and Safety Policies are applicable to its operations in Egypt, and similar principles are reflected in the respective JV EHS policies, and appear to address the key environmental, health and safety risks and issues associated with its Egyptian operations. Apache Egypt's operations (including its JVs) are based

on established facilities that have been operational for many years. These facilities have been augmented by a program of ongoing asset replacement, upgrading and expansion, and maintenance and production drilling, well workovers, and ongoing exploration (seismic and exploration drilling). These activities have been carried out within the confines of Apache Egypt's (including its JVs) designated license areas. Facilities commissioned prior to 1994 are exempt from holding an environmental impact assessment (EIA). Following the promulgation of *Law 4 (1994)*, all new oil and gas facilities and major refurbishments and extensions are required to submit an EIA. Apache Egypt has represented that required EIAs have been prepared and submitted to relevant authorities for its operations and its JVs operations. Risks covered by MIGA's Performance Standards which are not currently captured under the existing environmental and social assessment programs (strengthening environmental and social management systems, developing and implementing a formal stakeholder engagement plan), will be incorporated.

Apache Egypt submitted Environmental Impact Assessments on its assets at the time to OPIC for public disclosure in 2004, 2006, and 2008. Although the asset mix has changed since then, the nature of potential impacts and mitigation measures generally are the same for current operations. Apache Egypt has carried out environmental audits of some of its acquisitions as part of OPIC's requirements, including for its most recent acquisition of former BP assets in 2010 (this report is attached to this ESRS). Recommendations in the audit will be taken onboard and addressed by Apache Egypt as part of continually improving EHS performance at the JVs.

Management Program and Monitoring: Given the acquisition history of the assets, the site-level management systems have been developed on an asset-by-asset basis and/or referencing previous corporate management systems. Consequently, there is some variance between these existing systems. For example, QPC maintains ISO 14001 (environmental management) and OHSA 18001 (occupational health and safety) certified management systems; whereas only a few sites under KPC maintain ISO 14001 certified management systems. Apache Egypt has recognized these differences and over the last several years, it has been developing policies and procedures to align the various management systems and to strengthen oversight and review. Apache Egypt is actively developing programs and methods to continually improve EHS performance and promote consistent application of EHS policies and procedures within all its activities (e.g., establishing a schedule to carry out environmental audits at various facilities, rotating EHS personnel to different concessions, establishing a protocol to review site-level environmental documentation). Within the last year, a monthly internal inspection program has been initiated to regularly monitor field operations on rotational basis.

Each JV has its own EHS management system, documented in their respective manuals. These management systems generally address the following topics:

- roles and responsibilities
- planning and setting of objectives
- training; risk assessment and management
- site inspections and audits
- accident/incident investigation
- analysis and monitoring
- rules, regulations and procedures
- emergency preparedness and response

- operations and maintenance procedures
- personnel protective equipment
- health management
- management of change
- management of contractors and suppliers
- vehicle safety.

Based on the above elements, individual EHS plans are prepared for each joint venture operation, including an Apache Regional EH&S Plan, which is endorsed by the Egypt Region vice president and general manager, and a region-wide Oil Spill Response Plan.

Apache Egypt and its JVs carry out a standard industry haz-op protocol during the design phase on major new installations, and for major modifications and expansions of existing facilities. All new process plant and equipment, and modifications to existing plants are subject to review procedures before commissioning in order to reveal any hazards that were not recognized during the initial design process. As part of asset integrity management, equipment replacement is governed by the principle of "fit for purpose" to ensure equipment installed is designed for the purpose for which it will be used.

Apache Egypt submits quarterly reports to its corporate headquarters. These reports capture both Apache Egypt and JV operations. Annual EHS plans are developed by Apache Egypt and approved by the Regional Vice President, and then are reviewed and approved at the corporate level. Plans summarize last year's EHS performance and outline next year's targets. Apache Egypt is focusing EHS performance improvement for contractor safety, vehicle and driving safety, safety in the field, and environmental stewardship (e.g., ensuring key codes of practice are available in English and in Arabic, improving incident reporting protocol).

Apache Egypt is required to submit annual environmental self-monitoring report of its activities (including activities of the JVs) to government authorities (via an onsite environmental registry at the large field facilities locations) and to OPIC. These reports present the results of measurements of various emissions and discharges (e.g., stack emissions, vehicle emissions, evaporation pond discharge, sanitary effluent discharge), greenhouse gas emissions, ambient environmental concentrations (air quality and noise levels), radiation surveys, and other occupational health and hygiene related parameters (e.g., noise and light intensity, heat stress, indoor work space ventilation) These reports also summarize accident and incident statistics (see PS 2 in this ESRS for details) as well as spills. In general, these self monitoring reports provide EHS information related to JV activities, contractors, and Apache Egypt. Based on an external review of sections of the latest self-monitoring reports, recommendations will be offered for consideration for future reporting (e.g., ambient sampling, frequency of visual inspections, etc.).

An increase in total spills occurred in 2011 as compared to 2010. Spill numbers increased from 27 reported in 2010 to 56 reported in 2011. This increase is mainly attributed to improved incident reporting, definition of reportable spills within the JVs, and better communication regarding reporting requirements.

Organizational Capacity and Training: Apache applies its corporate EHS standards to its global operations ("Apache Worldwide EH&S Standards") and has scheduled to commence its internal exercise to benchmark operations in Egypt against its global standards.

Apache recognized its growing pace and the need to ensure senior full-time EHS oversight of its operations in Egypt and thus in 2008, Apache Egypt designated a full time in-country Regional EHS Manager to be responsible for managing and minimizing environmental, health and safety risks, and for demonstrating and promoting EHS leadership. This position is responsible to ensure contingency planning for major EHS incidents is adequate and updated, and to provide EHS oversight on major projects (including those of the JVs). The Regional EHS Manager is supported by a team based in Cairo and liaises with EHS General Managers and staff at KPC (134 EHS personnel) and QPC (43 EHS personnel). Communications between the Regional EHS Manager and the respective EHS General Managers at the JVs is becoming more frequent with communication channels evolving and becoming better established. Apache Egypt will need to verify that adequate EHS capacity exists (including within the JVs) to manage potential EHS risks in line with its increased production and expansion plans for the Region.

Contractor oversight (drilling, rig and mud contractors) is carried out by both Apache Egypt and its JVs. Apache Egypt stipulates in drilling contracts that the contractor will conduct operations in a compliant manner, adhering to Apache's EHS management system and relevant laws. On site observers monitor drilling activities to ensure that safe and environmentally compliant drilling operations are carried out. Procedures are in place for recording, investigating, reporting and undertaking corrective action in relation to EHS incidents including events involving contractor labour. Regular monitoring of contractor EHS performance is also carried out and will be enhanced. Improvements to following up on corrective actions by JVs have been identified and will be addressed.

Workers undertake an induction course before working onsite, which includes EHS training and the use of personal protective equipment. Field personnel receive additional EHS training relating to their specific job risks and duties.

Apache hires external consultants to carry out the environmental assessments (Form B for Category B projects, and EIA for Category C projects – under the Egyptian system). Apache's joint ventures each retains an external consultant who compiles the EHS field monitoring data for the annual monitoring reports that Apache and its JVs submit to regulatory authorities and to OPIC.

Community Development: Apache Egypt has built and maintained 206 local schools for both boys and girls within the municipal boundaries of its activities. These schools are open to all students, including Bedouin, in the area and have provided educational opportunities for 7,000 young girls. Also, Apache has partnered with Egypt's National Council for Childhood and Motherhood and the Sawiris Foundation for Social Development to continue to enhance the girls' educational experience. This school program has been very well received by the communities it serves and thus Apache Egypt is currently looking at ways to expand this program within Egypt.

PS2: Labour and Working Conditions

Human Resources Policy and Management

Egypt has ratified eight fundamental International Labour Organization (ILO) conventions, including conventions on forced labour, freedom of association, right to organize and collective bargaining, equal remuneration, discrimination, minimum age, and child labour, and also enforces Egyptian Labour Law #12/2003.

Apache Egypt has developed a Personnel Policy which is applicable to all national full-time regular employees and which follows the Egyptian Labour Law #12/2003. Apache's policy specifies terms of employment and working conditions, which are aligned with the requirements of MIGA's Performance Standard 2. The policy addresses procedures for hiring and recruiting, probation, training, performance review, promotion, medical, salary and compensation, resignation, disciplinary procedures, standard working hours and leave (including maternity), and retirement. The national labour law includes requirements for equal employment (race, colour, religion, social origin, sex, political opinion, and nationality) and thus, this requirement is reflected in Apache's policies and procedures. Hiring and promotions are merit-based. Job vacancies are advertised in the media (e.g., newspapers, job seeker websites) and also through referral programs.

Apache Egypt communicates its human resources policies and procedures to all employees. The company's human resources policy has been approved by the Ministry of Labour and is posted within the workplace. Apache does not hire workers below the age of 18, and the company has no objection to collective bargaining. A formal grievance mechanism has been established by law; however, to date, all grievances have been resolved as per the procedures described in Apache's policy. Apache Corporation's Code of Business Conduct is applicable to all its subsidiaries, including Apache Egypt, and requires that business be carried out fairly, ethically, and in compliance with applicable laws, regulations, and government requirements. Expatriate employees are governed by their respective Apache home office human resource policies, all of which address the requirements of PS 2.

EGPC hires all national workers for the joint venture companies (KPC and QPC) and follows national labour laws. Trade unions are currently active at the JVs; workers have the right to freedom of association and have the opportunity to collectively represent to the JV management any issues or grievances that they may have.

Apache and its JVs utilize contractors for numerous projects such as drilling operations, seismic data acquisition, facilities and pipeline construction, etc. These contractors and subcontractors are registered companies and thus are subject to abiding by Egyptian Labour Law.

Apache Egypt employs approximately 250 national employees and approximately 150 expatriates (including resident and rotating staff) and the vast majority of the workforce is based in Cairo. Khalda Petroleum Company (KPC) employs approximately 2,500 national employees, and Qarun Petroleum Company (QPC) employs approximately 770 national employees. Workers in the field rotate on a shift basis and are housed at full service camp accommodations. Improvements to worker accommodations have been made over the last few years to improve and expand wastewater treatment, and to upgrade living quarters. Ongoing maintenance and repairs to worker accommodations will continue to be part of Apache's operations and will be an item to be reported upon as part of ongoing environmental and social monitoring to MIGA. Using

reasonable efforts, Apache will continue to assist contractors to improve their workers accommodations.

Occupational Health and Safety (OHS)

Workforce occupational health and safety (OHS) is another key component of Apache's EHS management system. Potential OHS hazards identified include: fire and explosion, air quality, hazardous materials (including naturally occurring radioactive material - NORM), well blowouts, emergency preparedness and response, and traffic safety. Hazard identification and risk assessments have been carried out and OHS procedures have been developed and implemented for both Apache Egypt and its JVs. Employees are trained on safety procedures based on their positions and adequate personal protective equipment is available. Individual job descriptions are reviewed through standard job safety analysis to ensure that the safety management procedures and practices are correctly followed. Only trained personnel are permitted to enter areas where NORM contaminated materials are stored, and regulatory authorities routinely inspect field locations to ensure that proper handling and storage procedures are followed.

Routine OHS training programs include emergency response drills and refresher courses. One of Apache Egypt's joint ventures recently purchased a new ambulance and fire truck to better support operations at Khalda and the remote airstrip currently servicing all operations in the Western Desert. During severe sandstorms, all lifting, drilling, and other similar types of activities stop until visibility improves and work conditions are safe.

Oil and gas plants are well-lit and access is controlled. Apache indicated that fire suppression systems at all joint venture field sites are tested regularly and all are in good working order. Systems include water guns, foam, extinguishers, fixed fire pumps (including over the top spraying for tanks), and emergency shut-down devices. Appropriate fire life and safety requirements are found in the offices in Cairo. Medical facilities are staffed by sufficient doctors and nurses, as required under Egyptian labour law.

Incidents, including near misses, are reported to Apache Egypt by the joint ventures and each is investigated following Apache's corporate protocol, which was formalized in 2009. Procedures are adapted where necessary to prevent re-occurrence. During 2011, ten recordable Apache Egypt/JV injuries were reported; four contractor workplace fatalities occurred and sixty serious/medical treatment case contractor injuries were recorded. Four significant incidents involving fire or explosion were reported and required localized shutdown.

In 2011, a total of thirty-one (18 Apache and 13 Contractor) vehicle incidents were recorded. Apache has indicated that these driving statistics are comparable to its joint venture peers who have onshore operations in Egypt, and Apache Egypt recognizes that traffic accidents are one of the key areas to address within its JVs and contractors. In 2009, a fleet management system was implemented for one of Apache Egypt's joint ventures. This installed monitoring technology records vehicle speed limits, use of seatbelt and vehicle lights, and driver behaviors (such as harsh breaking and acceleration). Improvements to the system are being undertaken, and good driving behaviors are being recognized and rewarded. Apache's joint venture operations will also begin to verify driving speeds of its personnel and contractors by patrolling roads in the field and will follow up with contractors as necessary.

PS3: Pollution Prevention and Abatement

An overview of some of Apache Egypt's mitigation measures for preventing and abating pollution are summarized below.

Emissions to Atmosphere: Gaseous emissions are classified as follows: heater flue gases, discharges from process, emergency releases, maintenance and other services, volatile organic compounds, and fugitive emissions. Equipment is kept in good working order to minimize air emissions and noise, and vehicles are regularly maintained. Gas detection monitoring is carried out using portable devices, and budgeting is in place to install fixed gas monitoring at some field locations. Mercury has been tested from gas coming from specific fields and thus a mercury trap has been installed for incoming gas.

Emissions from newly installed generators with over 50 MW capacity, such as at Salam Gas Plant, will apply to the WBG EHS Guidelines for Thermal Power. Flaring and greenhouse gas emissions are discussed below.

Potential for Contamination of Soils and Groundwater: Storage tanks are generally bermed and visually inspected. Historical soil contamination from previous operators is likely given the age of some of the assets; however, Apache Egypt has indicated that it is unlikely to be of significant quantities.

In case of spills and accidental liquid releases, barriers and dykes are used around the contaminated area to prevent the migration of spills. Contaminated topsoil or sand is removed, and is remediated at either biological treatment pads or through thermal desorption and/or incineration technology.

Pipeline right-of-ways are regularly patrolled to identify potentially damaged areas. Pipeline integrity is through maintenance and repair programs to remove build up (routine pigging) and to identify corrosion / integrity weaknesses. Most major pipelines have cathodic protection. Apache Egypt's joint ventures are currently repairing several sections to pipelines. Some flow lines at QPC facilities are currently being switched to fiberglass rather than steel as fiberglass piping is more resilient.

In desert locations, the chance of surface water pollution and groundwater contamination is extremely limited as encountering water in this environment is minimal. Groundwater contamination in densely populated areas is extremely unlikely to occur as all measures; including industry best practices are taken in drilling practices in direct accordance with Egyptian Environmental Affairs Agency (EEAA) guidelines.

Wastes: Principle wastes generated by Apache Egypt and its joint venture operations comprise: drill cuttings and spent drilling fluids, produced water, sanitary waste, and general non-hazardous and hazardous waste materials. Disposal options include:

- *Drill cuttings* and *spent water-based drilling fluids* are field tested and then disposed of appropriately in evaporation pits (usually lined). Pits are remediated following the drilling program. Oil based drilling fluids have not be used since the mid 2000s.
- *Produced water* is disposed of by down hole injection or discharged into contained ponds or lagoons; prior to injection, produced water is temporarily stored in lined earthen lagoons. Not all historically constructed containment ponds or lagoons are lined, and the JVs are

gradually moving toward replacement with lined ponds. Historical contamination from previous operators resulting from produced water being discharged to unlined evaporation ponds are managed appropriately and are being remediated. Although none of the lagoons discharge to surface waters, Apache Egypt has chosen to comply with the WBG guidelines for surface water discharge, which are very similar to Egyptian regulations. Oil is separated from the water via an API gravity separator and water is stored in evaporation ponds. Daily monitoring is conducted for oil and grease, and pH levels. Tests are also carried out for toxic metals, with parameters reported within acceptable limits or as non-detectable.

- *Hydrostatic testing water* is collected in sumps and then pumped to the evaporation ponds.
- *Sanitary waste* generated at KPC facilities is treated at primary waste water treatment plants. Discharge from these plants is used for irrigation purposes and as such are subject to testing. Khalda will construct an expanded sanitary waste treatment facility to handle waste from expanding operation and all contractor camps, including Salam, Umbarka and Kalabsha. KPC will apportion the capital and operating costs among contractors and facilities will be operated and maintained by KPC.
- *Sanitary waste* generated at QPC is collected in a below ground septic system and is not sampled. The waste is transported off site and disposed appropriately.
- *General wastes* are disposed at approved locations (such as trucked to Matrouh) or where possible, available for reuse or recycling. Much of the materials and scrap stored in the maintenance and junk yards belong to EGPC as outlined in the concession agreements; therefore the JVs have sorted materials but are not able to dispose / reuse without EGPC permission.
- *Naturally Occurring Radioactive Material (NORM*): Radiation monitoring was carried out by the Atomic Energy Authority of Egypt (AEAE) at all sites and elevated levels were found in various parts of gas and oil processing equipment, due mainly to NORM from the reservoir formation itself. Materials contaminated with NORM are properly stored in secure locations. The AEAE routinely tests potential NORM-contaminated material to determine appropriate disposal or storage methods. Contaminated equipment needs to be decontaminated and certified decontaminated by AEAE prior to re-sale. AEAE also routinely monitors NORM long-term storage sites, which are fenced and signed. The AEAE keeps records of all long-term storage locations. As Egypt has no long-term solution for radioactive material, NORM storage sites will become the responsibility of AEAE upon closure of the oil and gas sites.
- *Hazardous wastes* include mud chemical additives which are considered toxic or hazardous. Apache Egypt's joint venture facilities are licensed by EGPC to handle and store a number of hazardous waste materials. Use, storage and handling and disposal are as per the instructions provided on the material data safety sheets (MSDSs). Hazardous waste which is not NORM contaminated will be stored outside of NORM dedicated storage yards. Not all chemical storage areas have concrete pads. Emergency eye wash and shower stations are inspected to ensure in stations are in good working order; those that are not working when inspected are quickly repaired. Chemical containers and oil drums are returned to suppliers for re-use.

Flaring and GHG emissions: High efficiency flares / burners with sufficient capacity are used at all locations. In addition to flaring to maintain a pilot light, flaring occurs at remote facilities where flaring of produced gas is the only economic option.

Apache Corporate reports its greenhouse gas (GHG) emissions through the Carbon Disclosure Project. Data collection and accuracy is continually improving. Sources of GHG emissions includes gas treatment (CO_2 removal) plus production flaring, combustion, crude oil and produced water flash gas, fugitive emissions and venting, crude oil handling and transportation,

and dehydration and venting. GHG emissions for Egyptian operations in 2010 (the most recent calculations) were reported as 3,465,843 tonnes CO_2-e (carbon dioxide equivalents). Total gross production for Egyptian operations was 176,354,686 barrels of oil equivalent, or 176,355 MBOE.

Apache Egypt is adopting practices to reduce its GHG emissions and volatile organic compounds (VOCs), as illustrated in the following examples:

- New retrofitting on four gas turbine generators exhaust stack at Khalda to install new waste heat recovery units and therefore no longer using fuel gas for the oil heating process.
- Diesel generators are being switched to natural gas, which has also resulted in significantly reducing the number of diesel tanker deliveries to remote locations.
- Trunk lines are being installed at Qarun to minimize oil trucked from the various wells (already reduced trucking by 100 truck loads daily).
- Darker coloured oil storage tanks are being piloted to take advantage of the heat generated by solar radiation in order to improve the viscosity of the oil.

Preventive actions: Oil spill contingency plans have been developed and workers are adequately training. Emergency shutdown valves are at the wellhead and down hole and can be activated automatically or manually, and operated remotely where needed. Emergency response plans have been developed and are regularly updated.

Cumulative impacts: Apache Egypt's facilities are generally self-contained in terms of the disposal of effluents (produced water and sanitary effluent), do not spatially overlap, and generally are not neighboring other significant oil and gas operations to result in cumulative impacts. Well pads, pipeline rights-of-way, access roads, and other infrastructure have been designed and located so as to minimize land requirements.

Current emissions monitoring seems to indicate that impacts are limited to property boundaries; however this will be confirmed with ongoing project monitoring efforts. Apache Egypt will review its site specific environmental and social management plans to ensure that not only adverse direct impacts are monitored, but will also identify potential cumulative impacts, and ensure these impacts are monitored.

Water used for drilling and production is typically brackish and is supplied by an approved EGPC contractor. For KPC, potable water is trucked from Matrouh. For QPC, potable water is trucked from 6th October City, or pumped from freshwater sources. Water for drilling and water flooding for Apache Egypt and both JVs are sourced from deep brackish wells (which are not in communication with any potable shallow aquifers) or produced water. Apache Egypt is reporting water withdrawals through the Carbon Disclosure Project – Water Disclosure. The most recent reported information for Apache's Egypt operations is for 2009. Approximately 25,197,000 m^3 per year of groundwater was extracted and approximately 28,000 m^3 per year of municipal water consumed. Approximately 83% of the water was recycled/reused in the Egyptian Operations. No adverse impacts have been identified related to water withdrawal.

Closure: Ongoing reclamation and restoration is carried out at temporarily disturbed areas, including drilling mud disposal sites, and material lay down areas. Best efforts to restore topographic features are followed and excavated soil is stored and replaced.

Apache Egypt has yet to close many production wells as its assets are early to middle age and are still producing. Typical closure procedures will include plugging the well to ensure fluid

migration does not occur within the borehole. Down hole equipment will be removed and casings will be cut below ground surface.

Effluent / emission parameters: Apache Egypt has already committed, as part of OPIC's coverage, to meet the more stringent emission / effluent parameters as determined under national standards and presented in WBG EHS guidelines. Apache Egypt's operations (including the JVs) have generally been compliant.

Apache Egypt and its JVs have been improving environmental practices at existing operations (e.g., moving toward re-injection for produced water, replacing unlined evaporation ponds with lined ponds , reducing upset conditions or insufficient processing capacity at older installations) and will continue to develop EHS improvement plans as part of its budgeting and planning processes.

PS4: Community Health, Safety & Security

The majority of Apache Egypt's activities are located in remote and sparsely populated areas. Potential community health and safety impacts are related to physical hazards (pipeline failures, well blowouts, tank explosions, etc.) and increase in heavy vehicle traffic. Those facilities in close proximity to public roads and populations are fenced and secure to prevent uncontrolled access to the sites.

Apache Egypt and the JV's standard operating procedures include ongoing scheduled maintenance and implementation of preventive measures to minimize adverse health and safety impacts. Examples of such measures include fitting flow lines with safety valves for protection against overpressure, shut-off valves, and flaring systems for blow-off in case of accumulation of liquid. Anti-corrosion coatings are used on pipelines and corrosion is minimized by continuous cathodic protection of equipment. Ongoing maintenance at the JV field locations is being carried out.

An emergency response plan (ERP) is in place for Apache Egypt which is utilized by all Apache Egypt companies and JVs. Emergency management follows the Incident Command System, an all-hazard incident management approach to provide standard response procedures. Firefighting equipment is available on site.

Apache Egypt is committed to evaluate its operating practices to ensure that risks and impacts to local populations are minimized and carefully monitored. Health and safety issues will be discussed with nearby communities as part of the ongoing stakeholder engagement plan, and will include emergency response scenarios and land use near wellsite boundaries. Traffic management plans will be developed in areas of expansion near communities and will take into account community locations to minimize disturbance and safety risks. The choice and / or location of water supplies, including water required for future water flooding programs, will take into account the needs of the local population.

Security Arrangements: Apache's security management process includes carrying out a detailed threat analysis and assessment security personnel qualifications, and providing equipment, and training. Security measures employed by Apache are the minimum necessary to protect personnel and assets. Apache Egypt hires a private security company to provide (unarmed) guards for its Cairo offices. Bedouin are hired by Apache Egypt and its joint venture

operations as (unarmed) guards to deter theft at all remote field locations and are equipped with cell phones. Supervision of these guards is provided by the JVs' security department.

Most of the assets in the Western Desert are located in military patrolled areas. Desert passes issued by the military are required to travel to, or work at, these sites. The joint venture government partner (EGPC) of KPC arranges security for these facilities / assets. Oil and gas assets are considered as national assets and therefore can be subject to military security. A Joint Venture General Manager may request that the government provide more law enforcement capability in an area, which may result in deployment of extra police or military units. Apache represents that it has a robust risk assessment methodology it employs to judge risks to its personnel and operations. Within this process, Apache will consider the Voluntary Principals on Security and Human Rights.

PS5: Land Acquisition & Involuntary Resettlement

No physical displacement of property and individuals has resulted from Apache Egypt's operations to date, and none is expected in the future. Apache Egypt has obtained government-issued concessions through bid rounds, direct purchases, or "farm ins" (earning percentage of ownership based on performance). Most of its operations have been in existence for many years and are not expected to expand beyond their current footprints. Development in the Western Desert does not require land payments as land is directly owned by the Government.

When new exploratory or developmental activities are planned, users of the land are identified and consulted as part of the environmental impact assessment process. Negotiated land rental agreements on either a temporary basis for exploratory work or more permanent lease agreements for well pads and processing facilities are required for activities in agricultural areas (including coastal areas). A common process is followed for reaching these agreements, which includes assessing the land and crop value, preparing a land acquisition and compensation plan, and registering the agreement with the local government authorities (agriculture, municipality, etc.). Land used on a temporary basis is reclaimed and returned to the land owner / land user.

F. Environmental Permitting Process and Community Engagement

The Egyptian Environmental Affairs Agency (EEAA) is responsible for the enforcement of Law 4/1994 which requires that new establishments or projects, expansions or renovations of existing operations are subject to an environmental impact assessment before a permit can be issued. Projects are classified based on severity of possible environmental impacts[2].

The EEAA operates as the central enforcement agency and coordinates between government bodies. For upstream oil and gas activities, the EEAA is responsible, in agreement with EGPC, for issuing environmental approvals and conditions upon which the license is based. Executive summaries of EIAs are available from the EEAA upon request. Apache Egypt and its JV's have indicated that all necessary environmental reports have been submitted to the EEAA and all necessary environmental permits and approvals have been received for current activities.

The EEAA requires community consultations for EIAs carried out for complex projects such as expansions and field oil and gas development activities. Most of Apache Egypt's (including JVs) activities are located in remote locations with no nearby communities. Thus, the company's consultation activities have been limited and carried out on an informal and formal

[2] Note that the EEAA system of classification is reverse to MIGA's classification of project impacts.

basis. Consultation activities, including stakeholder's involvement, in regions where there are affected populations (e.g., coastal areas and Nile Valley) consist of the following activities:

1) Plan, design, and execution of the project as per the local and international standards;
2) Emphasize community environment, health & safety measures;
3) Ensure positive impact on shareholders & subgroups representing the local community;
4) Apply local laws and international best practices regarding waste management, restoration, reclamation, and decommissioning; and
5) Restore the site to the surrounding land use upon project life-cycle completion.

In the Western Desert, the Bedouin Chief for the affected area will contact Apache Egypt or the JV directly to begin the process of engaging local Bedouin labour and to provide additional support for exploration projects. Bedouins also have established formal business activities (e.g., the local Bedouin Chief has a registered Egyptian company and workers have appropriate government issued identification) focusing on providing services to oil and gas operations, such as onsite security, waste removal, catering, roustabouts on the drilling rig (unskilled labour), and the rental of automobiles and drivers. Apache Egypt will assist local Bedouin tribes who may not be familiar with the process to register a company.

Apache has an informal grievance mechanism to identify problems or concerns at an early stage. Grievances are generally brought forward at a field level to an Apache representative and then are resolved as soon as possible. In order to support Apache Egypt's (including JVs) ongoing and expanding operations, the company is committed to developing a documented stakeholder engagement plan that will define a consultation and disclosure strategy, including addressing vulnerable groups. This plan will inform interested parties and will maintain ongoing communication with all stakeholders. It will also include provisions to disclose major ESIA documents associated with Apache Egypt's (including JV) activities and will describe the company's defined grievance mechanism including a process for recording, following through and closing complaints. Resources and responsibilities for implementing and regularly updating the plan will be defined.

Apache Egypt has also committed to develop as part of its environmental and social management program an ongoing communication program for internal and external stakeholders consistent with MIGA's Performance Standards.

G. Availability of Documentation

The following documents are available electronically as a PDF attachment to this ESRS at www.miga.org:

- Baseline Audit Report: Apache Egypt Western Desert Assets (acquired 2010), prepared by ERM for Apache, dated 15 March 2012.
- Environmental Impact Assessment (EIA) Pre-Seismic and Drilling Activities for Tharwa (Siwa, Sallum, West Ghazalat, Farafra) and East Ras Budran Concession Areas, prepared by EPSCO, 2008
- Environmental Impact Assessment (EIA) for Egyptian Oil & Gas Activities (Apache Egypt Companies), prepared by Firebird Development Inc., November 2005(Appendix D)
- Environmental Impact Assessment (EIA) for Egyptian Oil & Gas Activities (Apache Egypt Companies), prepared by Firebird Development Inc., February 2004.

Executive summaries of existing EIAs submitted to the EEAA are available through the EEAA offices. The above listed documents are available for viewing at the offices of Apache Egypt Companies, 11 Street 281, New Maadi, Cairo, Egypt.