Earth Link & Advanced Resources Development
Selected References

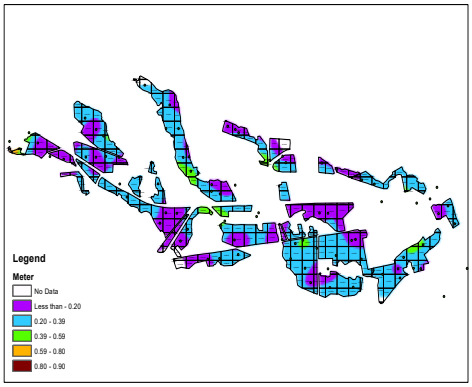
Environmental Management for the Oil & Gas Sector

ELARD

SOIL REMEDIATION PROJECT IN NORTH AND SOUTH-EAST KUWAIT AREA

Client

Al Ghanim International General Trading & Contracting Company W.L.L.



Location

Kuwait

Date

Jan. '16 – Jul. '16

Project Description

Alghanim has been awarded a contract for Excavation and Transportation of Heavily Oil Contaminated Soil to Landfill in South-East Kuwait Area and Site Preparation Works for the Remediation Technologies Demonstration Project by Kuwait Oil Company (KOC) under the Contract # 15051722 and Excavation and Transportation of Heavily Oil Contaminated Soil to Landfill in North Kuwait Area by Kuwait Oil Company (KOC) under the Contract # 14050822 (hereinafter referred to as "Project") whereby Alghanim is responsible for Pre-excavation, Site characterization, Compliance Monitoring, Final Environmental Impact Assessment (FEIA), Project Health Safety and Environmental Reviews PHSER 3, 4 and 5, Quantitative Risk Assessment (QRA), Lab Inspection Services, Ground Truthing, Performing HSE Studies, procurement, inspection, supply and transportation of all material and equipment to Site, screening and disposal of unexploded ordnance, excavation and transportation of oil contaminated soil to KOC landfill at South East & North Kuwait for permanent disposal, site preparation works for RTDP, of the one part.

Scope of Work

The work to be performed under this SERVICE CONTRACT includes but not limited to the following Environmental Consultancy services:

1. Performance of an initial assessment of the available information and data, including:
   - Review of the relevant Technical Specifications of the Contract Documents
   - Review of the existing previous investigation reports, including soil sampling results and previously estimated volumes and extent of types of contaminated waste to be excavated and perform a data gap analysis on these estimated volumes in order to develop sampling plans that will assist in refining and or confirming these estimates.
2. Assistance in preparation of Technical Report Submittals to PMC, Such as:
   - Soil Sampling plans
   - Soil sampling work Methodologies
   - Soil Characterization Reports with estimation of Volumes and extents of Wastes to be excavated
   - Ground Truthing work plans and reports
   - Soil Mixing Plan and work Methodologies
   - Soil Excavation Plan and Work Methodology
   - Post Excavation Soil Sampling Plan
   - Post Excavation Sampling Reports
3. Provide technical assistance in specific complex field activities such as for the preparation and implementation of Soil Mixing Plans, if needed.
4. Assist in the planning and the organization of the sequence of activities and in building a proper technical environmental team for the execution of the Two projects.
5. Assist Alghanim in building its technical capacity related to environmental matters for the proper execution of its two projects.

HSEIA EVIEW AND HAZOP & SIL STUDIES FOR B1 AND B2 PLANTS (CONTRACT NO 7500000397)

Client

Abu Dhabi Polymers Co. Ltd. (Borouge)

Location

Abu Dhabi, UAE

Date

May. '16 - May. '17

Project Description

Borouge operates a PolyEthylene (PE), PolyPropylene (PP) and various PolyOlefin production plants in Ruwais. To comply with ADNOC COP requirements for HSEIA, Borouge requires to have five (5) yearly review and validation of Phase –III HSEIA reports for Borouge 1&2 plants for further submission to ADNOC. Project scope also include 5 yearly PHA (Process Hazard Analysis including HAZOP and SIL) revalidation for B1 and B2 plants.

Scope of Work

- Phase 3 HSEIA Review and Reports for B1 and B2 plants including HAZ-ID/ENVID/OHID/ Workshops, Bowtie workshops, MOPO workshop, QRA Review, HSEMS Review, Hazard & Effect Register, EIA Report, OH Report, COMAH Report, Emergency Response Plan Review.
- HAZOP Review and revalidation workshops for B1 and B2 plants.
- SIL Review and revalidation for B1 plants.

PHASE 3 HSEIA STUDY FOR CARBON BLACK AND DELAYED COKER PROJECT (CBDC)

Client

Abu Dhabi Oil Refining (Takreer)

Location

Abu Dhabi, UAE

Date

Apr. '16 - Oct. '17

Project Description

Takreer is in the process of implementing the Carbon Black and Delayed Coker (CBDC) Project to manufacture UV Carbon Black, semi-conductive black and Calcined Coke utilizing the Slurry Oil from the Residue Fluidized Catalytic Cracker (RFCC) located in Ruwais Refinery West (RRW), the residue from the vacuum distillation unit in Ruwais Refinery East (RRE) and LPG from the RRW. The project comprises of new process facilities as well as existing process units that need to be revamped.

Project is currently in construction Phase and ELARD has been retained to develop Phase 3 HSEIA Study report for CBDC's operation stage. Phase-3 HSEIA Study is part of original contract with Takreer to conduct the Phase 2 HSEIA study as part of the Engineering, Procurement and Construction (EPC) Phase of the project and Phase 3 HSEIA study to cover the project operations phase.

Scope of Work

Phase 3 HSEIA Report for CBDC project including HAZID/ENVID/OHID/ Workshops, MOPO workshop, QRA update, air & noise modelling studies, OH Surveillance programs, EERA, HSEMS Review, Hazard & Effect Register, EIA Report, OH Report, COMAH Report, Emergency Response Plan update.

PHASE 1, 2 & 4 HSEIA STUDIES FOR GASCO BLACK POWDER MANAGEMENT – NEW SEPARATION AND FILTRATION PROJECT

Client

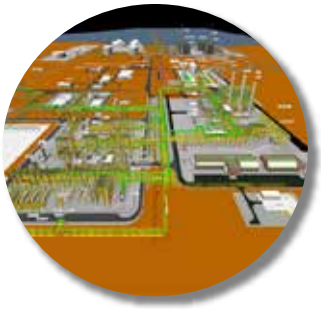
Al Hassan Engineering Co. Abu Dhabi LLC

Location

Abu Dhabi, UAE

Date

Dec. '14 - Nov. '16



Project Description

Black Powder Management – New Separation and Filtration, GASCO (Project No 5626) Project is initiated to address the issues related to black powder generation, a common phenomenon experienced by many gas pipeline operators, which is generally explained by internal walls corrosion spurred with the reaction of iron (Fe) in ferrous pipeline steel with moisture and other contaminants in the gas.

Project scope includes enhancement/ upgrade of separation and filtration systems, at five locations of GASCO, to improve black powder removal during normal operation and pigging to a level acceptable to the customers.

Scope of Work

- Phase 1& 2 HSEIA Report including HAZID/ENVID/OHID/ HAZOP Workshops, SIMOPS workshop, Construction Review, Fire & Gas detection studies, HSEMS Review, Hazard & Effect Register, EIA De-minimis Report, OH Deminimus Report, COMAH Report, Emergency Response Plan.
- Phase 4 Deminimus report.

ENVIRONMENTAL TRAINING AND COMPETENCY DEVELOPMENT PROGRAMS FOR ENOC

Client

Emirates National Oil Company Limited (ENOC) LLC

Location

Dubai, UAE

Date

Sep. '16 – Jan. '17

Project Description

ENOC is seeking to build the competency and capacity of its staff members in the different departments with respect to environmental studies and requirements in the context of UAE, Dubai in particular.

Scope of Work

- Preparation of workshop material, presentations and exercises
- Delivery of training workshops at ENOC
- Preparation of workshops' evaluation reports and completion certificates

The training topics covered were:

- Environmental Site Remediation & Reclamation
- Basic Environmental Social Impact Assessment (ESIA)
- Waste Management & Environmental Protection
- Environmental Benchmarking and Performance Indicators
- Environmental Baseline Study and Environmental Sampling Techniques
- Fundamentals of Air Dispersion Modeling

PHASE-1 HSEIA STUDY FOR MASTER PLAN AND INFRASTRUCTURE FACILITIES OF NEW RUWAIS CITY (WSO-7010-03)

Client

Abu Dhabi National Oil Company (ADNOC)

Location

Abu Dhabi, UAE

Date

Mar. '14 - Nov. '14

Project Description

ADNOC aims to develop Phase 1 HSEIA Report for the New Ruwais City, a full development project that consists of various types of accommodations and related public facilities. The project is in its early design stage.

Scope of Work

Review of proposed site layout and master plan in relation to the adjacent facilities (industrial and civil). HSE risks generated by the new housing project and affecting adjacent sites were identified and analyzed. Recommendations given in the HSEIA to control such risks in the project design.

STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) OF HYDROCARBON E&P ACTIVITIES IN OFFSHORE MONTENEGRO

Client

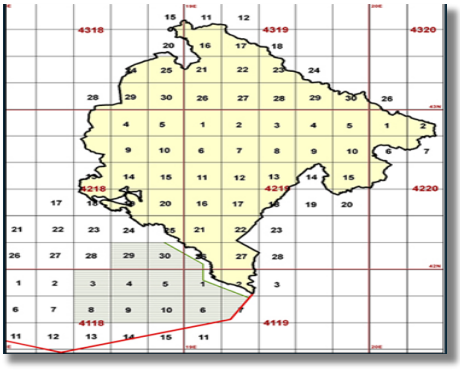
Ministry of Economy

Location

Montenegro

Date

Mar. '14 - Jun. '15



Project Description

The government of Montenegro is preparing itself to launch its first licensing round for offshore hydrocarbon exploration and production. As part of this process, a Strategic Environmental Assessment (SEA) is being prepared to ensure that environmental and socio-economic impacts are identified, assessed and mitigated at the earliest stages of E&P activities.

ELARD is undertaking the study in collaboration with local consultants. The SEA includes a scoping phase and an assessment phase, and is being conducted in a highly participatory manner. The SEA study shall result in the preparation of an Environmental and Social Management strategy, including mitigation and monitoring measures that should be implemented by future operators, contractors and the government, to ensure environmental and social impacts are properly managed. The outcomes of the SEA study will be included as part of the contract conditions for the future exploration and production licensees.

Scope of Work

- Preparation and delivery of an inception workshop
- Support to local team in data collection and development of an SEA framework of objectives, indicators and targets
- Preparation of a scoping report
- Analysis of alternatives
- Impact assessment
- Support in organization and delivery of public consultation sessions and public debate
- Support in preparation of the SEA report

WATER QUALITY SURVEY – HIGH PRIORITY SURVEYS FOR THE IRAQ COMMON SEAWATER SUPPLY PROJECT

Client

Petrolinvest / South Oil Company

Location

Basra, Iraq

Date

Jul. '14 – Dec. '15

Project Description

The project site is located in Khor Al Zubair, Basra where a seawater treatment facility will be erected to process water that will be supplied to the southern Iraqi oilfields. As part of the High Priority Surveys Project, ELARD was retained to execute a Water Quality Survey Program on the estuary located at the mouth of Shatt Al-Basra, at a location that is subject to extensive variation in water quality due to tidal fluctuation. The objective of the survey is to collect sufficient data for the design of the treatment plant. The Water Quality Survey Program entails the:

- Development of a Detailed Survey Execution Plan and Procedures, including field sampling and testing procedures, laboratory analytical testing methods and logistical approaches to collect and transport samples to the labs.
- Establishment of an environmental testing laboratory in Basra, led by a Water Quality Expert and a Senior Chemist, to analyse water samples for parameters with short holding times. The established custom-built laboratory uses Standard Methods and follows standard QA/QC procedures for analysis and reporting.
- Coordination with TestAmerica laboratories, USA for the periodic transport of water samples from Basra to Florida and the analysis of water samples.
- Development of an exhaustive and user-friendly results database.

Scope of Work

ELARD mobilized a team of 17 project staff in Basra to implement the following scope:

- Execution of an intensive surface water sampling program, every two hours for five days, twice per day over 30 days and once per week over one year, for a total of over 1500 samples.
- Analytical laboratory testing of collected water samples, for a suite of 37 analytes, out of which 15 parameters were analysed in the newly established ELARD Environmental Laboratory.
- Performance of specialized testing for coagulant demand, chlorine demand/decay and settleability.
- Collection and testing of bed sediment samples.

ENVIRONMENTAL IMPACT ANALYSIS FOR THE OFON PHASE 2 OFFSHORE PROJECT

Client

Apave International
Operator: TOTAL Nigeria

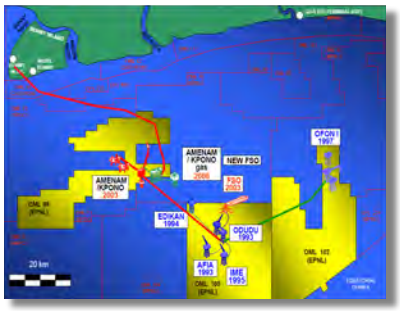
Contractor: SubSea7

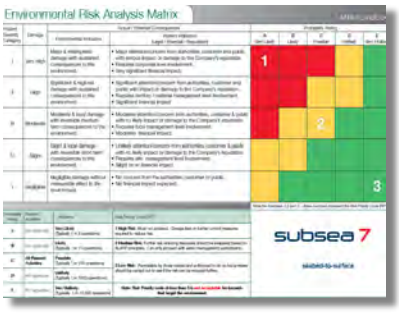
Location

Nigeria

Date

Mar. '13 - Dec. '13





Project Description

Subsea 7 has been contracted by TOTAL to perform the following activities for the OFON 2 project in Nigeria:

- Provision of three (3) installation vessels to conduct LBL array installation, crossing preparation, pre-commissioning works (hydrotest and drying), as-laid surveys, pipe laying activities, structures installation, metrology, risers installation, cable laying, spools installation, a drop object protection;
- Pipeline offshore pre-commissioning after pipeline laying operation and after expansion spools installation;
- On-shore fabrication activities including spools, risers, riser guard, risers clamps, and installation aids;
- On-shore pipeline coating (to be conducted by sub-contractor);
- Logistics and transportation activities.

Scope of Work

- Conduct Environmental Risk Assessment for the offshore and onshore activities to be conducted by Subsea 7 for OFON 2
- Prepare Environmental Risk Registers (ERRs) covering all offshore and onshore activities
- Organize and facilitate ERA workshops with TOTAL, Subsea7 and sub-contractors to review and finalize risk assessments
- Prepare risk assessment reports including finalized ERA registers

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR IRAQ EXPORT PIPELINE INFRASTRUCTURE

Client

Oil Projects Company (SCOP)

Location

Iraq

Date

Aug. '13 – Jul. '14

Project Description

The project consists of a crude oil export pipeline to transport oil produced in Basra to the Haditha area of Iraq. The pipeline will run parallel to the existing Iraq Strategic Pipeline and the alignment will comprise of five (5) pumping stations or above ground installations (AGI), namely PS1A to PS5A. The total length of the pipeline is 676 km. The initial pumping station (PS1A) comprises a large tank farm; the intermediate pumping stations (PS2A, PS3A, and PS4A) increase the pressure in the pipeline to support the flow. PS5A is the main junction storage and pumping area where crude oil is transferred to other pipeline systems.

Scope of Work

The EIA study will include the following:

- Identification of all applicable national Iraqi and international regulatory environmental requirements for the Project and all relevant public and private institutional Stakeholders for the development a Stakeholder Engagement Plan (consultation plan);
- Provision of a detailed description of the Project components, construction plan and processes of the planned land-based infrastructure, schedules and management, and refinery operation.
- Assessment of the existing environmental baseline conditions in the project area through performing the following:
  - Noise Monitoring campaign
  - Air Quality Monitoring for Gases and Chemicals of Potential Concern (COPC) associated with the oil refining sector
  - Subsurface soil, surface water and groundwater Sampling;
  - Ecological survey (covering the relevant terrestrial and aquatic receptors);
  - Socio-Economic Survey (covering the project affected population and communities and cultural sensitivities);
  - Public Consultation and Stakeholder Engagement Meetings; and
  - GIS Mapping.
- Modelling studies (air quality and noise)
- ESIA and ESMP reports

FLARE RADIATION MONITORING IN OFFSHORE FACILITIES IN AZERBAIJAN

Client

BP

Location

Azerbaijan

Date

Feb. '12 - Jun. '12

Project Description

Earth Link and Advanced Resources Development (ELARD) has been retained by BP Azerbaijan to conduct a flare radiation monitoring campaign at three (3) offshore platforms, to be used by BP to validate radiation modeling results.
The Monitoring program was established in order to measure the Flare Heat Flux levels; Wind Speed and Direction were also measured.
The Flare Heat Flux was monitored at Seven (7) monitoring stations at each platform and data was recorded and evaluated according to the BP standard practices.

Scope of Work

Flare Radiation Monitoring, Evaluation, and interpretation of the Heat Flux Levels at different monitoring locations within the workings areas boundaries to provide a representative description of the existing conditions in relation to Heat Flux at the platform, and its effect on Human Health Monitoring.at three (3) offshore platforms; East Azeri, Central Azeri, and West Azeri platforms.
Heat radiation was monitored at the three (3) offshore platforms.

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE MISSAN CRUDE OIL EXPORT PIPELINE (MOEP)

Client

Petrochina Company Limited, Iraq Branch

Location

Missan and Basra–Iraq

Date

Mar. '13 – Jun. '13

Project Description

The Project consists of a buried crude oil export pipeline to transport crude oil from Halfaya Oilfield in Missan to Fao Terminal Station in Basra. The pipeline should maintain throughput capacity of the entire pipeline at one million barrels per day.

The total length of the pipeline is 283 km (63 km in Missan and 220 km in Basra). Nine (9) km of the pipeline will have the diameter of 32□, while the rest of the pipeline will have the diameter of 42□.

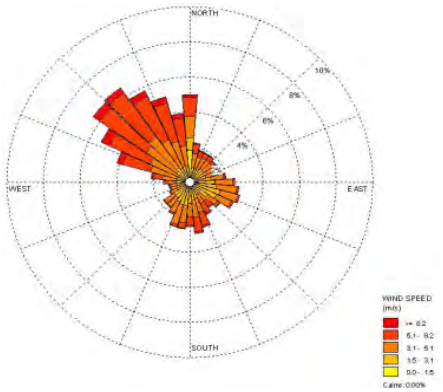
The Pipeline traverses areas of dried marshes within the Euphrates-Tigris River basin. In the vicinity of the proposed pipeline path are the Hawizeh Marshland and Central Marshes. The proposed pipeline path crosses the eastern edge of the Al-Hammar Marshland. It also crosses four major flowing water bodies: Tigris River, Euphrates River, Al-Massab Al-Aam Canal and Basra Canal, and many streams, irrigation canals and drainage canals.

Scope of Work

- A description and analysis of the Iraqi regulations that the Project's design, construction and operation should comply with;
- A description of the pipeline Project and an analysis of alternatives;
- A thorough description of the environment along the proposed pipeline route with information collected from available documents, and primary data collected through extensive field surveys that included soil, groundwater, surface water, noise and air quality sampling campaigns;
- An identification and assessment of the potential impacts that could arise from the Project's interaction with the environmental and socio-economic components;
- An Environmental and Social Management and Monitoring Plan (ESMMP), which describes the measures that should be taken by different Project entities during the Construction and Operation phases;
- The preparation of a Solid Waste Management Plan;
- The preparation of a Water Body Crossings Management Plan;
- The preparation of a Site Restoration Plan; and
- The preparation of a Oil Spill Contingency Plan.

PHASE 2 AND 3 HSEIA STUDY FOR CARBON BLACK AND DELAYED COKER PROJECT (CBDC)

Client	Location
TAKREER	Abu Dhabi, UAE
EPC	**Date**
Samsung Engineering	Oct. '12 – Dec. '15



Project Description

Takreer intends to implement the Carbon Black and Delayed Coker (CBDC) Project to manufacture UV Carbon Black, semi-conductive black and Calcined Coke utilizing the Slurry Oil from the Residue Fluidized Catalytic Cracker (RFCC) to be installed as part of the on-going Ruwais Refinery Expansion (RRE) Project, the residue from the vacuum distillation unit in existing Ruwais Refinery (RRD) and LPG from the RRE. The project comprises of new process facilities as well as existing process units that need to be revamped.

A Phase 1 HSEIA study has been prepared as part of the Front End Engineering Design (FEED) phase of the project. Takreer awarded ELARD to conduct the Phase 2 HSEIA study as part of the Engineering, Procurement and Construction (EPC) Phase of the project as well as the Phase 3 HSEIA study to cover the project operations phase.

Scope of Work

The Preparation of Phase 2 HSEIA study for the EPC phase is divided into 2 stages;

- Stage one (1) categorized by the Phase 2 Early Works/Construction and which includes:
  - Baseline studies comprising of air and noise quality, soil and groundwater, and overall environmental Baseline Study.
  - HAZID/ENVID/OHID workshops

  H&E Registers

  Phase 2 Early Works/Construction HSEIA study
- Stage two (2) categorized by the Phase 2 Detailed Design includes;
  - HAZID/ENVID/OHID workshops
  - H&E Registers
  - HSE Studies (3D fire and gas mapping, dropped object study, EERA, ESSA, dust explosion analysis, air quality modeling, noise modeling, dredging plume dispersion modeling)
  - Phase 2 HSEIA Study
- Preparation of Phase 3 HSEIA for the operations phase of the project.
- Review, verification, and endorsement of EPC contractor HSE plans, studies and procedures.

ENVIRONMENTAL RISK ASSESSMENT FOR ORYX GAS TO LIQUID PLANT – RAS LAFFAN – QATAR

Client

Monaco Engineering Solutions (MES)
Oryx GTL

Location

Ras Laffan - Qatar

Date

2011 - 2013

Project Description

ELARD is supporting MES in a 3-year call-off contract to provide health, safety and environmental services to Oryx Gas-to-Liquid facilities in Ras Laffan, Qatar. ELARD's scope is related to the environmental services. ELARD has supported Oryx teams to update their environmental risk assessment registers for all units at their facility. ELARD's scope also include quantitative environmental risk assessment and general environmental support as required by Oryx.

Scope of Work

- Updating the environmental risk assessment procedure
- Training to Oryx staff on environmental risk assessment
- Updating of the environmental risk assessment registers for all units of Oryx GTL (3-week workshops at Oryx facilities)
- Updating environmental objectives and targets for Oryx
- Quantitative environmental risk assessment
- Call-off environmental support

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE FRONT-END ENGINEERING AND DESIGN (FEED) STAGE OF A GRASSROOTS OIL REFINERY, NASSIRIYA - IRAQ

ELARD

Client	Location
State Company for Oil Projects (SCOP)	Nassiriya, Iraq
FEED Engineer	**Date**
Foster Wheeler, UK	Aug. '11 – Nov. '12

Project Description

Despite having the fourth largest oil reserves worldwide (estimated at 115 billion barrels) after Saudi Arabia, Iran and Canada, Iraq is in short supply of refined crude products and its hydrocarbon infrastructure is in need of reconstruction, upgrading and investment.

The central importance of oil and gas revenue for the Iraqi economy is widely recognized by Iraqis, and most groups accept the need to create new legal and policy guidelines for the development of the country's oil and natural gas. Iraq produces about 2.9 million barrels per day (bpd) and exports about 2.2 million bpd of oil. It imports most of its fuel for transportation, heating and cooking purposes and exports about.

In an effort to increase its production and exports, Iraq's State Company for Oil Projects (SCOP), defined as the engineering arm of the Ministry of Oil, has awarded Foster Wheeler (UK) the Front-End Engineering and Design (FEED) contract for the construction of a new refinery in Nassiriya located 200 km from Basra in Southern Iraq.

Having an extensive experience and recognized expertise in the coordination and preparation of large, multi-discipline ESIAs to satisfy a variety of regulatory and industry requirements, often within challenging schedules, ELARD was solicited by SCOP to provide consultancy services for conducting an Environmental and Social Impact Assessment (ESIA) for the construction and operation of the grassroots Nassiriya Refinery, situated in Iraq.

Scope of Work

This ESIA study is being undertaken during the FEED stage of the proposed Nassiriya refinery project (300,000 BPSD) aiming at identifying the key environmental issues at the conceptual design phase by means of a "first emissions" assessment (i.e. atmospheric, inland, etc.), an "alternative designs and process" investigation and an independent environmental and social impact assessment.
The objective is to provide environmental information to the engineering team at a very early stage of the basic engineering process for a successful integration of the Best Available Technologies (BAT) and control measures to maximize the Project's environmental performance.
The results of the ESIA study are intended to be subsequently used during the Detailed Engineering, Procurement and Construction (EPC) stage of the project.
The ESIA study involves the following:

- Identification of all applicable national Iraqi and international regulatory environmental requirements for the Project and all relevant public and private institutional Stakeholders for the development a Stakeholder Engagement Plan (consultation plan);

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE FRONT-END ENGINEERING AND DESIGN (FEED) STAGE OF A GRASSROOTS OIL REFINERY, NASSIRIYA - IRAQ

ELARD

Scope of Work

- Provision of a detailed description of the Project components, construction plan and processes of the planned land-based infrastructure, schedules and management, and refinery operation.
- Assessment of the existing environmental baseline conditions in the project area through performing the following:
  1. Air Quality Monitoring campaign;
  2. Noise Monitoring campaign;
  3. Subsurface soil, surface water and groundwater Sampling;
  4. Ecological survey (covering the relevant terrestrial and aquatic receptors);
  5. Socio-Economic Survey (covering the project affected population and communities and cultural sensitivities);
  6. Traffic monitoring campaign;
  7. Archaeology and culture survey;
  8. Public Consultation and Stakeholder Engagement Meetings; and
  9. GIS Mapping.
- Air Quality Technical Study (Emissions Inventory and Dispersion and Deposition Modeling and Impact Assessment);
- Sound Quality Technical Study (Noise Modeling and Impact Assessment).
- Wastewater discharge modeling study.

Surveys and sampling campaigns are carried out in line with International Guidelines and Standards such as those set by the World Bank's IFC Equator Principles and Performance Standards.

- Identification of the nature and extent of any potentially significant environmental and social impacts be they positive (beneficial) or negative (adverse), temporary or long term, including routine, non-routine (planned) operations and unplanned (accidental) events.
- Performance of a Best Available Technologies (BAT) Analysis to identify alternatives considered for potential control technologies and techniques
- Development of a tailored, practical and cost-effective Environmental and Social Management Plan (ESMP) that assures the Project's compliance with national regulations, Contract Terms and HSE requirements and international guidelines and Codes of Best Practices. The ESMP includes a list of mitigation measures, monitoring activities, procedures and protocols to be adopted by the Foster Wheeler and Sub-Contractors during the Construction and Operation phase to minimize the risk of contaminating the local and global environment.

The FEED stage is properly guided and informed by the ESIA process to ensure the negative environmental impacts from the project are minimized and positive impacts are maximized, to the extent possible.

ENVIRONMENTAL IMPACT ASSESSMENT STUDY OF THE ARAB GAS PIPELINE (AGP) PROJECT, SYRIA

Client

IPA Water + Energy Consulting Ltd. & Euro-Arab Gas Mashreq Co-operation Center (EAMGCC)

Location

Aleppo, Hama & Homs Governorates, Syrian Arab Republic

Date

Feb. '08 – Mar. '09

Project Description

Syrian authorities have acquired interest in laying the gas feeding line in its territories enabling the country to receive great royalties and a steady supply of gas which will enable it to depend more on natural gas for internal use and for power generation particularly in response with Syria's growing demand for power generation paralleled with the depletion of its local oil reserves. This project is expected to benefit Syria at a time when the market and demand for gas is anticipated to grow rapidly in the next decades.

In order to characterize the physical, biological socio economic and archeological baseline conditions, ELARD conducted extensive desk studies, field surveys, consultation meetings, satellite imagery processing, desk research, soil and ground water sampling, air quality and noise level monitoring. Sampling and measurement results were conducted in renowned international laboratory. Based on a detailed project activity description, the potential types of impacts were identified based on identified sensitive receptors location, contaminants migratory pathways and proximity to project development sites.

Potential sources, impacts, and accidental hazards from construction, commissioning and project handover activities were assessed. ELARD proposed a waste management plan for solid and liquid by-products as well as recommendations including oil spill response plan, good housekeeping practices, base camp locations, and a management of hazardous

Scope of Work

Detailed environmental baseline description (Soil, Geology, Hydrogeology, Floral and faunal Biodiversity, Ambient Noise Level, Ambient Air Quality, Archeology & Cultural Heritage, Socio-Economy and Intersections with key Environmental Sensitivities) covering a Study Area extending along a distance of 60 km for phase 1 and 185 km for phase 2.

Investigation, description and documentation of the geographical and temporal extent of the potential adverse as well as beneficial impacts from the AGP project on the local and national environments.

Public participation / consultation to:

- Document and evaluate potential environmental and socio-economic concerns;
- Receive and discuss the public's recommendations / alternatives to mitigate possible impacts;

Detailed mitigation and monitoring plan including oil spill response plan, analysis of alternatives, occupational safety & health plan, etc...

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE FRONT-END ENGINEERING AND DESIGN (FEED) STAGE OF A GRASSROOTS OIL REFINERY, KARBALA - IRAQ

Client	Location
Technip SpA, Italy	Karbala, Iraq
Executing Agent	**Date**
State Company for Oil Projects (SCOP)	Oct. '09 – Sep. '10

PROJECT PROPONENT

ELARD (Leading) and Stantec (previously known as Jacques Whitford Stantec Limited (JWSL))

Scope of Work

This EIA study is being undertaken during the FEED stage of the proposed Karbala refinery project aiming at identifying the key environmental issues at the conceptual design phase by means of a "first emissions" assessment (i.e. atmospheric, inland, etc.), a "alternative designs and process" investigation and an independent environmental and social impact assessment.

The objective is to provide environmental information to the engineering team at a very early stage of the basic engineering process for a successful integration of the Best Available Technologies (BAT) and control measures to ensure the Project's environmental performance.

The results of the EIA study are intended to be subsequently used during the Detailed Engineering, Procurement and Construction (EPC) stage of the project.

The EIA study involves the following:

- Identification of all applicable national Iraqi and international regulatory environmental requirements for the Project and all relevant public and private institutional Stakeholders for the development a Stakeholder Engagement Plan (consultation plan);
- Provision of a detailed description of the Project components, construction plan and processes of the planned land-based infrastructure, schedules and management, and refinery operation.
- Assessment of the existing environmental baseline conditions in the project area through performing the following:
  1. Noise Monitoring campaign
  2. Air Quality Monitoring for Gases and Chemicals of Potential Concern (COPC) associated with the oil refining sector
  3. Subsurface soil, surface water and groundwater Sampling;
  4. Ecological survey (covering the relevant terrestrial and aquatic receptors);
  5. Socio-Economic Survey (covering the project affected population and communities and cultural sensitivities);
  6. Public Consultation and Stakeholder Engagement Meetings; and
  7. GIS Mapping.

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE FRONT-END ENGINEERING AND DESIGN (FEED) STAGE OF A GRASSROOTS OIL REFINERY, KARBALA - IRAQ

Scope of Work

- Air Quality Technical Study (Emissions Inventory and Dispersion and Deposition Modelling and Impact Assessment); and
- Sound Quality Technical Study (Noise Modeling and Impact Assessment).

Surveys and sampling campaigns are carried out in line with International Guidelines and Standards such as those set by the World Bank's IFC Equator Principles and Performance Standards.

- Identify the nature and extent of any potentially significant environmental and social impacts be they positive (beneficial) or negative (adverse), temporary or long term, including routine, non-routine (planned) operations and unplanned (accidental) events through Air Dispersion Modeling and Noise Impact assessment, Water and Waste-water Management and Waste Management among other.
- Performance of a Best Available Technologies (BAT) Analysis to identify alternatives considered for potential control technologies and techniques
- Development of a tailored, practical and cost-effective Environmental and Social Management Plan (ESMP) that assures the Project's compliance with national regulations, Contract Terms and HSE requirements and international guidelines and Codes of Best Practices. The ESMP shall include a list of mitigation measures, monitoring activities, procedures and protocols to be adopted by the Technip and Sub-Contractors during the Construction and Operation phase to minimize the risk of contaminating the local and global environment.

The FEED stage should be properly guided and informed by the EIA process to ensure the negative environmental impacts from the project are minimized and positive impacts are maximized, to the extent possible.

Project Description

Despite having the third-largest oil reserves worldwide (estimated at 115 billion barrels) after Saudi Arabia and Canada, Iraq is in short supply of refined crude products and its hydrocarbon infrastructure is in need of reconstruction, upgrading and investment.

The central importance of oil and gas revenue for the Iraqi economy is widely recognized by Iraqis, and most groups accept the need to create new legal and policy guidelines for the development of the country's oil and natural gas. Iraq produces about 2 million barrels per day (bpd) and exports about 1.6 million bpd of oil. It imports most of its fuel for transportation, heating and cooking purposes and exports about.

In an effort to increase its production and exports, Iraq's State Company for Oil Projects (SCOP), defined as the engineering arm of the Ministry of Oil, has awarded France's Technip over $ 20 million (USD 25.2million) for the Front-End Engineering and Design (FEED) contract for the construction of a new refinery in Karbala located 110 km south-west of Baghdad.

Having an extensive experience and recognized expertise in the coordination and preparation of large, multi-discipline EIAs to satisfy a variety of regulatory and industry requirements, often within challenging schedules, ELARD in association with Stantec (previously Jacques Whitford Stantec Limited (JWSL)) were solicited by Technip, Italy to provide consultancy services for conducting an Environmental Impact Assessment (EIA) for the construction and operation of the grassroots Karbala Refinery, situated in Iraq.

PROVISION OF SUPPORT RELATED TO GREEN HOUSE GAS MANAGEMENT

Client

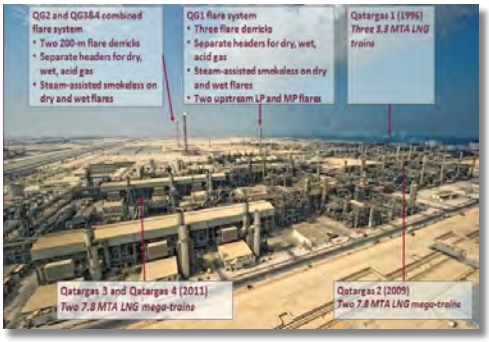
Qatargas

Location

Qatar

Date

2012



Project Description

Qatargas has solicited ELARD for the support in developing technical papers and materials related to greenhouse gases emissions and its energy management system to be used for dissemination to the wider audience in events such as COP 18.

ELARD's work supported Qatargas' in its on-going GHG and energy management programme.

QG programme is divided into three phases:

Phase 1 :

- Understanding the GHG issue, its context and implications and developing a GHG management position.
- Analyzing the potential impact of climate change on Qatargas' operations and reviewing opportunities to reduce GHG emissions.

Phase 2:

- Preparing procedures, manuals and detailed externally verified emissions inventories of all Qatargas facilities (LNG Trains, Laffan Refinery, RLTO) – covering Scope 1, 2 and 3 emissions.
- Benchmarking / establishing key performance indicators.

Phase 3 (in progress):

- Ongoing flare reduction, JBOG project.
- Assessing carbon reduction opportunities and abatement techniques via sustainability assessment and engineering studies including Life Cycle Assessment.

Scope of Work

- Develop technical papers related to Qatargas Green House (GHG) Management Program:
  - GHG management strategy
  - Flare management and reduction strategy
  - JBOG project
  - Carbon capture and delivery
- Evaluate Qatargas GHG emissions/intensity with standards and other peer companies in the region.
- Preparation of materials to be used at Conference of the Parties and for dissemination purposes

ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENTAL SITE ASSESSMENT FOR CAMERON NEW AFTERMARKET BASE BASRA, IRAQ

Client

CAMERON

Location

Basra, Iraq

Date

Feb.' 12 - Jun. '12

Project Description

The Project shall be located in Al Basra, south of Iraq with a surface area of about 40,000 m^2 , out of which 2,900 m^2 are dedicated for workshop offices. It will be an aftermarket base with special security features to support Cameron's operations in Iraq.
The aftermarket base activities shall consist of field services support, maintenance operations, equipment storage, assembly and testing preventive maintenance of well heads and other operations.

Scope of Work

- The preparation of the Environmental Impact Assessment study for Cameron camp in Iraq, the scope of work for the EIA study included:
  - Identifying all applicable national (Iraqi) and international regulatory environmental requirements for the Project;
  - Describing the existing environmental and socio-economic conditions prevailing at the site in the surrounding area before the start of the construction activities;
  - Describing the Project characteristics which may impact the environment;
  - Analysis of different Project alternatives,
  - Identifying and assess the impacts (both positive and negative) of the Project on the existing environment that will occur during construction and operation;
  - Identifying appropriate mitigation measures and evaluate project alternatives that might reduce environmental impact; and
  - Summarizing the control measures and monitoring programs that shall be implemented to comply with the Iraqi Government and/or international standards.
- Conducting a Phase 1 Environmental Site Assessment, the assessment was prepared in general accordance with (ASTM) Standard Practices for Environmental Site Assessments: Phase 1 ESA Process (ASTM Designation: E1527-2005). The purpose of the Phase 1 ESA was to identify any potential sources of environmental risk or liability on the subject property. This assessment included a Site reconnaissance as well as research and interviews with Cameron and a Government Official from the South Oil Company (SOC), the owner of the land.
- Conducting a Phase 2 Environmental Site Assessment, the objective of this Phase II ESA was to validate the results of the Phase I ESA conducted earlier by ELARD that revealed evidences of possible recognized environmental conditions (RECs) associated with the subject property, the Phase I ESA recommended a Phase II ESA to be conducted. The Phase II ESA was conducted in general accordance with the American Society of Testing and Materials (ASTM) Standard Practices for Environmental Site Assessments: Phase II ESA Process (ASTM Designation: E1903-97). The assessment included the collection of Ten soil samples (in addition to two quality control/ quality assurance (QA/QC) samples, one sample as a field blank and one sample as a duplicate), and three groundwater samples from wells drilled for the sampling purposes (in addition to two samples as part of the QA/QC procedure). The samples were sent for analysis to Analytico laboratories in Holland.

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT FOR DEZGAS PLANT & THE UPGRADING FACILITIES

Client

TOTAL E&P SYRIE

Location

Der Ezzor, Syrian Arab Republic

Date

February 2012

Project Description

TOTAL E&P SYRIE, started its operations in December 1988 on the Der Ezzor permit where it signed a Production Built under a BOT contract (Build, Operate, Transfer) – the gas plant was handed over successfully to the Syrian Gas Company on 31st December 2005. Personnel of the Syrian Gas Company were trained to carry out all the operations on the Plant. A Technical Services Agreement between SGC and TEP Syrie has been in effect since 1st January, 2006. TEP Syrie is proposing several modifications to the existing gas plant in addition to the installation of pipelines and a trunkline.

Scope of Work

- Identify all applicable Syrian national legislation, policies, standards and corporate requirements;
- Provide a detailed description of the Project previous and proposed activities;
- Describe the existing environmental baseline conditions of the Study Area covering the physical, ecological, socio-economic, and cultural elements likely to be affected by the proposed drilling activity and its associated operations and/or likely to cause adverse impacts upon the Project, including both natural and man-made environments. The baseline description included soil, groundwater, noise and air quality sampling campaign;
- Identify and assess the potential impacts on environmental, archaeological, cultural and social resources and receptors associated with the Project;
- Identify and evaluate appropriate mitigation measures for these impacts; and

SUPPORT IN THE ENVIRONMENTAL BASELINE SURVEYS (EBS) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR CRUDE OIL PIPELINE IN MISSAN OILFIELDS, FROM BUZURGAN TO HALFAYA, IN THE REPUBLIC OF IRAQ

Client

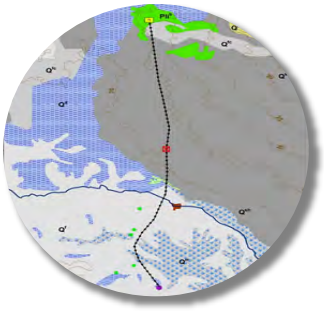
Bureau Veritas Abu Dhabi

Location

Missan–Iraq

Date

Feb. '13 – May '13



Project Description

The crude oil pipeline located in Missan Governorate starts from the outlet of the custody meter skid of Buzurgan CPF at Buzurgan Initial Pump Station and terminates at the Junction Point near Halfaya Oilfield.
The 53 km long pipeline has a diameter of 32". Designed maximum crude oil transportation rate is 450,000 barrels a day.

Scope of Work

- Description of the geology, soil, groundwater, surface water, socioeconomics, cultural heritage and archaeology baseline environment along the proposed pipeline route.
  Secondary data were collected from available documents, and primary data were collected through extensive field surveys that included the collection and analysis of soil, groundwater and surface water samples.
- Conducting noise and air quality sampling campaigns.
- An identification and assessment of the potential impacts that could arise from the project's interaction with the soil, groundwater, surface water, cultural heritage and archaeology and socio-economic components.
- The Environmental and Social Management Plan (ESMP) for the following environmental components: soil, groundwater, surface water, socioeconomics, and cultural heritage and archaeology.

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE JIEH AND ZOUK POWERSHIPS PROJECT

Client

Karadeniz Energy Group

Location

Jieh, Mount Lebanon
Zouk, Mount Lebanon

Date

Aug. '12 - Nov. '12

Project Description

ELARD conducted an Environmental Impact Assessment (EIA) for the Jieh and Zouk Powerships Project on behalf of Karadeniz energy group. The EIA aimed to identify and assess possible impacts resulting from the Project and to propose measures to minimize the significance of negative impacts and maximize the benefits of positive ones.

The consultants provided an assessment of a conservative concentration for the ambient concentrations of air pollutants. A total of five (5) scenarios per site were assessed depending on factors including: (1) stack heights, (2) operation load, (3) fuel quality, and (4) control measures. Background noise was monitored in accordance with internationally approved methodologies. The noise modeling software package, SoundPLAN, was used to predict noise levels from the proposed power ships. A marine biologist dived at the Study Area to collect sediment samples and at the same time document ecological status of the benthic area that is likely to be affected by the project. Sediment samples were analyzed for metals, VOCs, PCB, TPH, PAHs, pH, clay content, and organic matter content.

Scope of Work

- Modeling of ambient concentration of air pollutants likely to be emitted from the proposed power ships
- Baseline noise monitoring and prediction of noise levels from the proposed power ships
- Marine sediment samples collection and documentation of the ecological status of the benthic area at the project site
- Assessment of the impacts of the proposed power ships on the environment
- Development of an environmental management plan
- Analysis of Alternatives for mooring, dredging, wave break protection options, cooling water discharge and stack height options.

ENVIRONMENTAL, SOCIAL AND HEALTH IMPACT ASSESSMENT STUDY FOR THE DRILLING OF FOUR EXPLORATION WELLS IN SHELL SOUTH SYRIA EXPLORATION LTD (SSEL) BLOCKS XIII AND XV, SYRIA

Client

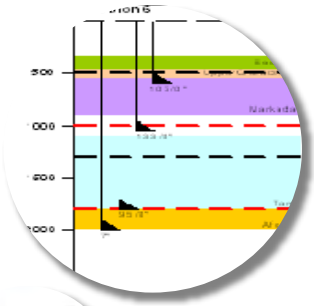
Shell, Syria (SSEL) Al Furat
Petroleum Company (AFPC)

Location

Ammouriya & Ouzeina Licebse Areas
Deir Ez Zor, Governorate, Syria

Date

Dec. '08 – May '09



Project Description

Following its renewal of the Production Sharing Contracts (PSCs) with the Syrian Government, Shell South Syria Exploration Ltd. (SSEL) has been given exclusive rights for hydrocarbon exploration, prospecting and development of Block XIII (13) and Block XV (15) equating to a total surface area of 14, 000 km^2 in the Southern Platform of Syria
The contract includes the drilling of four new exploration wells; two in each of the development blocks.
This Environmental, Social and Health Impact Assessment (ESHIA) aims at assessing the impacts that might result from drilling activities related to the exploration wells, proposing measures to minimize the negative impacts and maximize the positive ones.

Following a detailed characterization of the baseline conditions in terms of geology, hydrogeology, water quality, fauna and flora and socio-economic aspect, in the four Study Areas, the impact on the environment was evaluated based on criterion established by the World Bank for environmental screening. An Environmental Management Plan (EMP) was prepared to minimize and control the possible impact of the project on the surrounding environment.
The Due Diligence Study aims at assessing and documenting any evidence of environmental pollution around four (4) abandoned well sites located within the License Areas of Blocks XIII and XV.

Scope of Work

- Review of existing national and international legislation;
- Description of the physical and biological environment as well as the archeological and socio economical context;
- Potential Impact identification and Evaluation;
- Propose measures that help mitigate or reduce the potential identified impacts; and
- Environmental Management Plan (including mitigation and monitoring plan);

Investigate compliance of AFPC with national and international guidelines and standards as well as Shell Policies; and Quality Standards and Requirements;

- Due Diligence Study for four abandoned expliration wells.

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT OIL AND GAS EXPLORATION ACTIVITIES OF PETRO CANADA SYRIA IN BLOCK II IN DER EZZOR GOVERNORATE

Client

Petro Canada Syria, A Suncor Energy Business

Location

Der Ezzor, Syrian Arab Republic

Date

January 2012

Project Description

Petro-Canada NANE Ventures B.V has started exploratory activities since February 2004 in Block II which is located in the north eastern part of Syria in Alhasakeh and Der Ezzor governorates.

Petro Canada Syria has previously conducted many seismic surveys in Block II, and drilled three (3) exploratory wells. In the framework of oil and gas exploration, Petro Canada is planning to conduct a 2D seismic survey in Block II, the part located in Der Ezzor governorate, and depending on the results of the seismic survey two exploratory wells will be drilled.

The scope of the ESIA study covered all previous and planned exploration activities of Petro Canada in Block II within Der Ezzor governorate. As Petro Canada Syria suspended its activities in Syria in 2011 before deciding the locations of the new two proposed oil wells, a draft version of the ESIA report was submitted to PC, the final version will be submitted once the missing data becomes available.

Scope of Work

- Identify all applicable Syrian national legislation, policies, standards and corporate requirements;
- Provide a detailed description of all Project activities including the seismic and drilling works.
- Describe the existing environmental baseline conditions of the Study Area covering the physical, ecological, socio-economic, and cultural elements likely to be affected by the proposed drilling and seismic activities and its associated operations and/or likely to cause adverse impacts upon the Project, including both natural and man-made environments; the environmental baseline description included collecting soil and water samples from the Project Area.
- Identify and assess the potential impacts on environmental, archaeological, cultural and social resources and receptors associated with the Project;
- Identify and evaluate appropriate mitigation measures for these impacts and propose monitoring programs.

ENVIRONMENTAL IMPACT ASSESSMENT & RISK ASSESSMENT FOR OIL STORAGE TERMINAL – HAMRIYAH FREE ZONE, SHARJAH, UAE

Client	Location
Al Arabia Petroleum	Hamriyah Free Zone,
Executing Agent	**Date**
Al Arabia Petroleum Processes FZCO	Feb. '09 – Apr. '09

Project Description

Al Arabia Petroleum Processes FZCO proposed to set up an Oil Storage terminal facility to store and supply the MDO and Diesel Oil to meet the demand in the market. Two MDO tanks of 500 m^3 capacity each and one Diesel oil tank of 1000 m^3 capacity will be set up. MDO and Diesel oil will be loaded and unloaded by trucks.

ELARD prepared a comprehensive environmental assessment report identifying key impacts and mitigation measures to ensure that impacts would be acceptable to surrounding population and the environment.

ELARD also prepared a risk assessment matrix identifying the key hazards involved in each operation and precautionary measures to control the identified hazards.

Scope of Work

- Legal and institutional frameworks
- Comprehensive environmental baseline survey
- Impact scoping and assessment
- Development of an Environmental Management Plan
- Risk Assessment

GAS TREATMENT PLANT AUDIT - WATER, WASTE WATER, NOISE AND AIR MEASUREMENTS

Client

PETROFAC J1-191

Location

Homs - Palmyra, Syrian Arab Republic

Date

Jul. '11 – May '12

Project Description

Earth Link and Advanced Resources Development (ELARD) prepared an Audit report for the Gas Treatment Plant owned by Hayan Petroleum Company, which includes the results of the sampling campaign for the water, wastewater, noise quality and air emissions and quality measurement within the Gas Treatment Plant.

The objective of the this Audit is to assess the noise, industrial water and waste water quality within the gas plant and the air measurements at source (flare stack) and for the ambient air measurements, and compare it with Syrian standards.

Scope of Work

- Measurement of the emitted gases from the flare stack
- Measurement of the noise levels
- Measurement for the waste water discharged through the general sewage network
- Measurement of the quality of produced water discharged through open streams
- Measurement of the quality of indoor air in the work area

ENVIRONMENTAL IMPACT ASSESSMENT FOR 2D VIBROSEIS ACQUISITION & 2D/3D TESTS IN ASH SHAER DEVELOPMENT AREA-EBLA GAS PROJECT, PALMYRA, SYRIA

Client

Petro-Canada Ltd

Location

Homs Governorate,
Syrian Arab Republic

Date

Jan. '07 – Jul. '07

Project Description

Petro-Canada has acquired interest in the Ash Shaer Development Area within the Palmyra Block, Central Syria, with an intention to execute a field development program. The scope of the proposed seismic acquisition program is to acquire ca. 118.6 km of 2D Vibroseis and 10 km^2 of 2D/3D acquisition tests and Vertical Seismic Profiling or VSP's in existing oil/gas wells.

Petro-Canada has commissioned ELARD, to undertake an Environmental Impact Assessment (EIA) for executing the project covering impacts associated with the use of 5 Vibroseis trucks, dynamite use, workers influx, base camp construction/operation, off-road traffic management, waste management and safety issues.

This Environmental Impact Assessment (EIA) aims at assessing the impacts of the project activities following criterion and standards set by the International Association of Geophysical Contractors (IAGC), International Association of Oil and Gas Producers (OGP), and Syrian authority. The detailed study of the site environment revealed sensitive several archeological sites, feeding area for endangered bird species and major grazing land use activities by local Bedouins. Several consultation meetings with different interested parties (ministries, local authority, local community, international bird conservation bodies) were held; moreover a constructive discussion was established concerning the identified archaeological sites and rare bird species protection during project activities.

ELARD proposed an Environmental Management Plan (EMP) which includes a mitigation plan to minimize the likelihood and significance of possible impacts and monitoring program for the vibration, noise, compaction, emissions and protection of archaeological sites and bird feeding area with parameters to be monitored, frequency, locations and methods. In addition, a bilingual awareness archaeological brochure was developed to assist contractor crew in identifying, documenting and reporting procedure to local authority.

Scope of Work

- Detailed project description of the seismic acquisition program;
- Detailed description of the environment (Physiography, Meteorological, Soil, Geology, Hydrogeology, Biodiversity, Noise, Air Quality, Archaeology and Socio-Economy) covering the 820 km^2 Study Area;
- Prediction and evaluation of the environmental and social Impacts of the Project;
- Development of an Environmental Management Plan (EMP) to mitigate the potential impacts and Monitor Project Activities.

HEALTH, SAFETY AND ENVIRONMENTAL IMPACT ASSESSMENT OF THE INTER-REFINERIES PIPELINE PROJECT – UAE

Client	Location
Abu Dhabi Oil Refining	UAE
Executing Agent	**Date**
Bureau Veritas – Abu Dhabi	Dec. '05 – Apr. '06

Project Description

ELARD supported Bureau Veritas-Abu Dhabi in preparing the Phase II HSEIA for the inter-refineries pipeline project. The Abu Dhabi Oil Refining Company, TAKREER was established in 1999 as a public joint-stock company to take over the responsibility of refining operations previously undertaken by the Abu Dhabi National Oil Company (ADNOC). TAKREER is now operating two refineries in Sas Al Nakhl and Ruwais. Currently, the transportation of intermediate products between these two refineries is being done through shipping these products in tankers. New development projects are now being executed at both refineries, which require by the end of the year 2007 that additional volumes of intermediate and finished products be transported between these Refineries and their corresponding distribution depots which are located at Mussafah, Abu Dhabi International Airport (ADIA) and Al Ain. In order to cater for this additional demand, it is proposed to interconnect the refineries and the distribution depots with a network of pipelines under the Inter Refineries Pipelines (IRP) Project, the topic of this EIA study. The projects consists of the construction of multi-products pipelines more than 200 km-long as well as new pipeline terminals, among other facilities.

ELARD and BV prepared a comprehensive environmental assessment report identifying key impacts and mitigation measures to ensure that impacts would be acceptable to surrounding population and the environment.

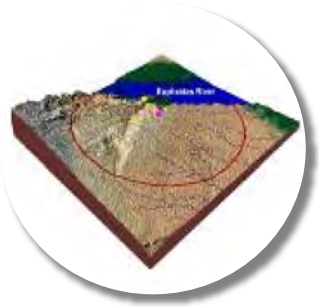
Scope of Work

- Review of legal and institutional frameworks
- Review of Environmental Baseline data
- Impact scoping and assessment
- Analysis of alternatives
- Development of an Environmental Management Plan

POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK & ENVIRONMENTAL BASELINE STUDY FOR DEIR AZZOUR CCPP (COMBINED CYCLE POWER PLANT)

Client

SOCOIN



Location

Der Ezzor, Syrian Arab Republic

Date

July 2011

Project Description

The Der Ezzor Combined Cycled Power Plant will be located more than 10 Km away from Der Ezzor city (Syria). The project involves the construction of one block 750MWe gas-fired as main fuel and distillated oil as back up.

The Power Plant will consist of two Gas Turbines (250 MWe at ISO conditions at generator terminal), two HRSG and one team turbine (250 MWe). The cooling of the steam turbine condenser is done with dry, natural cooling towers.

The project will include the construction of an approximately 25 Km water pipeline that will provide the water intake from the Euphrates River to the Power Plant.

Scope of Work

- Identify all applicable national (Syrian) and international (World Band and EIB) legislation, policies, standards and corporate requirements;
- Describe the existing environmental baseline conditions of the Study Area covering the physical, ecological, socio-economic, and cultural elements likely to be affected by the proposed Project and its associated operations and/or likely to cause adverse impacts upon the Project, including both natural and man-made environments.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY OF THE SECURITY PERIMETER FENCE OF THE WEST QURNA 2 (WQ-2) OILFIELD DEVELOPMENT

Client

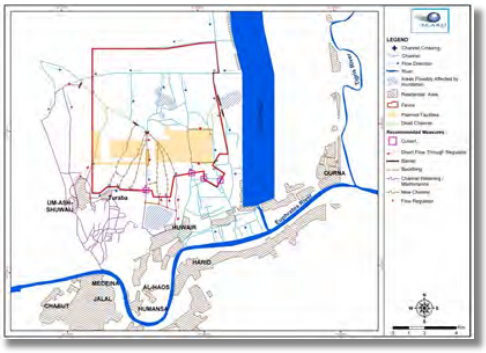
SIMA Baghdad

Location

Basra – Iraq

Date

Mar. '13 – May. '13



Project Description

The Project Activities include the construction, maintenance and rehabilitation of a security fence to be built around the perimeter of the WQ-2 Oilfield Development.
The Project is located in Qurnah District within the Basra Governorate.

Scope of Work

- A description and analysis of the Iraqi regulations that the Project should comply with;
- A description of the Project;
- A desktop description of the baseline environment in the Project area;
- An identification and assessment of the potential impacts that could arise from the Project's interaction with the environmental and socio-economic components; and
- An Environmental and Social Management Plan (ESMP), which describes the measures that should be taken by different Project entities during the construction, maintenance and rehabilitation of the security fence.

ENVIRONMENTAL IMPACT ASSESSMENT
DRILLING PALMYRA-4 & MAZROUR-3 EXPLORATORY WELLS AND GAS COMPRESSOR SETUP

Client

Hayan petroleum Company
INA INDUSTRIAL NAFTE D.D

Location

Homs - Palmyra, Syrian Arab Republic

Date

Sep. '11 – Dec. '12

Project Description

In compliance with Syria's institutional and legal framework and environmental legislations, HPC has commissioned Earth Link and Advanced Resources Development (ELARD), to perform an Environmental Impact Assessment (EIA) for drilling Palmyra-4 and Mazrour-3 exploratory wells and Gas Compressor setup in HPC Block.

The Palmyra -4 well is situated in Palmyra field about 9 km northern east of Palmyra City, Palmyra -4 well is a vertical exploration well that will be drilled to about 1965 m below ground, targeting Markada formation.

The Mazrur – 3 well is situated in Mazrur field about about 27 km northern east of Palmyra City, Mazrur -3 well is a vertical exploration well that will be drilled to about 3900 m below ground, targeting Kurrachine Dolomite formation

As for the Gas Compressor, will be installed at the gas gathering station (GGS) in Palmyra field, to compress low pressure dry gas with small quantities of gas condensate.

Scope of Work

- Collect preliminary information about the current status of the areas where the two wells and the compressor are located.
- Study the environmental impact of the company' activities on each of Hydrogeology and geology of the study area, population, biodiversity and archeological sites.
- Collect soil, water, air and noise samples
- Preparation of environmental impact assessment report of the project to assess the current status of the wells that had been explored previously.

This Environmental Impact Assessment (EIA) which including ground water, soil and air sampling analysis, aims at assessing the impacts of drilling the exploratory well and associated activities and proposing measures to minimize the negative impacts and maximize the positive ones.

DDS FOR MUSTADIRA-3 AND JIHAR 12 WELLS, EIA STUDY FOR SOIL POLLUTION REMEDIATION ACTIVITIES, PREPARATION OF TENDER DOCUMENTS FOR IMPLEMENTATION OF PROPOSED REMEDIAL MEASURES AND ASSESSMENT OF THE GREEN BELT

Client

Hayan petroleum Company
INA INDUSTRIAL NAFTE D.D

Location

Homs - Palmyra, Syrian Arab Republic

Date

Apr. '11 – Mar. '12

Project Description

The environmental audit aimed to collect qualitative and quantitative information in order to identify the source of contamination/ pollution that might have occurred during Mustadira-3 and Jihar-12 drilling activities and assess the level of contamination/ pollution in order to propose control/ treatment measures.

HPC - INA has made several wells drilling and discoveries in Hayan block. In general, every drilling site should involve at least one Mud pit in order to accumulate waste generated by drilling activities, and at least one Test pit for well testing purpose.

Recently, HPC is planning to treat the mud and test pits for the above- mentioned wells in compliance with Syria's institutional and legal framework and environmental legislations. So that, HPC has commissioned Earth Link and Advanced Resources Development (ELARD), for preparing EIA for soil pollution remediation for the mud and test pits in HPC Block.

Because of the failure of plantation and the death of a large number of trees have been planted previously around the residential area next to Gas Treatment Plant, HPC approached ELARD to assess the current status of the planted green belt to reflect the underlying causes of the trees' death and propose appropriate solutions

DDS FOR MUSTADIRA-3 AND JIHAR 12 WELLS, EIA STUDY FOR SOIL POLLUTION REMEDIATION ACTIVITIES, PREPARATION OF TENDER DOCUMENTS FOR IMPLEMENTATION OF PROPOSED REMEDIAL MEASURES AND ASSESSMENT OF THE GREEN BELT

ELARD

Scope of Work

1. Due Diligence Study for Mustadira-3 and Jihar 12 wells
   The main tasks have been undertaken were: Assessment the Environmental status of the drilling activities' area, Collect soil and water samples, identify the environmental impact and develop an Environmental mitigation action.
2. Environmental Impact Assessment (EIA) study for soil pollution Remediation Activities

The EIA has emphasized on the following tasks:

Task 1 - Performance of a Remedial Investigation The objective of this task is to conduct a soil and water sampling and laboratory analytical campaign to adequately characterize the extent of pollution, and to identify the presence or absence of many chemical parameters that may hinder or accelerate the proposed treatment process, type and level of pollution has determined in each pit individually.

Task 2 – Assessment of Two Pollution Remediation Points

Two alternative remediation points have been assessed.

Task 3 - Preparation of a Remedial Action Work plan

This task has included:

- Identification and assessment of the various potential treatment methodologies / remedial alternatives for both soils and water along with budgetary cost estimate for each alternative.
- Selection of the most feasible remedial alternatives and preparation of a remedial action work plan.
- Assessment of the proposed transportation routes that will be used to transfer the polluted soils from the mud pits to the remediation points, if it is necessary.

Task 4, Preparation of Tender Documents for Implementation of Proposed Remedial Measures

3. Assessment the Green Belt and propose a rehabilitation action plan for the vegetation cover, the study has focused on

- Assessment the current green belt activities
- Assessment the agro-climate conditions in HPC's area of activities as part of the dry areas ecosystem.
- Develop a rehabilitation action plan
- Propose restoration activities: including proposing of small ponds and water bodies, regular assessment of water quality.
- Development a plan for a greenbelt along HPC activities area, includes:
  - The proposed trees and bushes.
  - The agro climate conditions and cultivation procedures.
  - Irrigation and water evaporation management

ENVIRONMENTAL IMPACT ASSESSMENT FOR DRILLING ACTIVITIES OF JIHAR11 WELL, HAYAN BLOCK, PALMYRA

Client

Hayan petroleum Company (HPC)

Location

Hama, Syrian Arab Republic

Date

May 2011

Project Description

In the frame of oil exploration of HPC Block in the area of Jihar, HPC is planning to drill a new exploratory well in the area, Jihar 11 well. The drilling program, having a total expected duration of an estimated three and a half (3.5) months, involves various contracting activities, mainly the rig establishment, drilling activities, well construction, well testing, well installation, and civil works.
Jihar field which is characterized by medium height rolling hills and a slightly undulated plain, predominantly covered by open grassland (Badia) and semi-arid desert, lies approximately 35 km east of Palmyra (Tadmur) city.

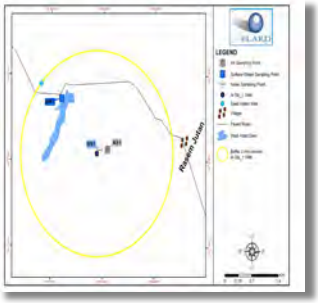
Scope of Work

- Identify all applicable Syrian national legislation, policies, standards and corporate requirements;
- Provide a detailed description of all Project activities and work plans;
- Describe the existing environmental baseline conditions of the Study Area covering the physical, ecological, socio-economic, and cultural elements likely to be affected by the proposed drilling activity and its associated operations and/or likely to cause adverse impacts upon the Project, including both natural and man-made environments;
- Identify and assess the potential impacts on environmental, archaeological, cultural and social resources and receptors associated with the Project;
- Identify and evaluate appropriate mitigation measures for these impacts.

ENVIRONMENTAL IMPACT ASSESSMENT OF DRILLING ACTIVITIES IN AL-SIB -1 WELL

Client

INA INDUSTRIAL NAFTE D.D



Location

Hama, Syrian Arab Republic

Date

Feb. '10 – Apr. '10

Project Description

In compliance with Syria's institutional and legal framework and environmental legislations, INA has commissioned Earth Link and Advanced Resources Development (ELARD), to perform an Environmental Impact Assessment (EIA) for drilling Al Sib- 1 well in Aphamia - INA Block.

The Al Sib -1 well is situated in Aphamia - INA Block about 80 km East of Hamah City, Al Sib -1 well is a vertical exploration well that will be drilled to about 2900 m below ground, targeting Kurrachine Dolomite formation.

Scope of Work

- Collect preliminary information about the current status of the area where Al Sib -1 well is located.
- Study the environmental impact of the company' activities on each of Hydrogeology and geology of the study area, population, biodiversity and archeological sites.
- Collect soil, water, air and noise samples
- Preparation of environmental impact assessment report of the project to assess the current status of the well that had been explored previously.

This Environmental Impact Assessment (EIA) which including ground water, soil and air sampling analysis, aims at assessing the impacts of drilling the exploratory well and associated activities and proposing measures to minimize the negative impacts and maximize the positive ones.

ENVIRONMENTAL BASELINE STUDY OF THE BLOCK XII, ENVIRONMENTAL IMPACT ASSESSMENT FOR 3 WELLS AND ENVIRONMENTAL MONITORING /SUPERVISION- DER EZZOR, SYRIA

Client

SOYUZNEFTEGAZ

Location

Der Ezzor Rural Governorate, Syria

Date

Dec. '08 – Mar. '10

Project Description

Block XII Located in the south-eastern part of Syria, covers a total surface area of approximately 5654 km^2

SoyuzNefteGas appointed ELARD to undertake

- An Environmental Baseline Study (EBS) for Block XII in order to provide an in-depth understanding of the receiving environment within the Area.
- An Environmental Impact Assessment (EIA) for the three wells in order to evaluate the possible impacts from drilling the wells and to anticipate the necessary mitigation measures and their costs.
- Soil sampling of these wells, pre and post drilling
- Monitoring & Inspection Program for Drilling Activities for the three proposed wells

The Environmental Baseline Study (EBS), a requirement by SNG, provides a general overview of the existing environmental and social conditions prevailing in the Study Area. In particular, this section sheds the light on key environmental sensitivities that may influence the development plans, such as endangered species' habitats or archeological sites of significance. The EBS also serves as an environmental management tool that enables the identification and assessment of the impacts resulting from the proposed drilling activities.

The EIA reports include the results of surveys, data analysis, and results of groundwater, soil and air samples analyses and recommendations about the environmental sensitivity of the study area. Measures and recommendations to mitigate the potential environmental impacts that might result from the construction and future operation of the wells.

The purpose of the Monitoring& Inspection Program was to determine SNG's implementation status with respect to the mitigation measures proposed in the Environmental Impact Assessment (EIA) report, where two (2) inspection visits have been conducted for each well, one during the well drilling phase, and the other during the decommissioning and dismantling phase.

Scope of Work

- Description of the prevailing environmental conditions in the study area in terms of geomorphology, geology, hydrogeology, faunal and floral habitats;
- Assess the types of habitats and human activities (land use and agriculture) within the study area;
- Evaluation of baseline conditions of water quality, soil type and quality, air, etc...
- Identification of Environmental Impact Assessment.
- Establish an Environmental Management Plan
- Environmental monitoring and identification of environmental pollution source

ENVIRONMENTAL IMPACT ASSESSMENT FOR OIL EXPLORATORY WELL- NORTH ASSAYAL-1, SYRIA

Client

TATNEFT Exploration- Production-International

Location

Abo-Kamal district, Der Ezzor Governorate Syrian Arab Republic

Date

Jul. '08 – Aug. '08

Project Description

The Syrian Petroleum Company (SPC) has given a concession area, namely Block 27, TATNEFT Exploration- Production-International Company for the drilling of exploratory oil wells.
The well is located in Albo-Kamal district-Der Ezzor Governorate, in the eastern south part of Syria.
North-Assayal - 1 is a vertical exploration well that will be drilled to about 3200 m below ground, targeting Swab\Khabour oil formation and about 172.68 m above the sea level.
This Environmental Impact Assessment (EIA) which including ground water, soil and air sampling analysis, aims at assessing the impacts of drilling the exploratory well and associated activities and proposing measures to minimize the negative impacts and maximize the positive ones.

Scope of Work

The scope of work included:

- A detailed baseline assessment tackling:
  - Geology and hydrogeology
  - Post and pre drilling Water and soil quality
  - fauna and flora
  - socio-economic aspect
  - Archeological sites
- The Identification of environmental impacts related to drilling activities
- Development of an environmental management plan to mitigate the impacts and set basis for future monitoring

ENVIRONMENTAL BASELINE STUDY FOR EBLA GAS PROJECT- EBLA GAS PROJECT ASH SHAER AND CHERRIFE DEVELOPMENT AREAS -PALMYRA, SYRIA

Client

Petro-Canada Ltd.

Location

Homs Governorate,
Syrian Arab Republic

Date

Jan. '07 – Jul. '07

Project Description

Petro-Canada has acquired interest in the Ash Shaer Development Area within the Palmyra Block, Central Syria, with an intention to execute a field development program including:

- Appraisal and development drilling, involving re-entries to the existing and drilling new wells,
- Construction of a gas processing plant with 80 mmscf/d capacity,
- Connecting gas wells back to a gas gathering system and field facilities via an approximately 83 km 14" multiphase pipeline to the Gas Processing Plant,
- Early oil production potentially involving transportation by road tankers.

ELARD conducted extensive field surveys, consultation meetings, satellite imagery processing, desk research, soil and ground water sampling, air quality and noise level monitoring, damaged land and flood risk assessment. The sampling and measurement results were compared to Dutch Soil Standards, Syrian National Ambient Air Quality and Groundwater Quality Standards and World Bank Noise Standards. The location of the sampling and measurements were determined based on identified sensitive receptors location, contaminants migratory pathways and proximity to project development sites.

Potential impacts and hazards from future development activities were assessed. ELARD proposed recommendations regarding contaminated soil remediation options, pipeline erosion management, mitigation and monitoring actions for planned construction and operation activities.

Scope of Work

- Detailed project description;
- Detailed description of the environment (Physiography, Meteorological, Soil, Geology, Hydrogeology, Biodiversity, Noise, Air Quality, Archaeology and Socio-Economy) covering the 1,250 km^2 Study Area;
- Highlight key environmental sensitivities;
- Investigate, describe and document the nature and extent of damage or contamination from previous or ongoing activities on the block's environment.
- Carry out an integrated due-diligence study as part of the EBS focusing on: Contaminated land particularly around the existing oil/gas well sites, waste disposal areas and dumps, and current state of the sites of specific interest, such as cultural heritage, archaeological and industrial sites.

ENVIRONMENTAL IMPACT ASSESSMENT FOR A DEEP OIL EXPLORATION WELL-HASSAKEH, SYRIA

Client

Gulf sands Petroleum Syria Limited

Location

Hassakeh Governorate, Syrian Arab Republic

Date

Jun. '06 – Aug. '06

Project Description

The Syrian Petroleum Company (SPC) has given a concession area, namely Block 26, to Gulf sands Petroleum Syria Ltd. (GPSL) for the drilling of exploration oil wells. Tigris 1 is a vertical exploration well that will be drilled to about 4500 m below ground, targeting potential Paleozoic oil reserves approximately 900 m south-east of the S-1100 well. The well is specifically targeting the Carboniferous Markada and Devonian Sandstone reservoirs.

This Environmental Impact Assessment (EIA) aims at assessing the impacts of drilling the exploration well and associated activities and proposing measures to minimize the negative impacts and maximize the positive ones.

After the detailed study of the site in terms of geology, hydrogeology, water quality, fauna and flora and socio-economic aspect, the environmental impact on the environment was evaluated based on criterion established by the World Bank.

An Environmental Management Plan (EMP) was prepared to minimize and control the possible impact of the project on the surrounding environment.

Scope of Work

- Project Description;
- Description of the Environment;
- Impact Prediction and Evaluation;
- Environmental Management Plan (Including mitigation and monitoring plan)

ENVIRONMENTAL IMPACT ASSESSMENT FOR TABBYEH GAS PLANT, DEIR EL ZOR, SYRIA

Client

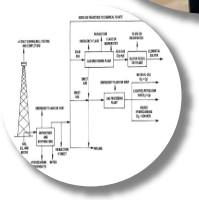
Total E & P Syria

Location

Deir El.Zor Governorate, Syria

Date

Jun. '06 – Oct. '06



Project Description

Total has contracted Earth Link and Advanced Resources Development (ELARD), to perform an Environmental Site Assessment ESA in order to assess the environmental conditions of the Tabyeh Gas Plant facility, and associated gas compression and gas gathering stations which were constructed by Conoco Syria Deir El zor Gas Plant Limited (CSDGL), a joint venture company between Conoco and Total. The objective of the study was to establish the state of environmental conditions when the facilities were handed over to the Syrian Gas Company at the end of the year 2005, and ascertain the possibility of environmental liability.

To meet the objective of the study, a detailed site environmental audit was performed on all the facilities, Based on these Audit, a comprehensive soil and ground water sampling plan was developed and presented to the client. Upon its approval the plan was implemented, in addition to conducting a NORM Assessment Survey. The samples were sent to an accredited Laboratory in the Netherland.

The results of the investigation were presented in the Environmental Assessment Report, in which all the hot spots were identified and characterized.

Scope of Work

- A Preliminary site Reconnaissance survey
- The preparation and implementation of a soil and water sampling program,
- A Rapid Naturally Occurring Radioactive Material (NORM) Assessment survey
- Sample Analysis
- Interpretation and Reporting

Beirut | Abu Dhabi | Dubai | Damascus | Tripoli | Basra | Maputo

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