PROJECT SHAHEEN

LENDERS' ENVIRONMENTAL AND SOCIAL REVIEW

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1.0 INTRODUCTION

1.1 Background

Mubadala and Dubai Aluminium are proposing to develop a greenfield alumina refinery at an industrial plot in Khalifa Industrial Zone Abu Dhabi (KIZAD) (Project Shaheen). The Project has been proposed to secure the supply of alumina for the UAE aluminium smelting industry (most notably Dubai Aluminium “Dubal” and Emirates Aluminium “EMAL”).

Project Shaheen comprises two major facilities:
- Alumina refinery which through two Phases is ultimately intended to produce 5.0 Mtpa of alumina; and
- Bauxite Residue Storage Area (BRSA) for the disposal of the process wastes.

When developed, Project Shaheen will be owned and operated by Emirates Global Aluminium (EGA) which was incorporated through the Mubadala Development Company of Abu Dhabi and the Investment Corporation of Dubai integrating their respective aluminium interests (Dubal and EMAL). EGA also owns Guinea Alumina Corporation (GAC), a strategic bauxite mining and alumina refining development project in the Republic of Guinea.

Project Shaheen is seeking support from EMAL for key services and due to EMAL having received Loans from Export Credit Agencies (ECAs) “the Lenders”, the organisation requires the agreement of the Lenders to proceed. These assurances are anticipated to be provided in the form of a Waiver.

In order to be in a position to provide this Waiver, the Lenders and EGA appointed Golder Associates Africa (Pty) Ltd. (Golder) to carry out an Environmental and Social (Due Diligence) Review of Project Shaheen and to determine whether it materially comply with applicable standards. These are as defined in the Organisation for Economic Co-operation and Development’s (OECD) Recommendation of the Council on Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence (The “Common Approaches”) (Dated: June, 2012).

1.2 Scope and Objectives of Lenders Environmental and Social Review

The objectives of the review are:
- To evaluate the Project, and its associated environmental and social documentation against international financial institutions environmental and social compliance criteria;
To prepare an action plan to address compliance gaps within a reasonable timeframe taking into account key risks and mitigation measures; and

To provide sound judgement on whether the Project meets the reference framework.

Specifically the work has included:

- A determination of project compliance;
- Review of the adequacy of Project Environmental and Social Impact Assessment processes and documentation;
- Identification of Environmental and Social Actions that may be required to address any gaps in compliance;
- Assessment of whether Project Shaheen has appropriate structures (in terms of human capacity, budgets, etc.) to manage Project environmental and social impacts and implement relevant action plans;
- Review of contractor environmental and social management procedures and contractual arrangements regarding environmental and social considerations; and
- Review of the proposed monitoring systems and suggesting amendments as required.

1.3 Project components and locations

The scope of the review was the following proposed infrastructure:

- Located in KIZAD A, a 255 ha fenced site comprising the proposed:
  - Bauxite stockpile area;
  - Bauxite processing facilities (for crushing, grinding and predesilication);
  - Facilities for the Bayer Process (digestion, clarification, precipitation, causticisation, evaporation, hydrate classification and filtration, calcination and alumina handling);
  - Reagent facilities (for lime slaking, acid and caustic cleaning preparation);
  - Sewage system;
  - Truck / wheel washing area;
  - Administrative buildings;
  - Workshop and warehouse; and
  - Fuel storage tanks.

- Located in KIZAD B, an approximately 900ha fenced Bauxite Residue Storage area comprising:
  - A sealed road (7.8 km) connecting the existing Ajban Road and the BRSA, laydown areas and storage yards;
  - Water management system for capturing and evaporating effluent decant and / or stormwater;
  - Bauxite residue disposal area (with underdrainage system and liner);
  - Truck / wheel washing area;
Car park and heavy equipment parking area; and

Office, workshop, warehouse, storage area.

1.4 Review Approach

1.4.1 Project kick-off and information gathering

A meeting was held between Golder and EGA to agree on the scope of work and schedule for the review and to begin to collect relevant information for the review. Subsequent e-mail communication was exchanged between Golder and the Lenders to confirm this scope.

1.4.2 Site visit

Golder completed the review over a 4-day period (August 3rd–7th, 2014) that included:

1) An assessment of the Environmental Impact Assessment (EIA) report prepared by GHD for Project Shaheen;

2) Detailed discussions with the EGA team responsible for undertaking the feasibility studies for Project Shaheen;

3) Discussions with EGA personnel to understand the nature of the commercial relationship between Project Shaheen and EMAL;

4) Discussions with the GHD EIA project management team; and

5) Discussions with personnel from the Environment Agency Abu Dhabi (EAD) responsible for the regulatory review and authorisation of Project Shaheen.

The Golder review team comprised:

- Mr Rob Hounsome - Principal Environmental Consultant

1.4.3 Information Review

Following the site visit the various documents collated at that time were reviewed considering the following aspects:

- The scope of the Environmental and Social Impact Assessment in relation to the project and its various components – this aims to ensure that the document covered all of the aspects relevant to the project, including ancillary infrastructure;

- The ESIA process and methodologies;

- The specialist studies included in the ESIA and their adequacy;

- The socio-economic impact assessment and social issues related to the project;

- The mitigation measures proposed in the Environmental and Social Management Plan (ESMP) and their adequacy;

- The adequacy of the impact descriptions and risk identification; and

- The adequacy of the ESMP in relation to the risks identified and possible mitigation measures that may be implemented – including management measures, monitoring and auditing, etc.

The list of information reviewed is presented below:

- Project Shaheen Environmental Impact Assessment (EIA);
Appendices to the EIA, including:

- Appendix A – EAD Correspondence Documents with Regard to Project Shaheen Alumina Refinery EIA
- Appendix B – Summary of Stakeholder Consultation & Supply Chain Review
- Appendix C – Project Shaheen Baseline Air Quality Survey (Dome)
- Appendix D – Project Shaheen Terrestrial Ecology Baseline Surveys
- Appendix E – Preliminary Cultural Review (Tourism & Culture Authority)
- Appendix F – Human Health Risk Evaluation
- Appendix G – Project Shaheen Air Quality Impact Assessment
- Appendix H – Project Shaheen Noise Impact Assessment
- Appendix I – Hydrodynamic Modelling for the Shaheen Project (DHI)
- Appendix J – Hydrodynamic Modelling for the Shaheen Project - Preliminary Results (DHI)
- Appendix K – The Brine Neutralisation of Red Mud from the Proposed Shaheen Refinery (Southern Cross University)
- Appendix L – GHD Observation on Bauxite Residue Neutralisation and Environmental Characterisation
- Appendix M – Flow Properties of Red Mud (TUNRA)
- Appendix N – Residue Waste Characterisation and Assessment of Proposed Disposal Approach
- Appendix O – Preliminary Geotechnical Review - Residue Properties & Liquefaction of Soils
- Appendix P – Residue Deposition Strategy
- Appendix Q – Dutch Circular on Target Values and Intervention Values for Soil Remediation (2009)
- Appendix R – US EPA Screening Criteria Values
- Appendix S – BRSA Design Report and Drawings
- Appendix T – KIZAD Masterplan
- Appendix U – Etihad Rail Alignment
- Appendix V – Construction Site Layout
- Appendix W – Visual Impact Renderings
- Appendix X – Process Flow Diagram for Ship Unloading, Conveying and Storage of Bauxite
- Appendix Y – Bayer Process Block Flow Diagrams
- Appendix Z – Water Balance (Refinery)
- Appendix AA – KIZAD Groundwater and Stormwater Network
- Appendix BB – Marine Water Monitoring Data Summary
- Appendix CC – Geological Logs and Field Documentation
- Appendix DD – Soil and Groundwater Analytical Reports and Summary Data Tables
- Appendix EE - Residue Disposal Technology Selection Report (Hatch)
- Appendix FF – Material Safety Data Sheets
- Appendix GG – Mercury Management Procedure

Environment Agency – Abu Dhabi (EAD): Environmental Studies Approval Form and Conditions;

Project Shaheen – Construction Environmental and Social Management Plan; and

1.4.4 Interim Gap Analysis Report and Environmental and Social Action Plan

As a result of the site visit and review of the EIA and associated Appendices, Golder prepared a Technical Memorandum (Memo) that represented preliminary feedback in the form of a Gap Analysis. As a result of the Gap Analysis, an Environmental and Social Action Plan was prepared to address each of the Gaps. The Gap analysis document was discussed with the Lenders via teleconference and then in person (September 18th & 19th, 2014).

The outcome of the Action Plan was collated into the Shaheen Alumina Refinery: Technical Reference Document (referenced above).

1.4.5 Report Preparation

The final Phase collated the information into this report.

Report Structure

The report is structured as follows:

- Section 1: Introduction;
- Section 2: Outlines the various applicable Policies, Regulations and Guidelines that are applicable through Lender guidelines;
- Section 3: Summarises the Findings of the Environmental Impact Assessment (EIA) documentation;
- Section 4: Outlines the Compliance Review with international lender requirements;
- Section 5: Provides the Conclusions and Recommendation of the report.

2.0 POLICIES, GUIDELINES AND PROJECT STANDARDS

2.1 Policies and Guidelines

The following policies, directives and guidelines have been utilised for this review.

<table>
<thead>
<tr>
<th>Name</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal Laws</td>
<td>Federal Law No. 7 of 2009: Establishing the UAE Ministry of Environment and Water (MOEW) as the public agency responsible for the environmental affairs of the UAE in general;</td>
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<td></td>
<td>Federal Law No. 24 of 1999 - Concerning Protection and Development of the Environment and its Executive Order issued by Council of Ministers Decree No. 37 of 2001: relating to the protection of the environment, the preservation of its diversity and natural equilibrium, and the prevention of all forms of pollution;</td>
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<tr>
<td></td>
<td>Federal Law No. 23 of 1999 – Concerning Exploitation, Conservation and Development of Living Aquatic Resources in the Waters of the State of the United Arab Emirates: ensuring the protection and conservation of aquatic resources, particularly the fish stock in the UAE;</td>
</tr>
<tr>
<td></td>
<td>Federal Law No. 8 of 1980 Concerning Regulations on Labour Relations as Amended by Federal Laws No. 24 of 1981, No. 15 of 1985 and No. 12 of</td>
</tr>
</tbody>
</table>

This document was prepared to augment the EIA following the Preparation of an Interim Gap Analysis Report (See Section 1.4.4 below).
1986

- Federal Decree No. 13 of 1999 Concerning Regulation of Ozone Depleting Substances
- Executive Order issued by Council of Ministers Decree No. 37 of 2001 on Regulation for Handling Hazardous Materials, Hazardous Wastes and Medical Wastes: provides the classification categories/criteria for hazardous materials and waste, as well as the regulatory requirements on the appropriate storage, management, transport and disposal of hazardous materials and wastes.
- Executive Order issued by Council of Ministers Decree No 12 of 2006 on Regulation Concerning the Protection of Air from Pollution
- Executive Order issued by Council of Ministers Decree No. 37 of 2001 on Regulation Concerning Environmental Impacts of the Project: determines that all projects with the potential to impact on the environment are required to perform appropriate EIA.
- Executive Order issued by Council of Ministers Decree No. 37 of 2001 on Regulation Concerning Protection of the Marine Environment: provides the allowable limits for parameters of effluent to be discharged into the marine environment.

International Finance Corporation (IFC) performance standards (PS) on social and environmental sustainability were developed by the IFC and were last updated on 1st January 2012. The overall objectives of the IFC PS are:

- To fight poverty
- To do no harm to people or the environment;
- To fight climate change by promoting low carbon development
- To respect human rights;
- To promote gender equity;
- To provide information prior to project development, free of charge and free of external manipulation;
- To collaborate with the project developer to achieve the PS;
- To provide advisory services; and
- To notify countries of any Transboundary impacts as a result of a Project.

The PS comprise of eight performance standards namely:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
- Performance Standard 2: Labour and Working Conditions;
- Performance Standard 3: Resource Efficiency and Pollution Prevention;
- Performance Standard 4: Community Health, Safety and Security;
### Performance Standards

- Performance Standard 5: Land Acquisition and Involuntary Resettlement;
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- Performance Standard 7: Indigenous Peoples; and
- Performance Standard 8: Cultural Heritage.


- The EHS Guidelines contain the performance levels and measures normally acceptable to the IFC and are generally considered to be achievable in new facilities at reasonable cost. When host country regulations differ from the levels and measures presented in the EHS Guidelines, Projects are expected to achieve whichever standard is more stringent. Reference to the EHS guidelines is required under Performance Standard 3.

### 2.2 Project Standards

The EIA for Project Shaheen presents a number of Standards (defined as Adopted Criteria) for the Project. The Project has chosen to integrate the maximum permissible Regulatory Standards in the UAE with those presented by the World Bank. The Project has then elected to select the more stringent of the two standards as being applicable. As a result, the project design parameters and/or the impact assessment have been evaluated against standards that are equivalent to, or more stringent than, the World Bank standards.

### 3.0 FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

This section presents a summary of the findings of the EIA carried out for the Project by GHD.

The EIA was carried out over a period of 18 months from December 2012 to June 2014 with a number of key milestones:

- **December, 2012:** EAD issued directive for Project Shaheen and GHD to submit Terms of Reference for the EIA (this essentially equates to a Scoping Study);
- **May, 2013:** The Terms of Reference are accepted by EAD and are then used as the basis for the detailed EIA studies;
- **March, 2014:** The first Draft of the EIA report is submitted to the EAD for review;
- **June, 2014:** After addressing comments received from the EAD, the final EIA report is submitted to the EAD for permitting reasons;
- **August, 2014:** the EAD issues the Environmental Permit for the project to proceed.

As outlined in Section 1.4.3, a number of Technical Studies underpinned the EIA in addition consultation was undertaken with a number of stakeholders and included, inter alia, Industrial Development Bureau (IDB), Center of Waste Management - Abu Dhabi (CWM), Urban Planning Council (UPC) and KIZAD.

The study identified a number of key environmental and social impacts as a result of the construction and operation of the project. A number of mitigation measures have been recommended as part of the environmental management plans to reduce the significance of those impacts. The key impacts and the mitigation measures have been summarised below:

- During the **Construction Phase**, the following key impacts are anticipated:
  - Air Quality: dust is likely to be generated through the movement of mobile equipment or plant and construction material on site. Wind erosion from uncompacted or unvegetated soil stockpiles is
Another source of dust at both the refinery site and the BRSA. It is possible that the ambient particulate levels will exceed the permissible limits. This is to be expected in the Gulf region to the already high levels of dust in the ambient environment.

**Waste:** A Waste Management Plan has been developed to manage the waste generated during refinery and BRSA construction. The anticipated waste materials include: general waste, mixed recyclables, septic effluent, metals and steel, timber, concrete, and paper and cardboard. Hazardous wastes are likely to include: contaminated materials and oil rags/filters.

**Groundwater:** Dewatering of the refinery site may result in the release of turbid water into the marine environment. The impact of this release is considered to be negligible depending on the release rate. Fuel spills during construction have the potential to contaminate the groundwater if not managed effectively.

**Terrestrial Ecology:** Floral communities present on the site will be removed during the levelling and grading of the construction site and due to the development of the access roads. Noisy machinery undertaking these tasks and moving materials onto and off the site will reduce the presence of fauna. The BRSA site provides habitat for the Spiny-tailed Lizard which will be lost during construction. The primary management measure is to prepare a Reptile Relocation Plan and implement it prior to construction.

**Noise:** Site preparation and foundation laying should be the noisiest activities to be undertaken during the construction phase. Other noise producing activities include the transportation of materials (equipment and backfill material etc.) from local suppliers to the construction site; the transportation of employees to and from the main cities and the initial power plant start-up. These are unlikely to be significant in an industrial setting.

**Traffic:** Construction traffic will be associated with the transport of fill material, construction equipment and materials, workers to the refinery and BRSA sites, and construction waste for offsite disposal. Potential impacts include an increase in traffic congestion, dust, gaseous and noise emissions, and increased potential for vehicular accidents.

**Socio-economic:** Construction will employ an average of 5,000 workers with up to 8,000 workers in peak periods. Workers will be housed in registered labour camps with appropriate labour camp management practices implemented. Construction of the BRSA will require the relocation of camel farms. An IFC compliant resettlement action plan has been developed to ensure that the rights of the camel farm owners are protected during the resettlement process. No indigenous people will be affected by the project.

**Cultural heritage:** Sites of archaeological importance have been identified within 1.5 – 2 km from the BRSA site. Although these will not be directly affected by the project, it is possible that they may be disturbed through the influx of workers, laydown areas, etc. An archaeological management plan (including a chance find procedure will be implemented to limit the risk to these sites).

During the **Operations Phase,** the following impacts are expected:

**Air quality:** Odorous compounds are likely to be emitted from the digestion, hydrate (including cooling towers) and clarification areas at the refinery. These are unlikely to impact sensitive receptors. Dust will be generated at both the refinery and BRSA sites and will potentially add to the already high particulate load in the region. Average annual Scope 1 and Scope 2 emissions constitute 1.3 Mt CO₂-e per annum which equates to an emission intensity of 0.51 t CO₂-e / t alumina produced.

**Waste:** Waste generated during operations includes bauxite residue (6 Mtpa), hydrate scale, calcium oxalate, lime slaker grit, general solid waste, sulphuric acid waste, laboratory waste, sewage, and elemental mercury. Bauxite residue constitutes the most significant waste stream and
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will be disposed at the BRSA - the construction and operation of which constituted a significant component of the EIA.

- Groundwater: contamination of groundwater may occur if accidental spillage or leakage occurs at the refinery site. A loss of integrity with the BRSA impermeable liner might result in groundwater contamination. This has been mitigated, as far as possible, through selecting appropriate (to the region and bauxite residue characteristics) barrier materials.

- Noise: The refinery will operate 24 hours per day and generate noise from a variety of sources. It is possible that noise exceedances may be realized at the refinery eastern boundary, largely due to the bauxite residue truck movements. It is unlikely that noise generated at the BRSA site will cause disturbance and/or exceedances.

- Traffic: The main traffic related activity is bauxite residue trucking from the refinery to the BRSA. The potential trucking route is still to be defined but is likely to route away from community areas. In the event that trucking will be routed via the Al Samha community with potential noise and/or accident related impacts.

- Socio-economic: Project Shaheen and future developments within the KPIZ, will require the development of socio-economic components such as:
  - Local workforce availability;
  - Workforce accommodation;
  - Health services facilities;
  - Police and emergency services; and
  - Transport regimes.

- Visual impacts: the refinery is visually in accordance with other infrastructure in the KPIZ area. The BRSA is located deep within the KIZAD Area B and is considered to be both physically and visually well segregated from key receptors.

The study concluded that all of the above impacts can reportedly be mitigated to moderate or low significance with the implementation of mitigation measures such as applying best practice soils and groundwater protection measures, implementation of a waste management strategy, prioritising compliance with IFC standards and implementing measures to minimise and control hazardous waste amongst other aspects.

4.0 COMPLIANCE REVIEW

This section presents the findings of the review undertaken of the Project (and associated environmental and social information) against UAE regulations and the International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability (2012).

4.1 UAE Law: Legal Compliance

An Environmental Permit was issued from the EAD on the 23rd of July 2014 with the following conditions:

- Project Shaheen should receive a No Objection Certificate from the Abu Dhabi Centre for Waste Management with particular reference to the BRSA;
- Appropriate management measures for: groundwater protection, fencing for fauna, translocation of fauna, and daily management should be implemented for the BRSA;
- Dewatering needs to be tested before release;
- A CEMP needs to be developed and submitted to the EAD for approval; and
An OEMP needs to be developed with specific reference to worker safety in relation to the management of mercury.

Subject to the fulfillment of these conditions, this review finds that the project has met the UAE regulatory requirements.

4.2 IFC Performance Standard Compliance  
4.2.1 PS 1 – Assessment and Management of Environmental and Social Risks and Impacts

Scope of EIA

- The project description in its geographic, ecological, social, health and temporal context has been adequately covered in the EIA. This includes a comprehensive description of the components associated with the construction and operation of both the refinery and the BRSA. The information is well presented and includes both site layouts and a detailed technical description of the technology to be utilised. The EIA goes on to describe all inputs and likely outputs from the refinery in terms of products and wastes (including solid, liquid and gaseous pollutants). The Project’s area of influence has been defined in the EIA based on a combination of direct and indirect impacts.

- While project description is comprehensive and covers all Phases of the project, the Closure activities are not covered in great detail. It is likely that Closure Planning can be dealt with in due course and this is not considered to be significant at this stage of the development.

- The project description provides details on related facilities that may be required (e.g. employee accommodation, conveyor belt locations, power supply, etc.). The Associated activities to be developed on the adjacent EMAL site are the subject of a Technical Modification and will be assessed as such in a subsequent review and are not covered here. The EIA further extended to include a review of the environmental and social performance of the bauxite source in Guinea.

- The EIA identified a number of possible project alternatives and their associated impacts, including:

  - No project – in which the negative impacts associated with dust, the BRSA, etc. will not occur while the benefits of economic development and employment etc., will not take place.
  - Locational alternatives linked with considerations for locating the refinery at different sites both within and outside the KIZAD area as well as outside the UAE (in Guinea, for example).
  - Technology options for refining and water treatment;
  - Alternatives for the management of bauxite residues were considered in-depth in the feasibility study and the EIA; and
  - Transport options for the movement of bauxite residues from the refinery to the BRSA were considered including road vs rail and alternative road routes.

The assessment finds that the Scope of the EIA is adequate and addresses the various project components in sufficient detail.

Identification of Risks and Impacts

- The EIA utilised a process for evaluating environmental and social risks based on a comprehensive understanding of a reference facilities (Yarwan Alumina Refinery located at Gladstone (Queensland, Australia) and the BRSA was based on the practices adopted by Gardanne Alumina Refinery (France). The process was further enhanced through adherence to the requirements of the EAD and the submission approval of Terms of Reference for the EIA. In order to overcome a concern that the EAD would not be familiar with the Environmental and Social issues associated with alumina refineries, Project Shaheen organised for a study tour for the EAD to the reference facilities.
On the basis of the key risks, baseline social and environmental conditions have been adequately evaluated in the EIAs and include: climate, soils, geology, marine and groundwater, vegetation and flora, birds, land-use, noise, visual, greenhouse gases, traffic, waste and the socio-economic environment. The baseline studies were conducted seasonally, as appropriate and are considered to be comprehensive to deal with all potential risks and environmental and social impacts.

The EIA has taken account of governmental and/or third party studies in the identification of Risks and Impacts. These include the KPIZ masterplan along with monitoring information derived from adjacent industries, including EMAL, Al Taweelah power plant and the port.

Cumulative impacts of existing projects, the proposed project, and anticipated future projects have been considered qualitatively in the EIA. The cumulative impact assessment process has not been conducted in accordance with the Good Practice Handbook - Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets, International Finance Corporation, Washington DC (August 2013), however, this is not considered to be a significant flaw in the study. Where possible, for example in the marine environment, cumulative impacts have been assessed on a quantitative basis.

The Impact Assessment table in the EIA does not follow international norms and standards. This has arisen as a result of the EIA following the specified protocol from the EAD EIA guidance document. Although, the approach/methodology does not follow international norms, the findings presented can be readily interpreted. The differences are considered to be cosmetic and non-substantive in nature.

Data limitations, gaps and uncertainties that may have a bearing on decision-making are presented in the EIA.

The EIA has recognised Human Rights principles considered whilst assessing the SIA focus areas and include - labour rights, right to equal and fair treatment (no discrimination), right to favourable conditions of work, right to a standard of living adequate for individuals/families health and well-being, right to freedom of expression, consultation with internal and external stakeholders and due process for consultation and compensation of affected stakeholders.

The Risk and Impact identification process is adequate and covers all of the likely and/or prospective Risks and Impacts that could be expected for Project Shaheen. The approach to impact assessment is sound albeit non-conforming to international norms and standards due to EAD requirements.

Environmental and Social Management Measures

The Project is in its pre-construction phase and an Environmental Management Framework (EMF) has been developed and is documented in the EIA. The core objectives of this are to:

- Present the management procedures to ensure that Project Shaheen is designed, constructed and operated in accordance with environmental legislation, policy and guidelines;
- Provide a mechanism for monitoring and reporting environmental performance;
- Define roles, responsibilities and accountabilities to ensure that parties and individuals involved in the Project understand and adhere to the Project Shaheen’s environmental management and monitoring commitments;
- Set requirements for environmental induction and training of staff, workers and visitors to ensure that they have adequate understanding of their roles and responsibilities; and
- Ensure continuous improvement of the Project Shaheen’s overall environmental performance through a process of continual review and compliance audits.

In addition to the EMF, a comprehensive Construction Environmental and Social Management Plan (CESMP) has been prepared by GHD that provides management and mitigation measures that address
the key impacts expected during the construction phase. The CESMP includes provision for the following specific environmental issues:

- Air Quality Control Plan;
- Erosion and Sediment Control;
- Soil and Groundwater Contamination Control Plan;
- Terrestrial Ecology Plan (incl. species relocation plan);
- Water Quality and Marine Ecology Plan;
- Noise and Vibration Control Plan;
- Traffic Control Plan;
- Waste Control Plan;
- Chemical and Hazardous Materials Control Plan;
- Social, Archaeological and Visual Control Plan;
- Spill Contingency Plan;
- Emergency Management Plan;
- Security Plan; and
- Infrastructure plan.

- The CESMP provides measures for monitoring and reporting environmental and social performance.
- Project Shaheen has identified the resources required to effectively implement the plan – both in terms of the on-staff environmental capabilities and well as the management support that will be required for effective implementation of the CESMP.
- An Operations Phase Environmental and Social Management Plan (OESMP) is yet to be developed. It is recommended that the OESMP is developed at least 6-months in advance of the commencement of operations.

The EMF and CESMP provide adequate measures to mitigate, manage and monitor the anticipated environmental risks and impacts for Project Shaheen. Through the CESMP, Project Shaheen has indicated an understanding of the capacity and structures required for the effective implementation of the management plans.

Stakeholder engagement

- Stakeholder engagement for the EIA has been limited to key and institutional stakeholders. This approach is acceptable in the context of the UAE regulations, however, the consultation exercise is considered to be inadequate in a global sense. In order to address this gap, Project Shaheen, with support from GHD (to ensure free, prior and informed consultation), have initiated a stakeholder engagement programme aimed at informing the adjacent communities of the proposed development, including:
  - Recruiting a Community Relations Office/officer;
  - Notify the local community via written correspondence including press release, letters and via the existing community newsletter (Mujtama’una) distributed by EGA;
  - Conduct the community Majlis;
Update the existing EGA website with a section on the refinery project; and

Establish a grievance management procedure including a project phone number and email address.

The stakeholder engagement will be undertaken in Q4 2014 prior to the start of construction activities.

The stakeholder engagement has, to date, been inadequate in meeting international requirements. The implementation of the programme outlined above, in advance of the commencement of construction will ensure that this gap is addressed.

4.2.2 PS 2 – Labour and Working Conditions

Project Shaheen is likely to employ a total of approximately 640 workers at the refinery and BRSA during operation. The Project will aim to have a workforce comprising approximately 18% UAE nationals in alignment with its Emiratisation policy with preference offered to members from the Al Samha community. During construction, it is anticipated that the average number of workers will be approximately 5,000 people increasing to a maximum of 8,000 workers during peak periods. It is anticipated that overseas workers will be housed in commercially available labour camps in either Abu Dhabi or Dubai.

As an EGA Asset, Project Shaheen will adopt EGA Labour Management policies and procedures which include:

- Employee Relations Management Plan
- Workforce Services Strategy
- Workers Emergency Health and Safety Policy
- Human Resources that includes the following topics:
  - Labour rights
  - Wages and benefits
  - Hours of work
  - Ramadan overtime compensation
  - Life, disability and health insurance
  - Housing and transport allowance
  - Training and professional development
  - Business conduct and ethics
  - Gender harassment
  - Workplace violence prevention
  - Fair treatment at work policy
  - Employee grievance
  - Resignation and termination of services
  - Leave - annual, compassionate, bereavement (Eddah), sick, disability, local emergency

The EGA Policies have been reviewed and found to be compliant with the UAE regulatory requirements and in accordance with the expectations of the International Labour Organisation (ILO).
The EGA policies do not allow for the formation of Worker's organisations as these are prohibited by UAE law. EGA have, however, put in place an internal grievance mechanism that allows for worker’s grievances to be raised. The Grievance mechanism is communicated to workers EGA will inform the workers upon being hired.

EGA’s contractors will be expected to adhere to their internal policies. This will be driven though the procurement team and will be an integral component of contractor selection for Project Shaheen.

During the Construction Phase, workforce accommodation will be the responsibility of the contractors. In order to ensure that workers accommodation is effectively managed and workers reside in acceptable conditions, the EPCM contractor (Bechtel) has prepared a ‘Labour Camp Accommodation Requirements’ protocol which has been developed to comply with UAE regulatory requirements as well as the Workers’ accommodation: processes and standards; Public guidance note by IFC and the EBRD. The protocol includes:

- General requirements applicable for the living conditions, establishment and maintenance of temporary labour camps used to accommodate construction workforce;
- Pre-emptive inspections prior to contract approval;
- Compliance inspections at a minimum every 12 months throughout the construction period, including: camp administration and management, kitchen, dining area, dry food and cold storage, food handlers and personal hygiene, drainage and layout requirements, accommodation, water and water treatment, toilets and sanitary facilities, laundry, hand wash and bathing facilities, waste disposal and pest control, lighting, electrical power and generation systems, sewage treatment and emergency preparedness; and
- Mechanisms for follow-up in the event of non-compliance.

Project Shaheen’s projected labour practices are compliant with the requirements of Performance Standard 2, wherever possible within the legal constraints of the UAE.

**4.2.3 PS 3 – Resource Efficiency and Pollution Prevention**

- Provisions for resource efficiency and pollution prevention are included within the EIA and associated specialist studies. This includes discussions relating to utility use (water, energy, etc.) as well as detailed descriptions of gaseous, liquid and solid wastes (hazardous and non-hazardous). The management of waste materials is included in the EMF and CESMP.
- Energy and water demand will be satisfied through captured infrastructure to be built at EMAL (the subject of the Technical Modification) and are both in-line with international norms and standards (as per the Australian and French reference facilities).
- The assimilative capacity of the KIZAD airshed has not been addressed in the air quality study albeit that the cumulative impacts have identified that the WHO and/or EAD standards will not be exceeded as a result of Project Shaheen. The EIA references this as the responsibility of KIZAD and is yet to be conducted.
- Pollution prevention measures outlined in the EIA and supporting documentation includes *inter alia*:
  - Waste management measures;
  - Dust mitigation through dust suppression and installation of emission control equipment at the cement plant;
  - Proper handling and storage of chemicals;
  - Erosion and stormwater control; and
Monitoring of surface water, groundwater, air, resource and energy, waste, ecology and social monitoring (social indicators and community health impact); and

Emergency preparedness and response.

The EIA has evaluated Scope 1 and 2 greenhouse gas emissions (GHG's) in accordance with the general principles of: the 2006 IPCC Guidelines for National Greenhouse Gas Inventories; and the Greenhouse Gas Protocol. The total emissions for the project were estimated as 63.6 Mt CO2-e. Scope 1 emissions over the life of the project were estimated to be approximately 24.2 Mt CO2-e, and Scope 2 emissions are estimated at approximately 39.4 Mt CO2-e. The average annual emissions for the project were estimated as 1.3 Mt CO2-e. The average annual emissions from Phase 1 of the project are estimated to be approximately 0.6% of the United Arab Emirates’ annual GHG’s. The emissions intensity for Project Shaheen was estimated as 0.51 t CO2-e / t alumina which compares favourably with the 0.71 t CO2-e / t alumina emissions intensity of other comparable alumina refineries operating internationally.

The specialist waste management study provides a comprehensive list of mitigation measures for hazardous and non-hazardous waste materials focusing on the waste hierarchy (prevention through efficient design, minimisation through procurement controls, reuse, recycling and then only disposal).

A Hazardous Materials Management plan has been prepared for the construction Phase that provides detailed measures on how to avoid, where possible or reduce impacts associated with chemical and hazardous materials storage and handling. The Hazardous Materials Management Plan provides provision to ensure ongoing compliance with the requirements of the Stockholm Convention, Rotterdam Convention and/or Montreal Protocol.

It is unclear on whether pesticides will be used on the site, as such no specific pest management plan has been established, or procedures for selecting, using or storing pesticides developed in line with the requirements of IFC PS3.

Project Shaheen’s resource efficiency and pollution prevention measures are compliant with the requirements of PS3.

4.2.4 PS 4 – Community Health, Safety and Security

The EIA and supporting documents identify community health and safety aspects as a particular impact that would be required to be managed by Project Shaheen. Due to the location of the Refinery (in the KIZAD) it is unlikely that there is any risk to the community from any infrastructure or equipment (aside from traffic) utilised at the Refinery site. In terms of the BRSA, existing structures (camel farms) within this footprint will be resettled as part of Project Shaheen and therefore community exposure to risks from infrastructure or equipment (aside from traffic) are likely to be minimal.

The risk of traffic has been identified as a key community risk and to this end, a Traffic Management Plan has been prepared (but is under refinement). Factors considered in the Traffic Management Plan, for construction includes:

- Speed limits;
- Traffic signs and control signals to direct and control traffic flow;
- Dust controls, such as truck wash down areas, canvas trailer covers;
- Noise controls such as scheduling of materials delivery, to limit (where possible) night-time deliveries, and regular inspection and maintenance of vehicles; and
- Delivery of materials in bulk. Where practical, construction materials will be delivered in bulk rather than in small batches which would require more frequent trips.
During operations alternate routes for the transport of bauxite residue from the refinery to the BRSA are under investigation. A route is being sought that does not intersect any residential area and extends across an existing industrial road network that is dedicated for large-scale industrial activity and port logistics.

- An Emergency Preparedness and Response plan has been developed that provides for the following measures:
  - Clear the area and evacuate staff and workers;
  - Check for any injured person and provide first aid;
  - Locate the incident source and stop / contain the situation, if safe to do so;
  - Notify the relevant authorities (e.g. fire brigade or ambulance) if help is necessary, or where regulations (e.g. AD EHSMS RF) requires such notification;
  - Control and manage the situation, and mitigate further environmental impacts;
  - Investigate the causes of the incident and identify the available corrective and preventive actions to avoid recurrence of the incident. Results of the investigation will be presented in conjunction with the incident report; and
  - Implement the identified corrective actions.

- A security plan has been developed that provides for measures to prevent theft and/or access into any areas on the site. The security plan will be refined in conjunction with KIZAD and the Abu Dhabi police force.

Project Shaheen has adequately considered Community Health, Safety and Security in compliance with the requirements of Performance Standard 4.

4.2.5 PS 5 – Land Acquisition and Involuntary Resettlement

- A total of eight camel farms were identified in the vicinity of the proposed BRSA site. The farms are transient and operated by Emiratis to provide a temporary area for feeding and stock watering camels for recreational racing. One of these farms (Camel Farm 7) is located within the BRSA and will need to be relocated as a result of Project Shaheen.

- The relocation and compensation process falls under the responsibility of the Abu Dhabi City Municipality (ADM’s) Shahama Center who have confirmed the following procedure:
  - Consultation and survey of the relocation area;
  - A letter is sent to the Shahama Center by the project proponent (KIZAD), informing them of the need for resettlement due to the project;
  - The Shahama Center consults with the owner of the camel farm (initially face-to-face and then via letter) to advise of the project timeline and possible requirement to relocate;
  - The Shahama Center surveys the project area to gather information on the facilities (if any) to be relocated and advises the farmer of the preferred relocation site; and
  - Following the survey Shahama Center determines and notifies a cut-off date after which no camel farms can be established or move into the project site area and a cut-off date for compensation for relocation. This is communicated to KIZAD.

- Relocation:
Recommendations on resettlement will be sent by the Shahama Center to the main office of ADM.

The ADM will then form a committee that consists of various stakeholders such as the Shahama Center, members of the land issuing authority as well as the ADM to decide on the type of compensation to be given for relocation.

The camel farm owners are then consulted as to the compensation and proposed timing around the relocation.

The Shahama Center manages grievances with regards to resettlement through meeting with the camel farmers. It is understood that currently KIZAD and the Shahama Center are in the process of finding a relocation area near KIZAD where no development is anticipated.

EGA will monitor the relocation process, being undertaken by the Shahama Center and KIZAD, to ensure that fair compensation is granted.

On the basis that they are recreational in nature, the camel farms do not provide either land or wage based livelihoods for their owners and/or operators. Further, the relocation of the camel farms will not result in economic displacement. Despite this, an adequate resettlement process in accordance with local norms and standards and which is unlikely to cause social risk is under implementation.

**4.2.6 PS 6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources**

The Refinery site is characterised as a highly disturbed alluvial plain with no vegetation. The site is characterised as having no conservation value. At the BRSA site, the dominant habitat is sand dunes with sand sheets and / or alluvial plains. The Lithified sand sheets (which occupy <5% of the BRSA) have conservation value. Of the fauna identified on the site, only the Spiny tailed Lizards (STL) is listed as being a vulnerable species of conservation importance.

Although, not specified in the EIA, Project Shaheen will not affect any of:

- Legally Protected and Internationally Recognized Areas; or
- Specific habitats that provide unique Ecosystem Services.

The EIA has not utilised the IFC PS criteria to define whether the project: (i) is located in modified, natural, and critical habitats; (ii) will potentially impact on or are dependent on ecosystem services over which the client has direct management control or significant influence. In addition, the report has not taken into account the differing values attached to biodiversity and ecosystem services by Affected Communities.

The Ecology Management recognises the requirement for the relocation of the Spiny-tailed Lizard. Spiny-tailed Lizards are protected under UAE law and require relocation prior to any activities undertaken at the BRSA. An adequate process has been specified for relocating this species that includes the identification of suitable host land.

A comprehensive ecological study has been undertaken for the EIA that has identified that the project is unlikely to impact habitats that have ecological significance. Despite the inadequacies identified in Bullet 3 above, and due to the degraded nature of the habitat, the project will comply with the requirements of Performance Standard 6.

**4.2.7 PS 7 – Indigenous People**

In accordance with the IFC definition, the EIA considers that within the project footprint, and surrounds (i.e. 15 km radius), there are no indigenous groups of people. The local Al Samha community:

- Is not differentiated by a distinct language; a common dialect of Arabic is spoken across Abu Dhabi;
Does not have a collective attachment to the land. The livelihoods of the local population are not dependent natural resources in their area and the majority of Emiratis in the Al Samha community are employed by government; and

Does not have cultural, economic, social or political institutions that are separate from the mainstream UAE society or culture. The Al Samha community falls under the jurisdiction of the ADM.

Performance Standard 7 is Not Applicable.

4.2.8 PS 8 – Cultural Heritage

The two project site surveys conducted for the EIA identified several archaeological sites located within and in the vicinity of the Shaheen Refinery and BRSA sites. The archaeological sites located within the project sites are considered non-critical, however the sites located outside the project sites require protection. One archaeological site 3 km north west of the BRSA was reported to comprise important Late Stone Age archaeological sites that represent examples of the temporary and seasonal camps of ancient people which is required to be preserved in situ.

Mitigation measures to be implemented to protect the archaeological features identified near the BRSA during the construction phase include:

- Avoidance through planning and fencing the archaeological areas;
- Undertake monthly monitoring of the archaeological sites in the vicinity of the BRSA construction footprint for evidence of disturbance or near misses
- Implement a Chance Find Procedure that:
  - Halts work in the area and immediate surrounds (50 m diameter of the area);
  - Notifies the Abu Dhabi tourism and Cultural Authority (TCA); and
  - Does not allow for the commencement of work until written notification is received from the TCA.

The archaeological study has identified potentially important cultural heritage resources that might be impacted by the project. The CESMP is robust to ensure ongoing compliance with Performance Standard 8.

5.0 CONCLUSIONS AND RECOMMENDED ACTIONS

The key issues identified in the review are:

Legal Compliance

1) Project Shaheen has complied with the requirements of UAE regulations and has received an Environmental Permit to proceed with construction activities. The Permit is conditional subject to a number of standard conditions.

Actions:

- No actions required and/or recommended.

IFC Performance Standard Compliance

1) PS 1 – Assessment and Management of Environmental and Social Risks and Impacts

a. The Scope of the EIA is adequate and addresses the various project components in sufficient detail.

b. The Risk and Impact identification process is adequate and covers all of the likely and/or prospective Risks and Impacts that could be expected for Project Shaheen. The approach
to impact assessment is sound albeit non-conforming to international norms and standards due to EAD requirements.

c. The EMF and CESMP provide adequate measures to mitigate, manage and monitor the anticipated environmental risks and impacts for Project Shaheen. Through the CESMP, Project Shaheen has indicated an understanding of the capacity and structures required for the effective implementation of the management plans.

d. The stakeholder engagement has, to date, been inadequate in meeting international requirements. The implementation of the programme outlined above, in advance of the commencement of construction will ensure that this gap is addressed.

**Actions:**
- Project Shaheen and/or their consultants should undertake the required community consultation in line with the plan and document the outcomes of that effort for distribution to the Lenders environmental and social consultant.
- An OESMP should be developed in advance of commencement of operations.

2) PS 2 – Labour and Working Conditions
   
a. Project Shaheen’s projected labour practices are compliant with the requirements of Performance Standard 2, wherever possible within the legal constraints of the UAE.

**Actions:**
- No actions required and/or recommended.

3) PS 3 – Resource Efficiency and Pollution Prevention
   
a. Project Shaheen’s resource efficiency and pollution prevention measures are compliant with the requirements of PS3.

**Actions:**
- No actions required and/or recommended.

4) PS 4 – Community Health, Safety and Security
   
a. Project Shaheen has adequately considered Community Health, Safety and Security in compliance with the requirements of Performance Standard 4.

**Actions:**
- No actions required and/or recommended.

5) PS 5 – Land Acquisition and Involuntary Resettlement
   
a. On the basis that they are recreational in nature, the camel farms do not provide either land or wage based livelihoods for their owners and/or operators. Further, the relocation of the camel farms will not result in economic displacement. Despite this, an adequate resettlement process in accordance with local norms and standards and which is unlikely to cause social risk is under implementation.

**Actions:**
- Project Shaheen should remain in close contact with the ADM throughout the resettlement process and ensure that each step is adequately documented in line with the requirements of the IFC PS 5.

6) PS 6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources
a. A comprehensive ecological study has been undertaken for the EIA that has identified that the project is unlikely to impact habitats that have ecological significance. The project will comply with the requirements of Performance Standard 6.

**Actions:**
- No actions required and/or recommended.

7) PS 7 – Indigenous People

a. Performance Standard 7 is Not Applicable.

**Actions:**
- No actions required and/or recommended.

8) PS 8 – Cultural Heritage

a. The archaeological study has identified potentially important cultural heritage resources that might be impacted by the project. The CESMP is robust to ensure ongoing compliance with Performance Standard 8.

**Actions:**
- No actions required and/or recommended.

**General**

In accordance with the requirements of the Common Approaches, this Lenders Environmental and Social review finds that Project Shaheen is materially in compliance with the requirements of the IFC Performance Standards, in line with the factors that would be required for a facility that is Associated of the Primary borrower. It is recommended that EMAL implement an ongoing review mechanism to ensure that the project remains in line with the Lender requirements and that is provided to the Lenders Environmental and Social Consultant on a periodic basis (in line with the EMAL Common Terms Agreement).

**GOLDER ASSOCIATES AFRICA (PTY) LTD.**

Rob Hounsome
Environmental Project Director

RH

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APPENDIX A

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