



Ashuganj 200MW Power Plant

Environmental and social compliance review

May 2015

United Ashuganj Energy Limited

CONFIDENTIAL



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United Centre, House NW (J)6, Road 51, Gulnash2, Dhaka-1212

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Executive Summary

United Ashuganj Energy Limited (UAEL, 'the Client') has commissioned Mott MacDonald to undertake a review of available environmental and social documentation in connection with the Ashuganj 200MW natural gas-fired power plant project in Bangladesh ('the Project'). UAEL is the Project proponent.

The environmental and social review is being prepared for the Lenders (Standard Chartered Bank, Export Credit Agency (Finnvera), International Finance Corporation (IFC) and Deutsche Investitions- und Entwicklungsgesellschaft (DEG) and other commercial lenders (including Development Finance Institutions (DFIs)), 'the Lenders')) in order to check compliance with national and international standards and guidance.

This report presents a review of the documents provided and compliance of the Project with the Equator Principles (EP) and thereby with the IFC Performance Standards (IFC PS) (2012) and relevant Environmental, Health and Safety Guidelines (EHS Guidelines).

The proposed Project is located within the Ashuganj Power Station (APS) complex on the east bank of the Meghna River approximately 90km northeast of Dhaka. The location has relatively good transportation infrastructure including the railway and motorway, which connect with Dhaka city. The APS complex has a number of existing generating units with a total generation capacity of 891MW. The current Project proposed is a natural gas-fired power plant with a capacity of 200MW. The plant will consist of 20 gas engine generators (9.73MW each), 20 super-heated steam boilers and 1 steam turbine (16.1MW). It is understood that there are also three more power plants with total capacity of 1,125MW currently under construction within the APS complex. The Project is currently under construction by the EPC Contractor Neptune Commercial Ltd (NCL) and it is anticipated that operations will start in April 2015. Operations and maintenance of the plant will be carried out by United Engineering & Power Services Ltd (UEPSL), a subsidiary company of UAEL.

The EIA study for the Project dated April 2014 was undertaken to Bangladeshi standards and also references international standards (Asian Development Bank (ADB) and International Finance Corporation (IFC)). Additionally a Social Impact Assessment (SIA) was completed in April 2014. Both studies, EIA and SIA, were updated in February 2015 following recommendations of Ashuganj 200MW Power Plant Environmental and Social Compliance Report Revision 2 issued in January 2015. Mott MacDonald reviewed the updated studies and identified the remaining gaps that need to be addressed to bring the Project to international standards.

The international standards, guidance and principles that the Project is benchmarked against in this report are:

- The Equator Principles III; Equator Principles Association, 2013 (EPIII)
- Performance Standards on Environmental and Social Sustainability; World Bank/IFC, January 2012
- EHS General Guidelines; World Bank/IFC, April 2007 (EHS General Guidelines)
- EHS Guidelines for Thermal Power Plants; World Bank/IFC, December 2008 (EHS Thermal Guidelines)
- Asian Development Bank (ADB) Safeguard Policy Statement, 2009

These standards and guidelines are internationally recognised as representing best practice in environmental and social compliance for large projects.

The review of documents showed that the EIA study and SIA study satisfy Bangladeshi national legislative requirements. The construction environmental clearance certificate No.07/2014/67 was issued by the Bangladesh Department of the Environment (DoE) on 24 February 2014. UAEL submitted the application to the DoE for operational environmental clearance on 20 December 2014, and received the operational environmental clearance certificate No.538/2013/73 issued by the DoE on 02. April 2015 (Number – 205), indicating the national environmental permitting process is being followed and appears to be in line with national environmental legislation.

Gaps have been identified between the updated EIA and SIA with respect to the requirements of benchmarked international standards. Actions that would resolve the identified gaps are summarised in the environmental and social action plan (ESAP) in this report. A summary of the key gaps is presented in Table E.1.

Table E.1: Gaps and solutions ((CP) = Condition Precedent; (CS) = Condition Subsequent; FC = Financial Close)

No.	Issue	Action/details	Report section/ section in the ESAP	Responsibility	Status	Comments
1.	Operational environmental clearance	Obtain environmental permit for operational phase of the Project from the DoE for the proposed 200MW power plant.	3.2.1/ 1.1	UAEL prior to start of operation (CS)	Closed	
2.	Decommissioning plan	Include a statement of commitment to develop a decommissioning plan prior to decommissioning of the plant which is to be submitted to the DoE for approval.	3.2.1/ 1.3	UAEL 12 months prior to decommissioning (CS)	Open	UAEL to provide a formal statement of commitment on a company letterhead that the decommissioning plan will be developed
3.	Short duration (24hour) air quality baseline data, more comprehensive baseline required	Collate relevant longer time period baseline ambient air quality data from other EIA's recently undertaken for the three other power plants with total capacity of 1,125MW that are currently under construction within the APS complex.	3.2.1.4/ 1.4	UAEL prior to start of operation (CS)	Closed	
4.	Evidence of appropriateness of 30m stack height	A stack height calculation in line with Good International Industry Practice (GIIP) should be undertaken to demonstrate that the proposed stack height of 30m is sufficient for proper dispersion and prevention of excessive ground level concentrations.	3.2.1.4/ 1.5	UAEL prior to start of operation (CS)	Open	The updated air quality assessment recommends a stack height of 40 metres but there is no technical justification for the choice. The plant is already built and retrofitting an additional 10 metre section on the stacks is likely to meet significant technical obstacles Stack height calculations should be carried out in line with Good International Industry Practice (GIIP).
5.	Air quality modelling	Provide further information to allow a better understanding of the modelling results; specifically: Further details on the frequency of 'maximum' process contributions Are the reported maximum concentrations absolute maximums or have a limited number of exceedances been allowed for?	3.2.1.4/ 1.6, 3.1	UAEL prior to start of operation (CS)	Open	This may help to improve the result of the modelling. Perhaps after removing absolute maximums from the results, if their frequency is very low, it will show that the overall project contribution is below 25% which aligns with the international standards
6.	NOx process contributions	Review the predicted of the short-	3.2.1.4/ 1.2, 3.1	UAEL prior to start	Open	Design mitigations, such as a greater

No.	Issue	Action/details	Report section/ section in the ESAP	Responsibility	Status	Comments
	of the Project have been assessed to potentially contribute 50% of the of the short-term (1 hour) relevant international ambient air quality standard under worst case conditions, this is greater than the recommended 25% threshold stated in the IFC Thermal Power Plant Guideline (2008)	term (1 hour) NOx process contributions with respect to the above air quality related actions. This guideline triggers the requirement of operational stage continuous ambient air quality monitoring typically made up of two systems located at the predicted maximum concentration or sensitive receptor and a background point. Operational stage continuous ambient air quality monitoring is recommended. For this reason it is considered appropriate to request UAEL to install one continuous ambient air quality monitoring station as the short-term project contribution is very high.		of operation (CS)		stack height, may have been able to improve dispersion in this regard though, given construction is complete options for mitigation are limited. Ideally, all operators within the APS complex should cooperate and install two ambient air quality monitoring stations for the entire complex and share costs. This approach would be efficient and result in reasonable shared costs. UAEL has confirmed that currently there is no continuous air quality monitoring undertaken for existing power plants or planned for those under construction within the Ashuganj complex site. Mott MacDonald recommends UAEL explores the opportunity for collaboration with other power plants in the Ashuganj complex to install an ambient air quality monitoring station and share the data and operating costs., In the event that other plant owners/operators are not willing/able to collaborate on installation and operation of an ambient air quality monitoring station(s) UAEL must install a suitable ambient air quality monitoring station. Opportunities to recover some of the capex and opex costs of such a station could come from charging other power plant operators for data when it is required.
7.	Cumulative air quality impact assessment	IFC directly communicated with the UAEL EIA consultant to undertake a cumulative air quality assessment using the information available for the EIA consultant from three other power plants in the Ashuganj complex	3.2.1.4/ 1.7	UAEL prior to FC (CP)	Open	The updated air quality modelling report (May 2015) including information from three other gas fired power plants was shared with Mott MacDonald on 21 May. Review of the document has shown that even with 30m stack heights the short-term cumulative impact from four

No.	Issue	Action/details	Report section/ section in the ESAP	Responsibility	Status	Comments
						power plants including Ashuganj 200MW project lies within relevant international ambient air quality standard
8.	Greenhouse gas emissions benchmarking	Estimate CO2 emissions per unit of energy (kWh) generated. Quantify annual CO2-equivalent emissions for the plant.	3.2.1.4/ 3.2	UAEL within 3-months of commissioning and ongoing annually as a minimum (CS)	Open	
9.	Noise assessment	Provide additional information on selection of ambient noise level. Provide information on guaranteed ground-borne vibration levels Indicate the distance to the nearest sensitive receptors. State the Project contribution at these locations	3.2.1.6/ 1.8	UAEL prior to operation (CS)	Open	
10.	Construction environmental and social management – mitigation and monitoring commitments	Clarify how the EIA and SIA mitigation measures have been implemented throughout the construction stage. Provide a formal statement of commitment that all environmental and social mitigation measures stated in the EIA, SIA, the requirements listed in the construction permit and the yet to be issued operations permit and the actions presented in the ESAP of this report will be thoroughly addressed during remaining time of the construction.	3.2.1.14	UAEL, EPC contractor (CP)	No longer relevant	
11.	Environmental and social management and monitoring plan (ESMMP) for operation	OESMP to be developed consistent with ISO14001 principles and containing measures to implement mitigation and monitoring measures identified in the EIA and SIA study, DoE operational environmental clearances and the recommendations made in this report including in the ESAP. OESMP to include (but not	3.2.1.14/ 1.10	UAEL (CP)	Open	UAEL to confirm through the formal statement of commitment on a company letterhead that they will develop OESMP

No.	Issue	Action/details	Report section/ section in the ESAP	Responsibility	Status	Comments
		necessarily be limited to): Details of required operational stage monitoring including that recommended for emissions to air, effluent discharges prior to entering the common outfall, noise and social aspects as recommended in this report. Waste management plan (WMP). Mitigation and monitoring measures for the prevention of local community exposure to disease.				
12.	Information disclosure	Complete commitment to publish EIA and SIA executive summaries on UAEL website, translate to Bengali and publicly disclose. Disclose information on the environmental and social impacts that are predicted for the operational phase and describe how they will be managed.	3.2.2.3/ 1.15	UAEL prior to operation (CS)	Closed	
13.	Compliance reporting during operation	Submit periodic (bi-annually) reports to the Lenders on environmental, social, health and safety performance, including status of each ESAP element and status of issues in the EIA, SIA and OESMP implementation, grievances of workers' and concerns of affected communities.	3.2.1.14/ 1.11	UAEL at commencement of operation at periods as required by the environmental regulator and lenders (CS)	Open	
14.	Emergency response plan (ERP)	Based on the framework in the EIA develop the Project specific Emergency Response Plan (ERP) (also known as a Disaster Management Plan) for potential emergencies (for example, fire, explosion, flooding, terrorist attack). The Flood Risk Assessment (FRA) should be specific to the Project and include assessment of the 100-year event risk.	3.2.1.13/ 1.16	UAEL – within 3 months of FC (CS)	Open	The ERP should consider the effect of potential emergency events at neighbouring facilities and include details on how those event will be coordinated in responding to emergency events

No.	Issue	Action/details	Report section/ section in the ESAP	Responsibility	Status	Comments
		Community health and safety will need to be coordinated with local municipal bodies such as the fire service, police and ambulance. These commitments will need to be elaborated in the ERP.				
15.	Stakeholder engagement plan (SEP)	Develop and implement a SEP which specifies planned consultation and disclosure activities for the operational phase of the Project. The SEP should also detail the grievance mechanism.	3.2.2.2/ 1.13, 1.14	UAEL within 3 months of FC (CS)	Open	
16.	Service rules	UAEL to revise its service rules and regulations document in order to provide more clarity in regards to working conditions and terms of employment such as normal working hours, overtime entitlements and probation periods.	3.3.2/ 2.1	UAEL prior to operation (CS)	Open	
17.	Employment contracts	Three employment contract copies should be reviewed against IFC PS2 requirements. These contracts should consist of one belonging to a junior, mid-level and senior employee.	3.3.3/ 2.1	UAEL prior to operation (CS)	Open	Include a statement to fulfil this requirement in the letter of commitment
18.	Retrenchment	UAEL to provide a document describing its retrenchment policy.	3.3.6/ 2.2	UAEL prior to operation (CS)	Open	
19.	Workers' grievance mechanism	UAEL must document the workers' grievance mechanism immediately and disclose it to its own employees and verify that all contractors have adequate grievance mechanisms in place.	3.3.7/ 1.14, 2.3	UAEL, ASAP prior to operation (CS)	Open	
20.	Construction occupational health and safety	Improve the health and safety performance on site. Comply with occupational health and safety guidelines of IFC PS 2, in particular through identification of potential hazards to workers and provision of preventative and protective	3.3.9/ 2.4	UAEL, EPC contractor. Immediate implementation (CP)	No longer relevant	

No.	Issue	Action/details	Report section/ section in the ESAP	Responsibility	Status	Comments
		measures. Make appropriate personal protective equipment (PPE) mandatory and enforce its use.				
21.	Operational occupational health and safety	Develop and implement an operational health and safety management plan in line with IFC PS 2 and the principles of OHSAS 18001.	3.3.9/ 2.5, 2.6	UAEL prior to operation (CP)	Open	
22.	Site security, access to site by the public and children	As a priority, fencing should be installed at the site and access, particularly for children, should be restricted.	3.5.2/ 4.1	UAEL, EPC contractor, ASAP prior to operation (CS)	Closed	
23.	Archaeological artefacts (low chance but possible)	Contractors to adopt a chance finds procedure during any remaining excavation works during construction and EPC contractor shall confirm compliance with International Finance Corporation's Performance Standard on Environmental and Social Sustainability – Cultural Heritage (Performance Standard 8).	3.9	UAEL, EPC contractor, ASAP prior to completion of excavation work	Closed	
24.	During teleconference calls held on 11 and 12 May it was brought to Mott MacDonald's attention that the Lenders were discussing compensation to fishermen for the land acquisition directly with UAEL	UAEL should follow up on this issue and update the lenders about the progress on this issue	3.6.1/ 5.2	UAEL prior to FC (CP)	Open	Mott MacDonald

Note: Items in grey colour are those that closed or no longer relevant

The Bangladesh Ministry of Power, Energy and Mineral Resources state that presently 68% of the population of Bangladesh have access to electricity¹. The Ministry's vision is to '*Provide access to affordable and reliable electricity to all by 2021*'. It is recognised if this Project is delivered with completion of the actions as identified in the ESAP, it will be aligned with and contribute to the realisation of a number of economic and social benefits for the people of Bangladesh in line with the Ministry's vision.

Mott MacDonald would like to thank UAEL for their level of responsiveness in the provision of requested information and support in response to clarifications raised during the preparation of this environmental and social compliance review.

¹ <http://www.powerdivision.gov.bd/user/index> accessed online January 2015

1 Introduction

1.1 Background

United Ashuganj Energy Limited (UAEL, 'the Client') has commissioned Mott MacDonald to undertake a review of available environmental and social documentation in connection with the Ashuganj 200MW natural gas-fired power plant project in Bangladesh ('the Project'). UAEL is the Project proponent.

The environmental and social review is being prepared for the Lenders (Standard Chartered Bank, Export Credit Agency (Finnvera), International Finance Corporation (IFC) and Deutsche Investitions- und Entwicklungsgesellschaft (DEG) and other commercial lenders (including Development Finance Institutions (DFIs)), "the Lenders") in order to check compliance with national and international standards and guidance.

This report presents a review of the documents provided and compliance of the Project with the Equator Principles (EP) and thereby with the IFC Performance Standards (IFC PS) (2012) and relevant Environmental, Health and Safety Guidelines (EHS Guidelines).

The proposed Project is located within the Ashuganj Power Station (APS) complex on the east bank of the Meghna River approximately 90km northeast of Dhaka. The location has relatively good transportation infrastructure including the railway and motorway, which connect with Dhaka city. APS complex has a number of existing generating units with a total generation capacity of 891MW. The current Project proposed is a natural gas-fired power plant with a capacity of 200MW. The plant will consist of 20 gas engine generators (9.7MW each), 20 super-heated steam boilers and 1 steam turbine (18MW). It is understood that there are also three more power plants with total capacity of 1125MW currently under construction within the APS complex. The Project is currently under being commissioned and it is anticipated that operations will start May 2015.

The EIA study for the Project dated April 2014 was undertaken to Bangladeshi standards and also references international standards (Asian Development Bank (ADB) and International Finance Corporation (IFC)). Additionally a Social Impact Assessment (SIA) was completed in April 2014. Both studies were updated in February 2015 following the recommendations of Ashuganj 200MW Power Plant Environmental and Social Compliance Report revision 2 issued in January 2015.

1.2 Objective

Due to the involvement of international banks in financing the Project there is a need to assess the Project against international environmental and social assessment standards. The EIA and SIA reports (2014 and 2015) have been reviewed for compliance with international standards and guidance as outlined in:

- World Bank/International Finance Corporation (IFC) Performance Standards (PS)
- IFC Environmental, Health and Safety Guidelines
- Equator Principles (EP) III
- Asian Development Bank (ADB) Safeguard Policy Statement, 2009

Gaps in compliance have been identified within this report and an action plan developed indicating the necessary actions to ensure the Project is compliant with international requirements.

1.3 International standards and guidance

1.3.1 Equator Principles

The Equator Principles 2013 (EP3) is a credit risk management framework for determining, assessing and managing environmental and social risk in project finance transactions. Currently 80 Equator Principles Financial Institutions (EPFIs) in 34 countries have officially adopted the Equator Principles. The Equator Principles apply to projects under consideration for finance with an investment value greater than USD 10million to ensure they are developed in a manner that is environmentally and socially responsible. Under the EP 3, countries are either 'designated' (as having robust environmental and social governance, legislation systems and institutional capacity designed to protect their people and the natural environment) or 'non-designated'. Bangladesh is listed as non-designated, meaning the environmental and social impact assessment is to be evaluated against IFC Performance Standards and the World Bank Group EHS Guidelines. Details of the Equator Principles can be found at:

<http://www.equator-principles.com/>

1.3.2 International standards and guidelines

The International Finance Corporation, part of the World Bank Group, publishes environmental and social performance standards (IFC PS) and environmental health and safety guidelines (IFC EHS) that are internationally recognised and widely referred to in order to demonstrate compliance with best practice in environmental and social issues related to industrial developments.

Details of the IFC Performance Standards and Environmental, Health and Safety Guidelines can be found: http://www1.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/IFC+Sustainability/

1.3.3 Standards and guidelines considered

The international standards, guidance and principles that the Project's assessment has been reviewed against comprise:

- Performance Standards on Environmental and Social Sustainability; World Bank/International Finance Corporation, January 2012
- Environmental Health and Safety General Guidelines; World Bank/International Finance Corporation, April 2007 (EHS General Guidelines)
- Environmental Health and Safety Guidelines for Thermal Power Plants; World Bank/International Finance Corporation, December 2008 (EHS Thermal Guidelines)
- The Equator Principles 3; Equator Principles Association, June 2013

1.4 Documents reviewed

In preparing this report the following documents have been reviewed:

- Environmental Impact Assessment (EIA) of United Ashuganj Energy Limited (UAEL) Ashuganj, Brahmanbaria, Bangladesh prepared by Adroit Environment Consultants Ltd (AECL), April 2014
- Social Impact Assessment (SIA) of the United Ashuganj Energy Limited (UAEL) at Ashuganj, Brahmanbaria, Bangladesh prepared by Adroit Environment Consultants Ltd (AECL), April 2014
- Updated Environmental Impact Assessment (EIA) of United Ashuganj Energy Limited (UAEL) Ashuganj, Brahmanbaria, Bangladesh prepared by Adroit Environment Consultants Ltd (AECL), February 2015
- Updated Social Impact Assessment (SIA) of the United Ashuganj Energy Limited (UAEL) at Ashuganj, Brahmanbaria, Bangladesh prepared by Adroit Environment Consultants Ltd (AECL), February 2015
- Site clearance certificate No.07/2014/67 issued by Bangladesh Department for Environment (DoE) on 24.02.2014 (No.0067) (in Bengali and English)
- EIA Report Approval No.07/2014/158 issued by DoE on 12.05.2014 (in Bengali and English)
- Environmental Clearance Certificate No.538/2013/73 issued by Bangladesh Department for Environment (DoE) on 02.04.2015 (Number – 205)
- Stack emission dispersion modelling of United Ashuganj Energy Ltd., updated in May 2015. The document included cumulative impact from four power plants in Ashuganj Complex area including the impact from the current Project
- Revised chapter 6 of the EIA based on the updated air dispersion modelling, May 2015

Additionally, a Mott MacDonald environmental specialist visited the site on 18 December 2014.

1.5 Structure of report

Table 1.1 provides the outline of the report structure.

Table 1.1: Report outline

Section	Outline of contents
	Executive summary
Section 1 (this section)	Introduction
Section 2	Provides brief Project description
Section 3	Assesses compliance with the national and international standards and guidelines and identifies the gaps between the current stage of the Project and international requirements and states the actions required to close the gaps
Section 4	Summarises the actions required and gives additional recommendations

2 Project Description

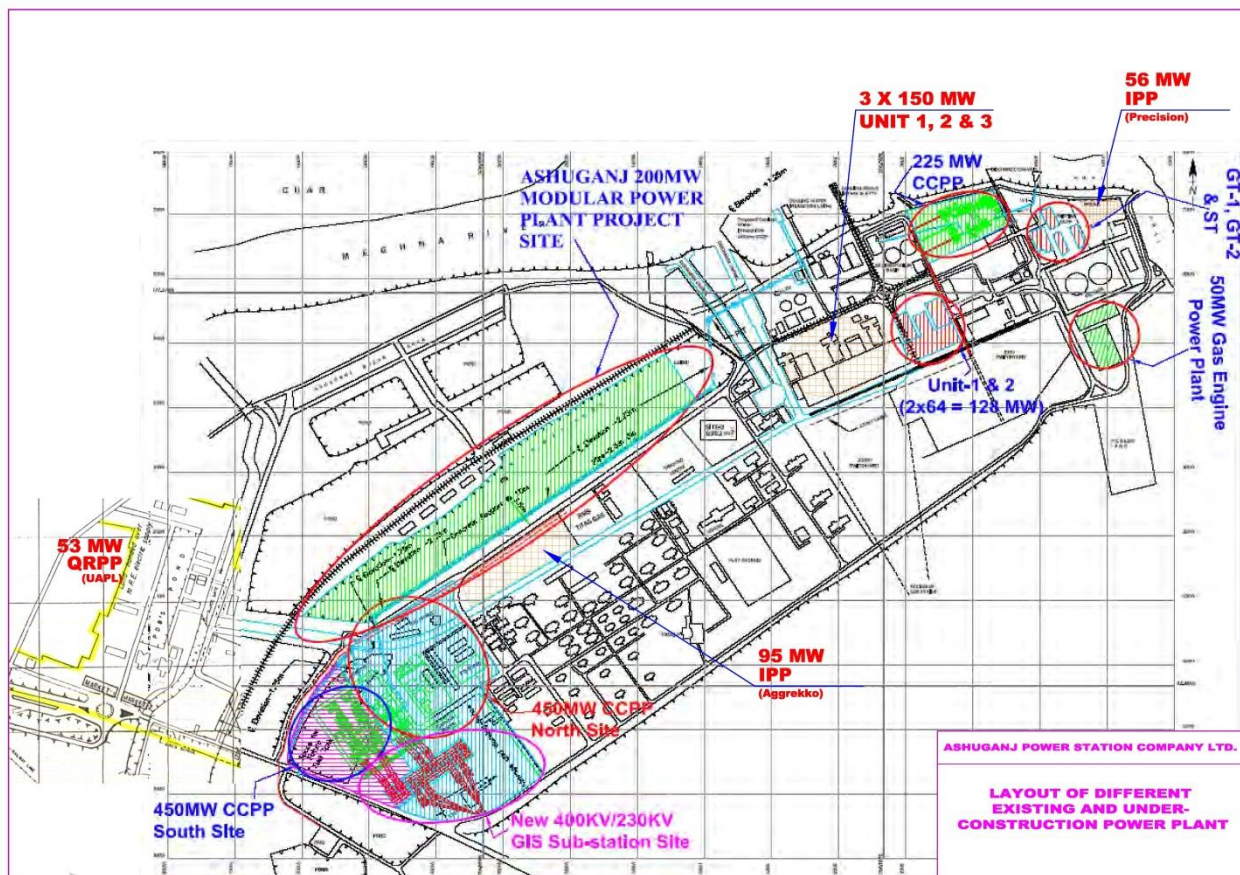
Ashuganj 200MW Project is a natural gas-fired power plant. The Project is at an advanced stage of construction and it is anticipated that operations will start February 2015. Key project details are summarised in the Table 2.1.

Table 2.1: Ashuganj 200MW power plant project

Key Project aspect	Details
Project Proponent	United Ashuganj Energy Limited (UECL)
Corporate office	United Centre, House no. NW(J)-6, Road no.-51, Gulshan-2, Dhaka-1212
External finance	70% foreign currency by International lender (Standard Chartered Bank, Export Credit Agency (Finnvera), International Finance Corporation (IFC) and Deutsche Investitions- und Entwicklungsgesellschaft (DEG) and other commercial lenders (including Development Finance Institutions (DFIs))
Internal finance	30%
Project location	Ashuganj, Brahmanbaria, Bangladesh
Generation technology	Modular type reciprocating engine based combined cycle power plant
Plant capacity	200MW
Annual production	1538 million kWh at 90% Plant Factor
Project cost	US\$ 170Million
Number of engines	20 x 9.73MW
Number of super-heated boilers	20
Number of turbines	1 x 16.1MW
Number of stacks	20
Stack height	30m
Fuel	Natural gas (no back-up fuel)
Total area of land	The power plant is located within the APS complex; Ashuganj Power Station Company Ltd lease land.
Total developed land	6.48 acre
Power transmission interconnection	Power evacuation through the existing Ashuganj substation Three transmission towers and interconnection lines within the APS complex Additional 230kV gas insulated switchgear at the Ashuganj 230kV switchyard
Gas interconnection	10" gas pipeline interconnection to the 'RMS' inlet point Approximate route - 0.5km laid adjacent to the APS complex internal road
Manpower:	
• Construction	• 250-300
• Operation	• 150 (approximately)
Cooling systems:	
• Closed circuit	• 18m ³ /h; water source - deep tube well
• Open circuit	• 6000m ³ /h open circuit; water source - Meghna river
Wastewaters:	Treatment/disposal point:
• Process wastewater	• RO treatment prior to reuse in closed circuit
• STG cooling water	• Discharged to a combined outfall
• Surface/ stormwater	• Discharge outlet to Meghna river
• Sanitary wastewater	• Connection to existing septic tank

Figure 2.1 shows the overall layout of the existing and under construction power plants in the APS complex along with the proposed Ashuganj 200MW plant (the Project).

Figure 2.1: Plan of power plants of the APS complex (red = existing plant, blue = under construction)



Source: UAEL

The Project location is shown in Figure 2.2.

6

3 Environmental and social compliance review

3.1 Overview

This chapter presents the review of the environmental and social assessment of the Project and is indexed in line with the IFC Performance Standards. Recommendations are italicised and appear in the Environmental and Social Action Plan at the end of the document. At the end of the chapter compliance with the IFC PS and the Equator Principles are summarised.

3.2 Assessment and management of environmental and social risks and impacts

The following section considers the assessment with relation to IFC PS1.

3.2.1 Environmental impact assessment

Power plants in Bangladesh are categorised as red category under The Environment Conservation Rules, 1997. The Bangladesh Department of the Environment (DoE) requires red category projects, which includes power generation projects, to undertake an Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA).

The EIA study has been produced to comply with the requirements of the Bangladesh DoE in order to receive an environmental permit (Environmental Clearance) for the Project. The EIA was reviewed and approval was granted by the DoE in May 2014. The study was updated in February 2015 to reflect comments made by the Lender's environmental advisors with respect to achieving compliance with international environmental and social issues.

UAEL has obtained an environmental permit for the operational stage (Environmental Clearance Certificate – 538/2013/73) on 2 April 2015. The document is valid for one year. The Clearance Certificate has a number of terms and conditions with which UAEL will need to comply during the operation of the Project. By doing this UAEL shows that the Project is in compliance with the Bangladeshi environmental permitting process. *Mott MacDonald advises that during the first operational monitoring report to the regulator UAEL informs the DoE that the EIA and SIA were updated to meet international standards and potentially approved by the lenders.*

The EIA documentation considers impacts during construction and operation of the site. The EIA gives general principles for the decommissioning phase, stating that these principles must be reviewed closer to the decommissioning period of the Project. The World Bank gives an average of 20 years of life for similar power plant projects.

We recommend that a commitment to develop a decommissioning plan should be made. Detailed plans and assessment are not considered necessary for decommissioning at this stage. The commitment will bind the Project proponent to developing a decommissioning plan at a pre-defined time.

UAEL should give a commitment to consider potential impacts from decommissioning a minimum of one year before decommissioning is undertaken. This will allow time for appropriate approvals to be obtained.

A report detailing potential impacts and how those impacts will be controlled shall be prepared and submitted to the DoE for review and approval. A Decommissioning Environmental and Social Management and Monitoring Plan should be developed to ensure that proposed control measures are adhered to.

This item shall form a Condition Subsequent to Financial Close. UAEL shall provide a written statement of commitment to comply with this requirement.

3.2.1.1 EIA methodology

Methodologies used to determine the construction and operational impacts have been provided within the EIA.

The methodology used to assess impacts has been broadly defined in the EIA in addition to the steps undertaken for the social impact assessment. The report also notes that EIA Guidelines of Bangladesh DoE for industries have been consulted, considered and used.

This is an appropriate approach to demonstrate Bangladeshi national legislation compliance. However, because international financing is involved and to show international best practice, relevant international standards such as those of the World Bank/ IFC, and the World Health Organisation and the Equator Principles, as discussed in section 1.3, should be explicitly considered within the assessment.

AECL also produced a separate SIA in April 2014 and a revised SIA in February 2015

3.2.1.2 Area of influence

The EIA shows (Figure 4.1) a 1km radius from the project area as the basis for collecting primary and secondary data for the assessment. The EIA also shows (Figure 3.1(b)) a 5km radius drawn from the Project site, but it is not stated if this area formed the basis for collection of data for the report. The area of influence (AoI) has not been clearly defined within the SIA. As the environmental impacts of the Project are different in nature, we consider that the AoI should be topic specific which is not currently the case in the EIA. The ground concentration of NO_x emissions determined by air emission dispersion modelling considered the distance of up to 5km radius around the project site.

3.2.1.3 Associated facilities

The EIA and SIA consider the interconnections of the gas and transmission lines to the local connection point and substation. Both interconnection points are within 1km of the project.

3.2.1.4 Air

Baseline air quality

Following Mott MacDonald recommendations the EIA and SIA were updated by AECL and some new baseline data were collected. AECL Lab undertook ambient air quality surveys on a 24-hour basis at the Project site. The measurements were taken on the following days: 25.02.2014, 27.02.14 and 01.03.2014. All samples were collected near the Project office. The results showing concentrations of PM_{2.5}, PM₁₀, suspended particulate matter (SPM), sulphur dioxide (SO₂), oxides of nitrogen (NO_x) and carbon monoxide (CO) are documented in Table 3.1 along with the allowable limits set by Bangladesh National Air Quality Standards and International/World Bank guidelines.

Table 3.1: Ambient air quality analyses

SN	Sample description	Ambient air pollution concentration in μm^3					
		PM _{2.5}	PM ₁₀	SPM	SO ₂	NO _x	CO
01	Method of analysis	Gravimetric	Gravimetric	Gravimetric	West-Geake	Jacob and Hochheiser	Indicator tube
02	Test duration (hours)	24	24	24	24	24	24
03	Bangladesh (DoE) standard for ambient air	65	150	200	365	100	10,000
04	International/ World Bank standard	75	150	NF	125	150	NF
05	Test result (concentration present) near project office of the proposed plant (sampling date: 25.02.14)	44	163	294	24	39	264
06	Test result (concentration present) near project office of the proposed plant (sampling date: 27.02.14)	51	144	239	26	36	310
07	Test result (concentration present) near project office of the proposed plant (sampling date: 01.03.14)	57	137	247	23	44	314

Source: Extracted from the revised EIA study report, February 2015; NF – not found

It has been noted by Mott MacDonald that the value inserted in the table as Bangladeshi standards for NO_x has an annual averaging time period and not 24 hours as it is given in the table. Bangladesh ambient national air quality standards do not provide NO_x standard for 24 hours averaging time. It is also noted that the term NO_x is a collective term which includes nitrogen oxide (NO) and nitrogen dioxide (NO₂) and that the regulated pollutant is NO₂ which should be reported; this is important in the interpretation of the modelling results as discussed later. Bangladeshi standard for CO given in the table has an averaging period 8-hour and not 24 hours.

Although the monitoring indicates that concentrations are below the relevant standards for every measured component but SPM and PM₁₀, monitoring was undertaken for a very short period of time (three different days for a period of 24 hours each day). Such a short period of monitoring provides only a snapshot of conditions at the time of the survey and cannot be considered a robust representation of long term ambient

air quality at the site. Similarly, it does not allow for fluctuations in meteorological conditions or local emission sources, which could have a significant impact on local pollutant concentrations.

The updated EIA report states that AECL was involved in gathering the ambient air quality data for Ashuganj 450MW CCPP which is situated 300m southwest from the Project. The monitored data comprise monthly concentrations for a period of one year starting from February 2014 and finishing in January 2015. We understand that this information was used for reference only. From the data provided it is seen that the baseline parameter which exceeded Bangladeshi and international standards was SPM. However during the days when 24-hour concentrations were measured both PM_{10} and SPM had exceeded the standards. The EIA study relates high concentrations of PM_{10} and SPM with the ongoing constructions of new power plants in the Ashuganj Power Station Company (APSCL) complex.

The EIA also includes monthly average data for October 2013, November 2013, December 2013 and January 2014 from a continuous air monitoring station located in Dhaka. However, as this location is over 90km from the Project site, it is not considered appropriate to relate these results with the site conditions.

Yearly baseline monitoring data collected for Ashuganj 450MW power plant by AECL and presented in the updated EIA report provides a more comprehensive air quality baseline and provides a better understanding of the real air quality situation in the Project area. The location of monitoring is within the Ashuganj Power Station complex and 300m southwest from the Project. The average annual concentrations result in $33\mu g/m^3$ which is slightly lower than the average baseline concentration collected for a short period of three days ($40\mu g/m^3$). However, it has helped to confirm that the short period baseline monitoring data is in the same order of magnitude with the long-term monitoring and was representative enough for the purposes of the air dispersion modelling.

Air pollution during construction

The area has predominantly sandy-clay soils which can result in dust and particles being exacerbated due to the movement of light and heavy transport vehicles required for construction.

The Project area is reported in the EIA to be an industrial area, however, based on Figure 3.1(a) and 4.1 of the EIA it is noted that there appear to be two schools, two hotels, shops, a training centre and residential area shown within 1km of the Project. There are also a number of power station offices. These should be considered potentially sensitive receptors and explicitly considered within the EIA. Mitigation measures as specified in the EIA will have to be applied to reduce dust generation such as watering down construction routes and implementing dust control procedures during dry periods.

Air pollution during operation

The EIA identified potential gaseous pollutants of concern; sulphur dioxide (SO_2), oxides of nitrogen (NO_x), carbon monoxide (CO) and carbon dioxide (CO_2).

The EIA states that Bangladesh's indigenous natural gas contains no dust and virtually no sulphur. As a result there will be negligible particulates or SO_2 emissions in the exhaust gases from the plant.

The Project will use lean burn mixture of air and gas in the cylinder. The excess of air in a lean burn engine results in combustion of more of the fuel and emits lower NO_x levels.

Following Mott MacDonald's recommendations stated in the draft version of this report (January 2015) AECL repeated the stack emission dispersion modelling with the updated information. The results were included in the revised EIA report released in February 2015. AERMOD version 8.8.9 was used for the purposes of modelling the prediction of NO₂ emissions from the power plant exhaust and its impact on ambient air quality within 5km radius around the plant. This is a USEPA approved modelling system. The concentration distribution was estimated between 500m up to 5km radius from the plant. Model runs only consider normal operation with the HRSG available. The site-specific meteorological input data were obtained from the World Meteorological Organization (WMO) for the period of 01 January 2013 to 31 December 2013 for a site which is situated less than 1.5km from the Ashuganj power plant. While the location of the meteorological station is considered appropriate for representative results we would typically expect at least three years' worth of meteorological data to be considered within modelling, highlighting the worst-case year in subsequent modelling. The wind rose plots for the area were drawn from AERMET programme for pre-monsoon, monsoon, post-monsoon and winter periods. Required input information about the exhaust was obtained from the engine manufacturer specifications. The model calculated the values for 20 stacks as individual source and calculated the summation of emission as a point source of NO₂ emissions. In accordance with the IFC General EHS Guidelines, the minimum stack height should be designed according to good international industry practice (GIIP) and/or confirmed using an approved Gaussian dispersion model. The stack height determination assessment has not been presented in the revised EIA report however two different stack heights, 30m and 40m, were used for modelling ground concentrations. Modelling was conducted for 20 individual engines releasing gaseous emissions as point source with flat terrain. It does not appear that nearby buildings have been included in the model; there are other power plants and tall structures in the area these may influence flow circulation.

In the updated modelling plume volume molar ratio method (PVMRM) was used and the following assumptions were made:

- For background O₃, a single representative value 100 percentile is used (selected in the same way as for the Ozone limiting method (OLM))
- NO₂/NO_x equilibrium ratio = 0.90 unless information is available to justify using a different value
- NO₂/NO_x in-stack ratio = 0.10 unless information is available to justify using a different value

It is important to know what has been assumed in the interpretation of the modelling results. The assumptions stated above correspond to a very conservative method and represent the worst case scenario.

NO₂ concentrations modelled are presented as 1h, 24h and annual average concentrations. Dispersion modelling results show ground level concentrations of NO₂ at various downwind distances on contour plots. The ambient data used in the evaluation of the modelling results is 24-hour average concentration measured by AECL on 25, 27 February and 1 March 2014. The maximum concentration values are reported. Predicted concentrations at specific sensitive receptors are not presented within the EIA.

Ground level concentrations of NO₂ with 30m stack height

For a 1h averaging period the maximum concentration of the Project process contributions is predicted to be 90-100µg/m³ at the radius 700-1000m from the plant. Beyond this radius the maximum predicted concentrations gradually decrease from 50-60µg/m³ to below 50µg/m³. As no Bangladesh standard exists for a 1h averaging period this has been compared to the international ambient standard of 200µg/m³ given within the EIA. A process contribution of 100µg/m³ is equivalent to 50% of the applicable international ambient standard. However it is not clear whether the maximum predicted concentration is common or only expected in rare conditions. Typically we would expect an air modelling assessment to provide further details on this aspect through consideration of a 99.8 percentile or equivalent (up to 18 exceedances in a year) which allows for exceptional conditions to be excluded.

For a 24h averaging period the maximum concentration of the Project process contributions is predicted to be 10-20µg/m³ at a radius of 100m north and south and 2000-5000m radius respectively. As no Bangladesh standard exists for a 24h averaging period this is compared to the international ambient standard of 150µg/m³. This magnitude of impact to air quality of the process contributions is equivalent to 13% of the applicable 24 hour ambient international standard. When added to the measured ambient air quality (40µg/m³, 24h averaging period) it results in a predicted ground level concentration of (60µg/m³), 40% of the national standard, though as noted previously, the level of monitoring undertaken for the EIA is not considered robust enough to define the ambient air quality. The averaged annual concentrations collected for a different power plant within the Ashuganj power complex site result in a slightly lower NO_x baseline concentration of 33µg/m³.

For an annual averaging period the maximum concentration of the Project process contributions is predicted to be 3-5µg/m³. This is compared to the national ambient standard of 100µg/m³. This magnitude of impact to air quality of the process contributions is equivalent to 5% of the applicable ambient national standard.

Ground level concentrations of NO₂ with 40m stack height

The updated dispersion modelling considered a stack height of 40m. Neither the EIA report nor the emission dispersion modelling report provides details of how this stack height was chosen.

Results of the air dispersion modelling considering 40m stack height differ from those for 30m stack height. For a 1h averaging period the maximum concentration of the Project contribution is predicted to be 60-80µg/m³ at a radius of 500-1000m from the plant. When this concentration is compared with the international standard for 1-hour averaging period (200µg/m³) it gives a contribution of 40% of the applicable international ambient standard. As mentioned previously the modelling does not state the frequency of such exceedances.

We recommended in our previous report an air modelling assessment to provide further details on this aspect through consideration of a 99.8 percentile or equivalent (up to 18 exceedances in a year) which allows for exceptional conditions to be excluded. This recommendation was not addressed.

Maximum concentration of the Project process for a 24h averaging period gives the contributions of 10-20 $\mu\text{g}/\text{m}^3$ at a radius of 100m north and north-west of the plant. The magnitude of impact to air quality of the process contributions is equivalent to 13% of the applicable 24 hour ambient international standard. This magnitude is equal to the same concentration (24h averaging period) from the Project process with the stack height of 30m.

It is noted that there is no difference in maximum concentrations for 24h averaging period between 30m and 40m stack height.

An annual maximum concentration of the Project process contributions is predicted to be 1-4 $\mu\text{g}/\text{m}^3$. The national ambient standard is 100 $\mu\text{g}/\text{m}^3$. This magnitude of impact to air quality of the process contributions is equivalent to 3% of the applicable ambient national standard.

The updated EIA report concludes that 40m stack height should be implemented by UAEL for the Project.

IFC has directly requested UAEL/ EIA consultant to update air quality modelling taking into account information available from EIA reports prepared for other power plants in the Ashuganj Complex. The revised documents were shared with Mott MacDonald on 21 May 2015. The review of the document showed that the model was run to calculate the contribution from four power plants together. The model considered different stack heights for Ashuganj 200MW power plant. Both 30m and 40m stack heights were used to determine the cumulative impact. The results showed that even with 30m stack height cumulative 1h averaged ground level concentrations were predicted to be 140 $\mu\text{g}/\text{m}^3$ at a radius of 1000m north and south and at a radius of 500m east and west from the power projects (the model does not state what was taken as a centre point, was it Ashuganj 200MW power plant or a centre of the Ashuganj complex). This cumulative impact is within the relevant international ambient air quality standard of 200 $\mu\text{g}/\text{m}^3$. When the model was run with 40m stack height for Ashuganj 200MW power plant the short term cumulative concentrations were predicted to be 90 $\mu\text{g}/\text{m}^3$. This lies within relevant international air quality standard.

Mott MacDonald's previous recommendation was that a stack height calculation should be undertaken to demonstrate that the proposed stack height of 30m is sufficient for proper dispersion and prevention of excessive ground level concentrations. In the updated air dispersion modelling two different stack heights were considered without clear explanation how they were chosen. Based on the modelling result the predicted potential maximum short-term (1 hour) process contributions with 30m stack height is 50% of the relevant international ambient air quality standard and with 40m stack height the Project will add 40% of the relevant international ambient air quality standard. Both values are excessive compared to the IFC Thermal Power Plant Guideline (2008) of projects not contributing more than 25% of the relevant ambient air quality standard.

AECL concludes in the EIA that 40m stack height is the best option for UAEL and that this is the height which should be chosen for the Project. Given the construction of the plant is already complete and the arbitrary approach in choosing the stack height Mott MacDonald does not see this recommendation bringing a significant benefit to the dispersion of ground level concentrations.

Mott MacDonald recommends that the stack height calculations should be carried out in line with Good International Industry Practice (GIIP). This can be achieved in several ways. The information on how this can be undertaken in its simplest form can be found in IFC General EHS Guidelines Annex 1.1.3 – Good International Industry Practice (GIIP). Stack Height. It is also common practice to use a dispersion model to explore the most appropriate stack height (eg 20m, 30m, 40m, 50m) taking into account ground level concentration improvements as stack heights increase. The cumulative impact assessment undertaken for four power plants in the area showed that even with 30m stack heights the air emissions do not breach the international and national ambient air quality standards.

Provide further information to allow better understanding of the modelling results; specifically:

- *Further details on the frequency of 'maximum' process contributions*
- *Are the reported maximum concentrations absolute maximums or have a limited number of exceedances been allowed for (ie, 1-hour result presented as the 99.8%ile which allows for up to 18 exceedances in one year)*

This may help to improve the results. Perhaps after removing absolute maximums from the results, if their frequency is very small, it will show that the overall project contribution is below 25%.

One of the conditions of the operational Environmental Clearance Certificate is that air quality parameters such as SMP , SO_x , NO_x , and CO will be monitored regularly in locations having down wind direction and in locations that have the maximum ground level concentrations. The result of the monitoring must be submitted to DoE quarterly.

Given the process contributions of the Project have been assessed to potentially contribute 50% of the short-term (1 hour) ambient air quality standards (for 30m stack heights), which is greater than the 25% threshold stated in the IFC Thermal Power Plant Guideline (2008) to trigger a requirement for operational stage continuous ambient air quality monitoring typically comprising two systems, one located at the location of predicted maximum concentration or a relevant sensitive receptor and the second located at a background point. Design mitigations, such as a significantly greater stack height, may have been able to improve dispersion in this regard but since construction is complete options for mitigation are limited.

The Project contribution to the Bangladesh annual NO_2 ambient air quality standard of $100\mu\text{g}/\text{m}^3$ is estimated to be 5%. The UAEL 200MW plant is only one of several gas fired power plants on the Ashuganj power complex site, the majority of which are owned and operated by the government owned Ashuganj Power Station Company Limited (APSCL) which will have part ownership of this Project. For this Project (Ashuganj 200MW power plant) it is appropriate to request UAEL to install one continuous ambient air quality monitoring station. Mott MacDonald have previously advised UAEL to determine if the current or proposed power plants have or are going to install permanent real time ambient air quality monitoring stations and UAEL have confirmed that currently there are no ambient air quality monitoring stations at the Ashuganj power complex. Mott MacDonald recommends UAEL explores the opportunity for collaboration with other existing plants and plants under construction on the APS complex site to install an ambient air quality monitoring station and share the operating costs and data. Ideally, all operators within the APS complex should cooperate and install two ambient air quality monitoring stations for the entire complex,

sited as recommended above, and share costs. This approach would be efficient and result in reasonable shared costs.

In the event that other plant owners/operators are not willing/able to collaborate on installation and operation of an ambient air quality monitoring station(s) UAEL must install a suitable ambient air quality monitoring station. Opportunities to recover some of the capex and opex costs associated with the monitoring station could come from charging other power plant operators for data when it is required.

The framework EMP states that the stack emission testing of NO_x, SPM, O₂ and temperature will be undertaken once every 3 months however, in line with the IFC guidelines, continuous emissions monitoring and annual stack testing for NO_x is required for a 200MW plant. At the time of writing this report UAEL confirmed that the Operational Environmental and Social Management and Monitoring Plan (OESMP) is being developed.

[Note: the site visit undertaken on 18 December 2014 revealed that the stacks are already in place (see Figure 3.1)]

Figure 3.1: Stacks



Source: Mott MacDonald, December 2014

Cumulative impacts

The short time period (24hours) of baseline ambient air quality data may not have captured the impact of other existing power plants in the APS complex due to varying meteorological conditions or plant operational factors. Therefore the air quality assessment cannot be considered to constitute a robust

cumulative assessment including the influence of the emissions of existing plants. The annual baseline data presented in the updated EIA report for reference may reflect the cumulative impact, however more details are needed on the method of monitoring for example, was it one day per month for 24hours or diffusion tubes. SPM was the only parameter which had exceedances almost every month during the year of monitoring (February 2014 – January 2015). But the EIA relates these exceedances with the ongoing construction at the APS complex.

IFC PS 1 also requires consideration of planned or reasonably defined future developments as part of the cumulative impact assessment. The air quality assessment has not considered the three other power plants with total capacity of 1,125MW that are currently under construction within the Ashuganj Power Station complex.

Information on the two other power plants with total capacity of 675MW that are currently under construction within the Ashuganj Power Station complex should be obtained if possible, e.g. from their EIA's, and the air quality assessment updated to consider the potential cumulative impacts at the APS complex.

Carbon

The EIA section on carbon dioxide emissions does not align with IFC guidelines.

Based on GIIP UAEL should:

- *Estimate CO₂ emissions per unit of energy (kWh) generated for the current power plant and compare this value with Bangladeshi and international benchmarks*
- *Quantify annual CO₂-equivalent emissions for the plant. If the obtained number exceeds 25,000 tonnes of CO₂-equivalent annually, commit to computing direct CO₂ emissions from the facilities owned and controlled within the physical Project boundary, as well as indirect CO₂ emissions associated with the off-site production of energy (generation electricity by others) used by the Project (if any). Quantification shall be conducted annually in accordance with internationally recognised methodologies and good practice*

The international performance standards for CO₂ emissions for the new gas fired power plants are provided in Table 3.2.

Table 3.2: Typical CO₂ emissions performance of new thermal power plants

Typical CO ₂ Emissions Performance of New Thermal Power Plants		
Fuel	Efficiency	CO ₂ (gCO ₂ / kWh – Gross)
Efficiency (% Net, LHV)		
Gas	38-45 (Gas Engine)	531-449 (Net)

Source: IFC EHS Thermal Power Plants

Bangladeshi average kg CO₂/MWh is estimated as 585kg CO₂/MWh for 2009 based on the latest data available from the IEA.

3.2.1.5 Water resources

The EIA states that water supply has been assessed and it was found that adequate water is available from the Meghna River to support a once-through cooling system for the proposed power station. The water requirement of the once-through cooling system is approximately $1.67\text{m}^3/\text{s}$.

The hydrological data used in the EIA was collected from Surface Water Processing Branch of Bangladesh Water Development Board (BWDB), for the years 1998, 2000 to 2006 for the Meghna River confirming availability of water to be adequate for the cooling purposes of the Project.

The power process will have two cooling systems. The EIA states that wastewaters from closed circuit cooling process will be recycled after cooling in the cooling tower with small amount ($15\text{m}^3/\text{h}$) of make-up water added. It is stated in the EIA that some part of the process water from open circuit cooling system will undergo a treatment process. The process is described very briefly. Process wastewater will first go through the iron and multi-media filters prior to first-stage reverse osmosis (RO). Following that, the water goes to a storage tank. From here some part of water will be taken and used as make-up water in cooling tower of closed circuit cooling process. The remaining water from the storage tank undergoes second-stage RO treatment producing demineralised water. Demineralised water will be fed to the waste heat steam boiler. The EIA description of the ultimate discharge of cooling waters to the outfall is not clear. In response to our requests UAEL has stated that cooling waters from the open circuit cooling system will be discharged to the combined outfall channel without any treatment.

UAEL confirmed that the surface wastewater will not be treated and will be disposed to the Meghna River.

Thermal pollution during operation

There is no evidence that thermal plume modelling has been used in determining the environmental impact of the heated water to be discharged into the river Meghna.

Publicly available EIAs for other power plants operating together in the APS complex area (<http://www.miga.org/projects/index.cfm?esrsid=66>) estimate the total discharge volumes to Meghna River of existing power plants in the APS complex is over $56.4\text{m}^3/\text{sec}$. Discharge from the Ashuganj 200MW power plant to the river will be $1.67\text{m}^3/\text{sec}$, stated to be 7°C above ambient water temperature. The DoE standard for industrial discharge to inland surface water is an absolute value of 40°C . The Meghna River temperature was measured by AECL Lab in May 2013 as 26°C and the average river temperature stated in the EIA is 30°C . Assuming the stated 7°C rise in discharge temperature the Project's discharge should be able to remain compliant with the national standard. The EIA states that in the mixing zone, due to instant mixing with equal mass of water the temperature will be reduced to 34.04°C and that this increase in water temperature will not have any significant impact on river water temperature. The Ashuganj 200MW power plant discharge will enter a common discharge channel of other plants in the APS complex, prior to discharge into the river. During the site visit it was noted that the current discharges from this common outfall consisting of discharges from the other existing operational plants were visibly steaming (see Figure 3.2). The site visit was undertaken during construction of the Project and therefore the existing outfall was being influenced by existing plants only.

Figure 3.2: APSCL complex two common outfalls



Source: Mott MacDonald, December 2014

The cumulative impact from all existing and operational plants in the APSCL complex area was not considered within the EIA. Given the size of proposed discharge from the Ashuganj 200MW power plant ($1.67\text{m}^3/\text{sec}$ effluent release to the common outfall channel) in comparison to that of the already existing operational power plants in area ($56.4\text{m}^3/\text{sec}$) and those currently under construction, the contribution of this plant is not considered significant.

The EIA states that an ecology survey has been undertaken assessing and quantifying “to a certain extent” the flora and fauna richness. However, the EIA is lacking sufficient detail on the methodologies used. The sections for each species do not describe exactly what was done and where (shown on a map). These details are required because the surveys need to be repeatable and to allow any changes to be monitored against the baseline.

Continuous monitoring of the temperature of the discharge to the common outfall is not specified.

The EIA does not state whether any pretreatment chemicals will be added to the intake or process waters. UAEL have submitted additional information about chemicals used for boiler feedwater. These chemicals are:

- Reverse osmosis (RO) antiscalant (20mg/litre)
- Caustic soda (only if pH is low) (0.5kg/day)
- The remaining impurities will be treated in the water treatment plant (WTP)

It is recommended that during operation UAEL undertake continuous monitoring of the temperature of their discharges immediately prior to them entering the common outfall channel. This is so UAEL can

demonstrate compliance of their plant to the national discharge standards separate from the potential influence of the discharges from other plants over which they have no control.

Wastewaters

The EIA does not provide enough detail on how each wastewater stream is handled, what treatment process are involved and what are the final disposal routes.

The EIA states that stormwater and sanitary drainage systems should be separate. The EIA states that sanitary wastewaters will be sent to an existing septic tank in the APS complex. The treated water from the septic tank will be discharged through a soak pit. The capacity of the septic tank is to be verified by the contractor as sufficient to cater for the additional load arising from the Project. The septic tank should be connected to a soak away by an overflow pipe where the liquid effluent can be drained. The EIA states that surface/stormwater runoff will go to the surface water drainage system which should include all necessary gutters, down pipes, gullies, traps, catch pits and manholes. UAEL clarified that the surface wastewater will have no treatment process and will be discharged to the Meghna River. The capacity of the surface water drainage system should be sufficient to deal with a storm return period of 1 in 5 years

The environmental management plan (EMP) states that the parameters which will be monitored for surface water quality at the intake and outfall are TSS, TDS, COD, BOD, pH, oil and grease, total nitrogen, total phosphorus and total coliform. The exact monitoring location is not provided. The frequency stated in EMP is "once in 3 months".

During operations monthly water quality analysis of the discharge water immediately prior to entering the common outfall should be undertaken for parameters in the national and IFC effluent discharge standards. If consistent compliance is demonstrated monthly monitoring frequency may be reduced to quarterly subject to agreement with the MoE/lenders.

UAEL should confirm discharges can meet with the most stringent standard between Bangladeshi and World Bank standards.

3.2.1.6 Noise

Ambient noise

The ambient noise measurements were undertaken by AECL Lab on 25 February 2014 for 24 hours using the noise level meter near the Project office of the proposed power plant. The results given in the EIA report shows that the ambient average noise level ranges from 63.74 – 75.12dBA (L_{Aeq}) during the daytime (07:00 – 22:00) and from 67.18 – 76.19dBA (L_{Aeq}) during the night time (22:00 – 07:00).

For both the daytime and night-time noise levels reported, hourly average values are above the national standard and international standard applicable to industrial areas (National: 75dBA for daytime and 70dBA for the night-time; International: 70dBA for both, daytime and night-time). The report attributes the existing high ambient noise levels to other power plants in the APS complex.

Noise during construction

Noise and vibration are normally generated from construction activities such as piling of foundations, crushing of stones and bricks, installation of machines and equipment and by the use of heavy machinery.

Careful consideration will have to be given to the sensitive receptors in the area such as residential buildings, markets and the UAEL office.

UAEL will need to include appropriate noise reduction measures and/or consideration of noise barriers between the site and residential properties where appropriate.

Noise during operation

Noise pollution modelling for Ashuganj 200MW power plant was computed using CUSTIC 3.2 software. The ambient sound level used in the modelling was 60dBA(L_{Aeq}). This level AECL assumes as the background noise level and this number should correspond to 12am night-time. Table 4.12 in the EIA report gives a different average number for this time – 66.44dBA. It is not clear why this number was used for the modelling when the measured ambient noise levels were higher (around 70dBA). The predicted values were computed for different distances starting from 20m and extending to 400m. Noise attenuation at different distances as a result of the modelling output is given in Table 3.3.

Table 3.3: Predicted sound level at different distances

Radius, m	20	50	100	200	300	400
Output sound level, dBA	30.20	25.17	20.14	15.10	10.07	05.03
Ambient sound level, dBA	60	60	60	60	60	60
Summation of two sound level	60.004	60.001	60	60	60	60

Source: Extracted from EIA

The ambient noise level should be measured at more than one location, at the four fenceline points and most importantly at the closest sensitive receptor (eg, residential facility on site, training centre).

No consideration is given to vibration. Stationary engines often cause ground-borne vibration which can impact on nearby sensitive receptors. It is acknowledged that the engines have been installed on substantial foundation blocks with vibration attenuating material between the foundation block and the surrounding structures. Nonetheless information should be provided on guaranteed vibration levels given by the engine suppliers/installers.

The noise modelling study does not provide details on how the input data was chosen. Ambient data used for analysis of the modelled results is 60dBA. However table 4.12 in the revised EIA report gives higher measured ambient noise levels even for the time specified (12am). Most of the values in the table were higher than 60dBA and closer to 70dBA. No additional information was provided justifying why 60dBA was selected as the ambient noise level and identifying the location of sensitive receptors and the distance between the Project noise sources and the receptors.

Information should be provided on guaranteed vibration levels given by the engine suppliers/installers.

Certain mitigating measures that have been identified, such as critical type silencers, will be used in the stacks. Gas generators will be enclosed in the buildings acoustically designed, providing styrofoam filler of 50mm width in between 150mm thick brick walls on the both sides of the styrofoam filter. EIA states that the styrofoam filter and brick wall together are able to absorb the noise from the engine room and the approximate engine room noise is around 90dBA near the generators and turbine. The noise due to running of the machines will be reduced through the use of acoustic enclosures.

The EIA noise assessment states that the proposed 200MW plant will comply with Bangladeshi and international noise standards. However, noise impacts were not satisfactorily demonstrated in the EIA and in order to establish compliance with international guidance and best practice the following is recommended:

A detailed noise impact assessment, including consideration of the effects of decommissioning of any units, should be undertaken. The assessment should indicate the distance to the nearest sensitive receptors and provide the Project contribution to noise level at these nearest sensitive receptor locations. Noise levels should be within Bangladeshi standards. If breaches of the standards are caused by construction activities appropriate mitigation measures shall be implemented. Overall consideration of cumulative noise is poor. The cumulative impact should be considered in coordination with other power plants and under DoE management.

3.2.1.7 Land quality

We have no evidence that a contaminated land survey has been undertaken. Mott MacDonald considers that the risks associated with contaminated land for the site for the power plant is moderate. The land is within the boundaries of the APSCL industrial compound and the historical land use is not known. The land may have been contaminated from historical activities.

Under normal circumstances it is important that the current condition of the soil and groundwater is known prior to commencement of construction so that no liability for contamination clean-up is adopted with the site. As per site visit in December 2014 it is clear that the Project is already at a very advanced stage of construction therefore detailed soil and groundwater contamination survey would be impractical to undertake at this time.

However, it is recommended that a review of ground condition/contamination liabilities is undertaken for the site.

3.2.1.8 Ecology (terrestrial and aquatic)

Baseline

The predominant ecological setting of the wider area is homestead, agricultural vegetation and roadside vegetation. The EIA study in this regard was based on a field survey and available published and

unpublished information. The study concludes there are neither wildlife sanctuaries nor any reserve forest or areas of particular ecological concern in the area of influence of the Project.

Maps provided in the EIA illustrate that no protected habitats or reserve forests occur within 50km of the site. It is, therefore, concluded that these areas are outside of the Project's area of impact.

We consider that as the plant is at an advanced stage of construction limited consideration of the ecology already removed is possible.

Terrestrial fauna

Although a number of species are known to be present in the area of impact including many common birds typical of the open Bangladesh countryside there is no evidence of significant terrestrial species or endangered species within the Project area. Endangered species in particular are almost certainly absent due to the lack of suitable natural habitat within the site.

Aquatic fauna

The River Meghna provides habitat for a wide variety of fish and shellfish species. As outlined in section 3.2.1.5, thermal pollution caused by cooling water discharged to the river was not assessed and, as a result, the impacts that the rise in temperature could have on the variety of fish species is not known. Considering the volume of the discharged cooling water from the Ashuganj 200MW power plant to the volume of water discharged from other already operating power plants in the APS complex area we find it reasonable not to undertake the thermal modelling for this plant separately.

Further studies on the thermal pollution caused by cooling water discharged to the river will need to be undertaken to fully assess the impacts that the rise in temperature could have on the variety of fish species. However, given the size of this plant it would be more appropriate that the cumulative study should be undertaken in coordination with other operating plants in the area and under the DoE management.

Aquatic flora

The EIA provides limited information on aquatic flora. As indicated above, given the limited impact of the Project due to the small volume of discharge water compared to the existing and proposed plants detailed consideration of aquatic flora, whilst undesirable, is considered acceptable.

3.2.1.9 Waste

The majority of wastes associated with the Project will be produced during construction. These wastes will include materials such as bricks, concrete and scrap metals. Should contaminated wastes be generated then these need to be disposed of at appropriate hazardous waste disposal sites. Recyclable waste materials will need to be collected separately.

The EIA states solid wastes generated during operation will include waste generated by people working at the Project site. Wastes will include filters and other consumables. We advocate that all the mitigations and recommendations be included in a Project specific waste management plan.

A waste management plans (WMP) should be developed for the operational phase. The WMP should be specific to the project and include details such as, but not limited to, waste details, sites for disposal, copies of consignments notes, assignment of responsibilities including named individuals within the UAEL with responsibility for waste management. The WMP should be prepared by UAEL and should comply with Bangladesh legislative requirements and guidance as a minimum.

Preparation of the WMP shall form a Condition Subsequent to Financial Close and shall be completed and approved before commercial operation of the plant commences.

3.2.1.10 Traffic and transport

The EIA states the existing main road network to the Project site to be in good condition. During the site visit on December 2014 it was observed that within the Project boundary there is limited control on vehicle movements and there is limited fencing or site security. The EIA states that a security fence 3m height should be placed around the permanent boundary of the site. However, only limited fencing was observed and people living nearby can access the site including a number of children were observed in the construction site areas.

After our previous report UAEL have sent us the evidence that the fencing was installed around the power plant (see Figure 3.8 and Figure 3.9).

Traffic movements during operation should be limited to personnel and maintenance vehicles. It is considered that the existing road network has sufficient capacity to accommodate such movements without significant impact.

It was noted in the social impact assessment that consultation with the local community raised the following concerns regarding traffic in the Project area:

- Requested provision of a safer road crossing for movement of people and cattle adjacent to the site
- Requested repair of local roads damaged by construction vehicles

Following our report appropriate fencing was installed at the site and access, particularly for children, was restricted.

3.2.1.11 Landscape and visual

The EIA describes the landscape around the Project site as anthropogenic industrial. Due consideration has been given in designing the Project infrastructure to avoid visual intrusion. The EIA states that the 200MW plant is planned to have modern architectural characteristics that will not create significant visual intrusion from any direction given the industrial nature of the existing facility. This issue is therefore not considered to be significant.

3.2.1.12 Socio-economic

The EIA report includes a separate social impact assessment that identifies and assesses project-related adverse and beneficial social impacts. This document is discussed in more detail in section 3.2.2.

3.2.1.13 Natural hazards

Flooding and other natural disasters such as cyclones and earthquakes are common phenomenon throughout Bangladesh. A flood study has not been provided. A framework emergency response plan (ERP) has been produced and responsibilities and lines of communication are described. Detailed plans for specific emergency scenarios have not been developed. The EIA states that the Project authority will undertake necessary disaster management to protect the properties from water logging/flood and that all structures will be elevated taking the highest flood level into consideration.

We recommend the ERP be further refined and developed to identify specific emergency situations and the necessary responses. A flood risk assessment (FRA) and flood management plan (FMP) should also be developed.

The ERP (also known as a disaster management plan) should be specific to the Project and include details such as, but not limited to, details of potential emergencies (for example, fire, explosion, flooding, terrorist attack) and specific emergency procedures and responses for each identified emergency, assignment of responsibilities including named individuals and reporting and investigation procedures. The ERP should consider the effect of potential emergency events from neighbouring facilities. The ERP should include details on how coordination with the neighbouring facilities will be undertaken in responding to emergency events.

UAEL have responsibility for these actions.

Preparation of the ERP shall form a Condition Subsequent to Financial Close and shall be completed and approved before commercial operation of the plant commences.

The FRA should be specific to the Project and include assessment of the 100-year event risk. The ERP shall be the responsibility of UAEL and shall be completed and approved before financial close.

Preparation of the FRA and FMP shall form a Condition Subsequent to Financial Close and shall be completed and approved before commercial operation of the plant commences.

3.2.1.14 Environmental and social management and monitoring plan

The EIA has identified the major impacts and has put forward mitigation measures and provided a framework of an environmental management plan (EMP). The EMP forms an essential part of an EIA as it relates to the implementation of the measures prescribed in the EIA to reduce the adverse impacts to acceptable levels and to enhance the beneficial effects.

Detailed EMP and social management plan (SMP) have been requested from UAEL by Mott MacDonald for review. UAEL have confirmed that these documents are under development. The EMP and SMP should be prepared before the start of operation. UAEL advised that the power plant is currently undergoing test runs. This poses a risk to the lenders because it means that operation may start without the guidance of an EMP and SMP, although UAEL committed, in the EIA report and SIA report, to develop an EMP and SMP.

UAEL has provided a written statement of commitment that UAEL's management standards (as described within the EIA report and SIA report mitigation sections) have been complied with during the remaining construction period by the contractors and UAEL.

Construction environmental and social management plan (CESMP) should have been prepared before the start of the construction phase. UAEL is responsible for ensuring the EPC contractor (Neptune Commercial Ltd. (NCL)) had developed CEMP and implemented all the mitigation measures throughout the construction stage. Given the construction is complete it does not seem reasonable now to develop CEMP and CSMP.

An operational management plan (OEMP) should be prepared before the start of the Project operation. Following the structure of the previous studies (EIA and SIA) it can be two documents, OEMP and OSMP, or one combining environmental and social aspects together (operational environmental and social management plan -OESMP). UAEL is responsible for preparing the document. The OESMP may also need to be submitted to the Bangladeshi DoE for review and approval. This should be confirmed with the consultant who prepared the EIA and SIA studies. Operational Environmental Clearance Certificate No.538/2013/73 states that UAEL should monitor emitted parameters and submit result of the monitoring to DoE on a quarterly basis. Developed OESMP should set the procedures for monitoring and reporting.

The OESMP should be developed and should contain measures to monitor and record all mitigation and monitoring measures identified in the EIA study and the SIA study and associated documents and the recommendations made in this report including in the ESAP presented in Table 4.1 of this report to assist in complying with international requirements.

The operational ESMP shall be prepared and approved before commencement of commercial operation. If it is a requirement of the DoE the plan shall be submitted to them for review and approval. If there is no such requirement the plan should be reviewed and approved by UAEL.

This item shall form a Condition Subsequent to Financial Close

Reporting

In line with the requirements of IFC PS 1 compliance with the requirements of the EIA, the SIA and the ESAP need to be reported in order to verify that the identified actions/mitigations are being undertaken.

Six-monthly reporting of compliance and progress with the requirements of the EIA, SIA and the ESAP should be undertaken throughout the operation phase of the project (frequency may alter as the

operational phase of the project progresses; i.e. when the operation of the project is consistently shown to comply with environmental requirements). Audits and reports shall be undertaken by an independent third party consultant who has appropriate experience in international standard ESIA compliance auditing and reporting. Reports will be provided to the lenders for their review and comment as appropriate.

UAEL shall contract a suitable third party consultant who will be approved by the lenders. All mitigation measures identified in the EIA report, the SIA report and the ESAP (see Table 4.1 of this report) must also be complied with.

Quarterly monitoring reports should be produced and submitted for review to the DoE.

These items shall form a Condition Subsequent to Financial Close to be complied with within six-months of commencement of operation.

Adoption of mitigation measures

Mitigation measures are contained within the EIA report and the Environmental and Social Action Plan (ESAP) presented in Table 4.1 of this report.

All mitigation measures identified in the EIA shall be integrated into UAEL policies and method statements as appropriate. A statement of commitment to this effect should be prepared by UAEL as soon as possible given the stage of construction of the Project.

Organisational capacity

It is understood that UEPSL are in the process of ISO accreditation (9000, Quality Management System; 14000, Environmental Management System; and 18,000 Occupational Health and Safety Management) certifications. This is a positive move and is applauded. Successful accreditation to the ISO management standards will demonstrate compliance with best practice in environmental, systems and health and safety management.

It is recommended that ISO accreditation in a defined timescale is made a condition of financing.

Environmental monitoring plan

An environmental monitoring plan has been tabulated as part of the framework EMP. The monitoring is proposed but further details are needed of the parameters to be monitored and the methods to be used to ensure that operational phase is fully considered. Monitoring identified for the operational phase includes stack emissions, ambient air quality, noise level and surface water quality monitoring.

Detailed monitoring programmes should be developed as part of the OESMP.

Training

Typically training programmes contain the following information:

- Identification of training needs for employees
- Development of a training plan to address defined needs
- Verification of training programmes to ensure consistency with organisational requirements
- Training of target employees
- Documentation of training records
- Evaluation of training received

The Project management team is identified as having responsibility to arrange training of personnel. Staff for the Project will have the training and experience needed for the job. The same will be required for the Project teams and personnel of the suppliers. We have reasons to believe that appropriate training will be given to employees prior commencing their contracts.

3.2.2 National social impact assessment

Mott MacDonald has reviewed the project's Social Impact Assessment (SIA) document, updated in February 2015 and the results of that review are set out below.

3.2.2.1 Assessment and management of environmental and social risks and impacts

To complement the EIA report, UAEL produced a separate SIA report that identifies and assesses project-induced social impacts, both adverse and beneficial.

Within an SIA, lenders expect that social risks and impacts are assessed using a clear methodology and criteria through which significance can be attributed to impacts. UAEL's SIA methodology is unclear and social impact significance criteria considering severity and scale of impacts do not appear to have been used. The SIA does not include adequate and appropriate impact mitigation and benefit enhancement measures to feed into a SMP designed to appropriately address the Project's construction and operational impacts. As noted above, a SMP has not been produced.

The SIA and the social sections of the EIA include a number of gaps. A key gap identified was insufficient relevant social baseline information that is needed to demonstrate that social impacts have been assessed appropriately and accurately. Another gap is that the SIA contains inadequate analysis of the Project's impacts, in particular in relation to community and workers health and safety.

Given that the project is expected to become operational in May 2015, there are limited actions which can now be implemented to mitigate the impacts and risks that emerged during the construction phase. Therefore, it is recommended that UAEL undertake an abbreviated SIA focusing on the operational phase of the project. This abbreviated SIA should then help UAEL identify the key impacts during the operational phase and determine the adequate management measures. These management measures should then be included in the operational phase SMP

3.2.2.2 Stakeholder engagement plan (SEP)

UAEL has not produced a stakeholder engagement plan (SEP) which describes planned and completed stakeholder engagement activities; identifies and analysis stakeholders; or which describes the community grievance mechanism. Not producing an SEP is non-compliant to the IFC PS.

UAEL did carry out consultations during the project development phase. The SIA states that surveys were carried out on the basis of a participatory rapid assessment (PRA) including consultation meetings, focus groups and interviews with people adjacent to the project and other stakeholders in the area of influence. These stakeholder events were held in:

- 2013, during the process of arranging the land lease
- 2014, during the EIA and SIA development and implementation of the project

The SIA reports that these consultation meetings were advertised in two national daily newspapers in both Bengali and English languages. Examples of the advertisements are included in the SIA. The SIA also summarises outcomes of the consultation held with the following stakeholders:

- Local communities (men, women and local elders)
- School committee and teachers
- Local government including the Union Parishad and NGO representatives

The SIA consultation summaries provide evidence that UAEL did organise some consultation events prior to construction activities commencing, albeit that these consultation events were only attended by men. According to site visit discussions and the SIA, consultation attendees were very verbal and gave their opinions on the project and their perceived risks and impacts. A summary of the issues raised by the community during the stakeholder consultations is provided in the SIA. The key issues raised include:

- Opportunities for employment of local semi-skilled and unskilled people
- Opportunities for subcontracting of local suppliers/business
- Provision of a safer road crossing for movement of people and cattle adjacent to the site
- Repair of local roads damaged by construction vehicles
- Provision of health check-ups for labourers and local school students to prevent transfer of communicable diseases

The SIA reports that these issues have been addressed in various sections of the EIA, and that the mitigation plans have been incorporated into the EMP and SMP. However, following a request by Mott MacDonald for a copy of the SMP, UAEL clarified that no separate construction or operational stage SMP had been prepared. Instead, UAEL provided section 7 of the SIA as the project's SMP. Mott MacDonald does not consider section 7 of the SIA to be an adequate SMP (see section 3.2.1.14).

The SIA also notes that the Union Parishad (local government) has been a key organisation involved in management of community relations as part of previous projects in the area. They were also involved in the consultation process for this Project. Union Parishad is reported in the SIA to assist in potential situations of social unrest (assessed to be unlikely for this Project).

It is recommended that UAEL develop and implement a SEP which specifies planned consultation and disclosure activities for the operational phase of the project. Importantly, this SEP should have a section which described all previous stakeholder engagement activities, i.e. those leading up to and those undertaken during the construction phase. The SEP should also detail the grievance mechanism as well as identify and analyse stakeholders. It is recommended that the SEP be developed in line with the IFC's Stakeholder Engagement: A good Practice Handbook for Companies Doing Business in Emerging Markets². This IFC SEP guidance should be closely followed and UAEL should include information on all stakeholder engagement activities, including with the local communities. Finally, the SEP should set out clear actions on how UAEL intends to engage with vulnerable affected people, in particular with women.

This item shall form a Condition Subsequent to Financial Close and should be completed within six-months of commencement of operation.

3.2.2.3 Disclosure of information

Based on the SIA report, disclosure of information was limited to information provided verbally during the consultation activities as listed in section 3.2.2.2.

As was stated in the EIA report the draft EIA report was made available on the UAEL company website (<http://www.united.com.bd/portfolio-page/energy/>) and the executive summary was translated into Bengali and disclosed to the public ([http://www.united.com.bd/new-brochure/Environmental Impact Assesment.pdf](http://www.united.com.bd/new-brochure/Environmental-Impact-Assesment.pdf)). Disclosure on the company website is a positive contribution to transparent and inclusive management of the Project.

Mott MacDonald recommends that UAEL organise public consultation events in the affected communities where UAEL will disclose the project's impacts to date as well as describe how UAEL has attempted to manage these. UAEL should also disclose the environmental and social impacts that are predicted for the operational phase and describe how they will manage these. Consultation with the wider Ashuganj plant operators are recommended in order to engender cooperation and share responsibilities for consultation and other more practical environmental and social issues.

3.2.2.4 Grievance mechanism

The EIA states that a grievance redress mechanism will be established and be implemented for the construction and operational stages of the project. Within the EIA, the following is provided:

- A grievance redress procedure flow chart
- Five members of the grievance redress committee are named and listed
- A commitment is made to maintain a grievance register
- A sample grievance form is provided
- A commitment is made for a third party to undertake six monthly reviews of the activities and the outcomes of the complaints database

² This guidance can be found online at:
http://www.ifc.org/wps/wcm/connect/938f1a0048855805beacfe6a6515bb18/IFC_StakeholderEngagement.pdf?MOD=AJPERES

At the time of the site visit, Mott MacDonald did not meet any of the grievance committee members and a grievance register was not presented for review. Together, these two aspects indicate that six monthly reviews of the grievance procedure and register have not been undertaken. All this indicates at a non-functioning grievance redress mechanism.

It is recommended that the community grievance mechanism for the operational phase of the project be clearly described within the SEP. This description should include information on timeframes within which grievances must be addressed, identification of the people responsible for managing grievances and provision of their contact details, description of how grievances can be submitted and a description of how this grievance mechanism will be disclosed to the public for example through sign posts at the project site's boundaries.

3.2.2.5 On-going reporting

Some level of on-going engagement has been identified as community co-operation is considered very important during Project implementation. Based on the outcome of consultation to date, it appears that stakeholders are willing to co-operate with UAEL in implementation of the proposed Project.

It is recommended that future planned engagement should be described in the SEP.

Throughout the lifecycle of the Project, the Project team will need to provide on-going information to and receive feedback from identified stakeholders, in particular on the effectiveness of the implementation of the measures in the environmental and social action plan (ESAP).

Information should be disclosed at key stages of the Project cycle and regular reports should be published to external stakeholders (e.g. as part of annual reports).

Reports will need to be issued not less than annually and they must be proportionate to the concerns of affected communities. If there are material changes to the Project, or to mitigation measures affected communities need to be informed.

3.3 Labour and working conditions

This section relates to IFC PS2.

3.3.1 Management of labour and working conditions

The EIA report and SIA report both state that the Project aims to employ as many locals as possible but does not define what is meant by local. According to UAEL, of the 250 to 300 skilled, semi-skilled and unskilled workers employed during the construction phase, between 100 and 150 were local. That is, approximately 45%³ of the workforce. The EIA states that, during the operational period, the Project

³ Calculated using the middle values, that is 275 employees and 125 locals

envisages employing approximately 150 skilled, semi-skilled and unskilled personnel. UAEL has confirmed to Mott MacDonald that equal opportunity to work was given to all groups of people irrespective of gender, race.

UAEL have stated that an 'adequate number of bathroom and latrines have been built for the workers with proper waste disposal system'. No details on the assessment methodology were given. Therefore, we would like to request UAEL to clarify how the 'adequate' number of toilets and bathrooms was identified.

3.3.2 Human resources

The IFC requires adoption of HR policies appropriate to companies' sizes and workforces. UAEL has a document titled 'Service Rules and Regulations' which it uses as its HR policy. This document is comprehensive and describes the company's policies on aspects including working hours, overtime and leave entitlements; possession of identity cards; protecting the workforce (e.g. no employment of persons below the age of 18); probation periods; resignation timeframes; reasons for employment termination; dress codes; workers code of conduct; employee training; and, employment benefits such as medical; scholarships; and transportation. UAEL's Service Rules and Regulations document is deemed to contain content in adherence with IFC PS2.

During the site visit, Mott MacDonald gained the impression that UAEL did not feel responsible for its contractors HR policies and procedures.

It is highly recommended that lenders clarify to UAEL that as the finance beneficiary, UAEL has the overall responsibility for the project's compliance to the IFC PS. As such, UAEL has responsibility in monitoring how its contractors are adhering to the IFC PS.

3.3.3 Working conditions and terms of employment

Example employment contracts have not been provided for review, thus Mott MacDonald is not in a position to comment on the terms of employment as outlined in these contracts. Based on information provided within the Service Rules and Regulations document, Mott MacDonald has three key observations in relation to working conditions and terms of employment:

- The document states that normal working hours are from 09:00 to 17:00 except in the month of Ramadan when these are from 09:00 to 16:00. It states that a normal working week consists of 42 hours per week but does not state the total number of working days per week. As such, it is unclear how 42 has been determined as the number of normal working hours per week, given that employees will also have a lunch break during a working day.
- Overtime entitlements for staff and workers are unclear. The Service Rules and Regulations document merely states that overtime rates can only be calculated up to a maximum of twice the normal hourly rate but does not distinguish between overtime entitlements during normal working days and the weekend.
- Information on probation periods has only been provided for officers (six months). No information has been provided on the probation periods for other employees.

It is recommended that UAEL revise its Service Rules and Regulations document in order to provide more clarity in regards to normal working hours, overtime entitlements and probation periods, as explained above. It is also requested that UAEL provide three employment contract copies for review. These contracts should consist of one each for a junior, mid-level and senior employee.

3.3.4 Workers' organisations

Bangladesh has ratified both core ILO labour conventions on the freedom of association: Convention 87 on the Freedom of Association and Protection of the Right to Organise and Convention 98 on the right to Organise and Collective Bargaining. Bangladesh ratified these conventions in 1972.

The SIA states that workers are free to associate and bargain collectively with the contractor and project authority. Additionally the SIA states that female labourers will have the right to form separate labour unions for collective bargaining with the contractor or project authority.

UAEL appears to be managing this aspect in compliance with the IFC PS.

3.3.5 Non-discrimination and equal opportunities

The aspects of non-discrimination and equal opportunities are not discussed within the EIA or UAEL's Service Rules and Regulations document. However, the SIA addresses this aspect by stating that there will be no discrimination amongst workers and that the project will follow a policy of equal opportunities, including between men and women.

During the site visit, women were not seen working on construction activities but two women working within the UAEL engineering team were actively involved in the site visit and associated meetings.

UAEL appears to be managing this aspect in compliance with the IFC PS.

3.3.6 Retrenchment

The term retrenchment is defined within the Service Rules and Regulations document but is not discussed within the document. Retrenchment is not discussed within the EIA or SIA, thus UAEL's retrenchment policy or procedures are unknown.

It is recommended that UAEL provide a document describing its retrenchment policy.

3.3.7 Grievance mechanisms

The Service Rules and Regulations document makes no reference to a workers grievance mechanism and this mechanism is not described elsewhere.

Given that construction is now substantially complete, UAEL must document the workers' grievance mechanism immediately and disclose it to its own employees and verify that all contractors have adequate grievance mechanisms in place. Where contractors do not have a workers' grievance mechanism, UAEL should make its grievance procedure available employees of these contractors. At a minimum, the following information should be provided in the document describing the grievance procedure:

- *Person responsible for managing the grievance mechanism*
- *Channels through which workers can log grievances (e.g. comment boxes or grievance forms and/or a phone number and email address)*
- *Measures for anonymous grievances*
- *Timeframes within which grievances will be managed and closed out*
- *How workers will be informed of the grievance mechanism*
- *Measures workers can take if they do not agree with the response provided*
- *The grievance handling process itself*

In addition, a workers' grievance register should be set up and be maintained by LTWP. At a minimum, the register should detail when the grievance was raised, whom by, how it was managed and its status (i.e. open or closed).

3.3.8 Protecting the workforce

UAEL's Service Rules and Regulations' states that children (persons under the age of 18) will not be employed and that UAEL will not use forced labour. During the site visit, Mott MacDonald did not see any child labour nor was there any indication of forced labour.

UAEL appears to be managing this aspect in compliance with the IFC PS.

3.3.9 Occupational health and safety (OHS)

Mott MacDonald requested that UAEL provide an occupational health and safety plan (OHS plan). To date, this plan has not been provided for review. Instead, UAEL provided a one page health and safety policy which Mott MacDonald does not consider to adhere to the IFC's standards in relation to OHS.

United Engineering & Power Services Ltd. (UEPSL), a sister company of the UAEL, is the operations and maintenance provider for the project. UEPSL is not OHSAS 18001 certified but is presently working towards accreditation.

Management of health and safety on site was observed to be poor during the visit conducted in December 2014. Based on observations the majority of workers were not wearing PPE and many were working in open-toed sandals or even bare feet whilst engaged in heavy physical work including shovelling aggregates, carrying construction materials and digging as shown in Figure 3.3 and Figure 3.4.

Figure 3.3: Construction workforce – no PPE (hard hats, high visibility jackets, safety shoes)



Source: Mott MacDonald, December 2014

Figure 3.4: Construction workforce digging and manual handling - no PPE (hard hats, high vis jackets, safety shoes)



Source: Mott MacDonald, December 2014

As shown in Figure 3.5 one individual was observed sitting astride a flange approximately five or six metres above the ground whilst trying to work on a fitting at full arms stretch to one side; he was wearing no PPE and had no harness to restrain him in case of a fall. The situation was assessed to be sufficiently dangerous that under our duty of care Mott MacDonald asked the UAEL site manager to stop the activity immediately. This instruction was actioned by the UAEL site manager and the activity was stopped. A harness was then produced. It is assumed that the person carrying out the work was going to use the harness, however this was not observed as the activity did not recommence prior to our site visit moving on to the next area.

Figure 3.5: Labourer working at height in switchyard - no PPE, no safety harness, no working platform



Source: Mott MacDonald, December 2014

The standard of health and safety on site was discussed further as part of the site visit close out. UAEL acknowledged that improvements in health and safety performance relating to the workforce on site were required. UAEL stated that many workers were not used to wearing PPE and felt encumbered and uncomfortable using the equipment even if it was provided, however this is not a valid reason not to enforce the use of PPE.

Following our recommendations UAEL has confirmed that a safety and security officer is now present at the site 24hours a day. One of the tasks of the safety and security officer is to ensure that all workers are wearing appropriate PPE at work. UAEL have also presented to us a list of personal protective equipment available at the site which includes:

- Hand gloves
- High voltage rubber gloves
- Safety belt
- Safety goggles
- Colour coded helmets
- Safety dust mask
- Ear plug
- Safety jacket
- Safety mark roll
- Safety dress
- Safety signs and posters
- Safety shoes
- Fire extinguisher
- Boiler suit

Additionally the safety and security officer arranges seminars and sessions to raise awareness among the personnel about STDs, HIV/AIDs.

It is imperative that UAEL instigates detailed health and safety plans and procedures on site during the operational phase of the Project. Without such procedures in place there is a significant risk that serious injury or death could be caused by the lack of appropriate health and safety procedures.

3.3.10 Workers engaged by third parties

It is unclear if third parties have all been contractually obliged to work to UAEL's standards as well as to national legislation and to IFC PS.

It is recommended that UAEL provide copies of contracts with all third party contractors for review. It is requested that UAEL have contracts in place requiring compliance with health and safety to UAEL's standards as well as to national legislation and to IFC PS with all parties involved in the project. Mott MacDonald advises UAEL to include the requirements for monitoring of sub-contractors health and safety procedures in their OESMP which is currently being developed.

3.4 Pollution prevention and abatement

This section relates to IFC PS3

3.4.1 Monitoring of emissions

Monitoring of emissions on a regular basis is necessary to demonstrate compliance with environmental permits, legal obligations and evaluating performance. Some items for operation and on-going environmental management and monitoring have been described within the EIA and the need for emissions monitoring has been identified. The frequency for all monitored parameters is stated once every

three months. This frequency aligns with the condition stated in the active operational environmental clearance certificate. Monitoring requirements are further considered in Chapter 7 in the EIA report – EMP.

To be compliant with IFC EHS Guidelines for Thermal Power Plants (2008) stack emissions should be monitored continuously for NO_x concentrations. Stack emission testing (usually undertaken by emission testing contractors using portable equipment in order to verify the accuracy of the continuous monitoring) should be undertaken annually.

Noise monitoring specified in the EIA is once every three months at the project site and nearest sensitive receptors. To demonstrate compliance with the World Bank standards, this frequency is considered sufficient.

No monitoring location is given in EIA for water intake and effluent outfall monitoring. *Temperature should be added to monitored parameters and should be monitored continuously. Monitoring location should be at the end of the Ashuganj 200MW PP discharge immediately prior to them entering common outfall channel. This will help UAEL to demonstrate compliance of their plant to the national discharge standards separate from the potential influence of the discharges from other plants over which they have no control. The emissions levels should be in line with Bangladeshi and IFC standards.*

3.4.2 Hazardous materials

Management of hazardous materials has not been addressed in detail within the EIA. Projects which manufacture, handle, use, or store hazardous materials should establish management programs that are commensurate with the potential risks present. Gas-fired power plants tend not to handle many hazardous materials although there will be oils and solvents that need appropriate handling and disposal. It is considered that with standard measures in place in the OESMP this should not represent a significant risk to human health. Gas handling on site will be according to appropriate design safety standards.

3.4.3 Emergency preparedness and response

A framework emergency response plan has been included in the EIA. The plan sets out procedures for initiating procedures in case of an emergency situation. The plan includes six general steps of behaviour in emergency situations.

The plan is a framework and needs further development and a final plan will be required prior to operations commencing. It should remain a live document and be reviewed and updated periodically. The Project will be located in an existing industrial area and emergency plans need to be in place for incidents that may occur at either the Project or adjacent industrial sites. The plan should also account for potential evacuation/communication of local communities.

Emergency environmental action plans should be in place to account for the following events as a minimum:

- Bulk fuel spillage from storage tanks (back-up fuel), pipelines or treatment facilities

- On site or off site chemical spillage from storage tanks, pipelines or treatment facilities
- Major fire, involving chemicals, fuel, waste oil or any other combustible substance stored in bulk at the site

Other scenarios may need to be considered according to perceived risks at the site but could include attack by hostile forces (for example terrorism) and natural disasters such as flooding or typhoons.

3.5 Community health, safety and security

This section relates to IFC PS4.

3.5.1 Community health and safety general requirements

The EIA identified potential for minor (“very insignificant”) impacts to communities from construction impacts such as dust, noise, traffic and waste generation.

A summary of the community health and safety issues raised during the stakeholder consultations includes:

- Provision of a safer road crossing for movement of people and cattle adjacent to the site
- Repair of local roads damaged by construction vehicles
- Provision of health check-ups for labourers and local school students to prevent transfer of communicable diseases
- Within the SIA, it is recommended that women be provided with a separate breast feeding corner in the project site. Mott MacDonald disagrees with this recommendation because it encourages children on site, thereby poses health and safety risks to children and workers. As further described in section 3.5.2, Mott MacDonald observed children walking and playing freely within the construction site.

3.5.2 Infrastructure and equipment safety

The EIA stated that a security fence should be provided around the permanent boundary of the site that should be 3m high above the site formation level, with gates with suitable locking devices.

The site security and protection of the community from health and safety risks has not been assessed as part of the EIA. However, the community health and safety issues raised during the stakeholder consultations as listed above include potential infrastructure safety risks to the community.

Additionally, only limited sections of security fencing were observed during the site visit. The overall APS complex is an open site with residential areas, a training centre and a school within the overall complex. As such, members of the community are passing the active construction site to go about day-to-day activities and women, children and men apparently not involved in the construction process were observed in active construction site areas as shown in Figure 3.6 and Figure 3.7.

Figure 3.6: Community members outside training centre/residential area immediately opposite active construction site



Source: Mott MacDonald, December 2014

Figure 3.7: Children in the loading jetties area adjacent to the unfenced floating intake structure construction site



Source: Mott MacDonald, December 2014

Following our recommendations UAEL have provided evidence that fencing was installed around the Ashuganj 200MW PP site and access, particularly for children and people not involved in construction, is now restricted (see Figure 3.8 and Figure 3.9).

Figure 3.8: Fencing installed around Ashuganj 200MW PP



Source: UAEL, April 2015

Figure 3.9: Fencing installed around Ashuganj 200MW PP



Source: UAEL, April 2015

Community health and safety will need to be coordinated with local municipal bodies such as the fire service, police and ambulance. These commitments will need to be elaborated into detailed plans and procedures.

3.5.3 Hazardous materials safety

The project includes hazardous materials such as the gas supply, lubricating oils, pre-treatment and operational and maintenance chemicals that have the potential to present a hazard to surrounding communities.

The EIA principles for environmental management during decommissioning state that: "All hazardous materials should be kept separate, documented and disposed to the safe recycling or disposal site."

The EIA Safety management plan states that emergency procedures shall cover: "Leakages and other releases of hazardous substances."

The operational EMP, SMP and emergency management plans are to be developed and should include measures to control the safe delivery, handling, storage and use of hazardous materials and response procedures for any leaks/spills considering prevention of exposure to surrounding communities.

3.5.4 Community exposure to disease

The EIA and SIA state contractor workforce are to be housed in on site accommodation and identify a potential risk to human health of communicable diseases if appropriate sanitary facilities are not provided. The EIA states an adequate number of toilets and bathrooms should be made for the workers alongside proper disposal system of sewage waste.

The mitigation measures identified in the EIA and SIA for prevention of community exposure to disease should be incorporated in the operational stage EMP and SMP, implemented and monitored and reported in line with the requirements of the EMP and SMP by UAEL.

3.6 Land acquisition and involuntary resettlement

This section relates to IFC PS5.

3.6.1 Land ownership

The site for the power plant development is currently owned by the Ashuganj Power Station Company Ltd (APSCL). The required land of UAEL is being leased from APSCL.

During the teleconference calls held on 11 and 12 May a new issue related to land ownership was brought to Mott MacDonald attention. Mott MacDonald's understanding is that there should have been

compensation to fishermen for land acquisition. It is understood that the Lenders have communicated directly with UAEL on this issue.

UAEL to follow up on the compensation and update the Lenders directly on progress.

3.6.2 Resettlement requirements

The SIA states that there are no issues relating to land acquisition for this stage of the Project development and no people will be physically or economically displaced. Additionally, the SIA states installation of the transmission line interconnection to the existing substation at Ashuganj will not displace or affect any of the households or other entities established beside the APS complex. Subsequently, IFC PS5 is not triggered by this project. Site visit discussions and observations did not indicate otherwise.

3.7 Biodiversity conservation and natural resource management

This section relates to IFC PS6.

3.7.1 Protection and conservation of biodiversity

Within the EIA a statement of projected impacts on flora and fauna indicates impacts are anticipated to be insignificant for construction and operation within the development site.

3.7.2 Habitat protection and conservation

Habitats, whether modified, natural or of critical conservation importance, can support a wide variety of species. The Project site is on existing industrial land considered of minimal biodiversity importance and the areas around the existing and the under construction plant are not considered significant in terms of flora and fauna. It is concluded that the Project will not have any significant impact on habitats or conservation. This reflects the relatively small size of the Project (200MW) compared to the existing and under construction plants within the Ashuganj power complex.

3.8 Indigenous people⁴

This section relates to IFC PS7.

The SIA confirmed that no indigenous people will be impacted by the development, although how this has been identified is not stated. The SIA also states the Project will not impact on traditional, customary lands or cultural resources. As such the SIA concludes that no indigenous peoples, as defined in the IFC PS, live in the area.

⁴ Indigenous Peoples as defined in the IFC Policy and Performance Standards and Guidance Notes

3.9 Cultural heritage

This section relates to IFC PS8.

The EIA states the nearest cultural heritages sites include the following, considered to be a considerable distance from the site such that no impacts will result from the Project:

- Araishidha union of Ashuganj, containing the birthplace of renowned poet Abdul Kadir located approximately 3km south of the proposed plant
- Wari Bateshwar, a historically significant site dating from 450BC, is located 6-7km from the proposed plant

The EIA states no known remarkable archaeological or historically important structures or sites are reported in the project site. The probability of finding significant cultural artefacts in the Project site is assessed to be low.

Chance finds procedure

It would be appropriate to instruct contractors to have a chance finds procedure for any unusual artefacts found during excavation. The EPC contractor should confirm compliance with international guidelines in this respect. In particular the EPC contractor should confirm compliance with IFC's Performance Standard on Environmental and Social Sustainability – Cultural Heritage (Performance Standard 8).

This action is the responsibility of UAEL and the EPC contractor.

This action is no longer applicable as construction is complete.

3.10 IFC Performance Standards

Table 3.4 sets out the IFC Performance Standards and presents comments on the applicability of the standards to the Project and summarises where actions are required to demonstrate compliance.

Table 3.4: Applicability of IFC Performance Standards

PS Ref.	Performance Standard	Applicable for Project (Y/N)/ Comment	Comment
PS1	Assessment and Management of Environmental and Social Risks and Impacts	Yes	An Environmental Impact Assessment to Bangladeshi standards has been completed. A separate Social Impact Assessment has been completed to Bangladeshi standards. A number of additional details are required to satisfy international requirements and these are detailed in the Action Plan (Table 4.1)
PS2	Labour and Working Conditions	Yes	UAEL has an adequate HR policy, as described within its Service Rules and Regulations document.

PS Ref.	Performance Standard	Applicable for Project (Y/N)/ Comment	Comment
			<p>However, given that Mott MacDonald was not provided with example employment contracts, we cannot comment on the contracts adherence to IFC PS. The HR policy suggests that there are some policy gaps related to working hours, overtime entitlements and probation periods.</p> <p>Site visit observations indicated that the working environment was unsafe and that the majority of workers were not wearing PPE. Moreover, the Project has no OHS plan or a SMP which includes labour management measures. UAEL have stated that the accommodation provided for their workers have adequate number of bathrooms and latrines, are provided with proper waste disposal system and sewage wastewaters are disposed to an existing septic tank.</p> <p>Clarification on methodology of identifying 'adequate number' is required.</p> <p>The health and safety management at this project and UAEL's management of labour standards and working conditions shall be monitored through the OESMP monitoring procedures.</p>
PS3	<p>Resource efficiency and Pollution Prevention</p> <p>PS3 requires reference to be made to relevant IFC EHS Guidelines which are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP), the following is considered applicable to the Project:</p> <p>IFC EHS Guidelines – General (2008)</p> <p>IFC EHS Guidelines for Thermal Power Plants (2007)</p>	Yes	<p>The EIA and SIA are in line with Bangladeshi standards</p> <p>A number of deficiencies such as air quality, greenhouse gases, have been found and further recommendations are made in the Action Plan (Table 4.1)</p>
PS4	Community Health, Safety and Security	Yes	<p>Community Health, Safety and Security to Bangladeshi standards have been considered in the SIA</p> <p>Further recommendations are made in the Action Plan (Table 4.1)</p>
PS5	Land Acquisition and Involuntary Resettlement	No	<p>The SIA states that there are no issues relating to land acquisition for this stage of the Project development and no people will be physically or economically displaced. Additionally, the SIA states installation of the transmission line interconnection to the existing substation at Ashuganj will not displace and is not anticipated</p>

PS Ref.	Performance Standard	Applicable for Project (Y/N)/ Comment	Comment
			to significantly affect any of the households or other entities established in the APS complex.
PS6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	Yes	Biodiversity and natural resource management has been considered in the EIA
PS7	Indigenous Peoples	No	There are not considered to be any indigenous peoples in the area.
PS8	Cultural Heritage	Yes	Impacts on cultural heritage are very unlikely for this project, given that it is located within an existing industrial site. Nonetheless, UAEL should confirm that a chance finds procedure was in place during construction and that it will be in place during the operational phase. If such a procedure did not exist for the construction phase, then UAEL should develop one for the operational phase of this project.

3.11 Equator Principles

Table 3.5 sets out the Equator Principles and presents comments on the applicability of the principles to the project and identifies where actions are required to demonstrate compliance.

Table 3.5: Equator Principles compliance

Principle	Comment
1: Review and Categorisation	<p>The Project will have a capital cost of over 10 million USD.</p> <p>Bangladesh is not listed by the EPs as a designated country and as such is required to comply with the environmental and social requirements as stated in the EPs Framework.</p> <p>Following the review of Project documentation, it is considered that the Project falls under Category B for the purposes of the EP, that is, <i>projects with potential limited adverse social and environmental impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures</i></p> <p>It is noted that a number of power plant projects are being added to the APSCL complex, which are contributing to cumulative impacts in relation to certain environmental aspects such as air quality and aquatic ecology. Future projects or developments at the APSCL complex may be classified as Category A if these cumulative impacts are considered to have reached significant, diverse, irreversible or unprecedented levels.</p>
2: Environmental and Social Assessment	<p>Category A and B projects require a social and environmental assessment. The IFC intends the social and environmental assessment to address impacts and risks as a means of managing, improving and mitigating impacts. The social and environmental assessment should enable the Project to meet the applicable requirements in PS 2 to PS 8, any applicable local laws and regulations, as well as any additional priorities and objectives for social and environmental performance identified by the Sponsor.</p> <p>The Project has followed national country requirements to date receiving environmental authorisation for the Project.</p> <p>The EIA and SIA are largely compliant with IFC PS1 in terms of impact assessment. Some requirements have been identified in relation to compliance with IFC PS1 and PS2-8 and corrective actions are noted and recommended for inclusion in the Project OESMP.</p>

Principle	Comment
	It is noted that the thermal pollution caused by the effluent discharged from the once-through cooling water may require an on-going monitoring programme throughout the duration of the Project in order to demonstrate compliance with legislative and international guidance requirements.
3: Applicable Environmental and Social Standards	<p>For projects not listed by the EPs as a designated country (such as Bangladesh), as defined by the EPs designated countries list, additional environmental/social standards are also applicable. The guidelines applicable to the Project consist of the following:</p> <ul style="list-style-type: none"> • IFC Performance Standards, January 2012 • IFC General EHS Guidelines, 2007 • IFC EHS Guidelines for Thermal Power Plants, 2008 <p>The Project is generally compliant with Bangladesh national regulations.</p> <p>Overall, the Project has some deviations from applicable international standards. Subject to developing and implementing an OESMP and ESAP commitments which include recommendations of this review.</p>
4: Environmental and Social Management System and Equator Principles Action Plan	<p>It is recommended that an OESMP will be prepared by UAEL before the start of the operational phase. This should be strengthened in line with the recommendations of this report.</p> <p>Project ESAP (Table 4.1) has been developed based on this review (within this report) identifying necessary actions needed to manage the environmental and social risks associated with the Project and the responsibilities for carrying out the actions.</p>
5: Stakeholder Engagement	<p>The Project is required to undertake a process of consultation with affected communities in a manner that provides them with opportunities to express their views on Project risks, impacts, and mitigation measures, and allows the Project Company to consider and respond to them.</p> <p>The consultation process should be undertaken in a manner that is inclusive, culturally appropriate, free from intimidation, timely and informed.</p> <p>In accordance with PS1, companies should disclose Project-related information to affected communities and other interested stakeholders of the Project in a timely manner so that stakeholders may understand the implied risks, impacts and opportunities of the proposed development and have the ability to voice their concerns or opinions with respect to the Project.</p> <p>Consultation and disclosure activities were undertaken as part of the SIA report and have been documented. However, a stakeholder engagement plan is required to identify future consultation and disclosure activities for the duration of the Project.</p>
6: Grievance Mechanism	<p>The EPs require the borrower to establish a grievance mechanism as part of its management system throughout the construction and operation phases of the Project. Stakeholders, including Project personnel and affected persons, are to be informed about the grievance mechanism and how to access it at the time of hire or being consulted.</p> <p>Neither a community nor separate workers grievance mechanism has been developed.</p> <p>Following development of an appropriate grievance mechanism available to the local community and other external stakeholders the Project will be compliant.</p>
7: Independent Review	Mott MacDonald has reviewed environmental and social documentation provided by the Project. Our review of this documentation in part fulfils this commitment.
8: Covenants Incorporation of covenants linked to compliance	Where responsibilities are placed on outside parties the Project ESAP should form part of the contract documentation.
9: Independent Monitoring and Reporting	This role will be arranged by the Lenders.
10: Reporting and Transparency	This role will be fulfilled by the Lenders.

4 Conclusions and recommendations

4.1 Compliance review

After completing a review of available documents relevant to the environmental and social aspects of the proposed 200MW Ashuganj Power Station development it is concluded that the Project is largely in compliance with national legal requirements. The Project has some deviations from the applicable international standards and guidelines. International standards and guidelines considered were:

- Performance Standards on Environmental and Social Sustainability; World Bank/ International Finance Corporation, January 2012
- Environmental Health and Safety General Guidelines; World Bank/International Finance Corporation, April 2007 (EHS General Guidelines)
- Environmental Health and Safety Guidelines for Thermal Power Plants; World Bank/International Finance Corporation, December 2008 (EHS Thermal Guidelines)
- The Equator Principles; Equator Principles Association, June 2013

Gaps where the above international standards have not been complied with have been identified and an environmental and social action plan (ESAP) has been developed specifying the actions required to close those gaps.

4.2 Environmental and social action plan (ESAP)

Table 4.1 constitutes the ESAP for the Project. It identifies the actions required, the basis of the requirements, the timing of the action, and the criteria to be used for determining whether the goal of the action has been successfully achieved. The ESAP should be read in association with the contents of the report where more details may be found for individual items.

Responsibilities for the implementation of all the actions are identified with oversight from UAEL where responsibilities for the EPC Contractor are identified. This is expected to be accomplished by inclusion of requirements in contracts and subcontracts, and by direct oversight and supervision by UAEL as needed.

This ESAP may be revised from time to time during the Project based on reviews of performance against actions identified. Deliverables and timescales in relation to provision of information to the Bank are for consideration.

Table 4.1: Environmental and social action plan ((CP) = Condition Precedent; (CS) = Condition Subsequent)

No.	Task / measure / corrective action	Responsibility	Deliverable (report/measure of success)	Deadline	Status
1.	Assessment and Management of Environmental and Social Risks and Impacts				
1.1.	Obtain an environmental permit for operational phase of the Project from the DoE for the proposed 200MW power plant.	• UAEL	• Operational permit issued by DoE	• Before start of operations (CS)	Closed
1.2.	Install one ambient air quality monitoring station. Explore the opportunity to collaborate with existing plants and plants under construction on the APS complex site to install an ambient air quality monitoring station and share the operating costs and data. This approach would be efficient and result in reasonable shared costs. In the event that other plant owners/operators are not willing/able to collaborate on installation and operation of an ambient air quality monitoring station(s) UAEL must install a suitable ambient air quality monitoring station. Opportunities to recover some of the capex and opex costs associated with the monitoring station could come from charging other power plant operators for data when it is required.	• UAEL	• Include a statement on progress in a periodic report to the Lenders	• Within three months of FC (CS)	Open
1.3.	Include a statement of commitment to develop a decommissioning plan prior to decommissioning of the plant which is to be submitted to the DoE for approval.	• UAEL	• Statement of commitment • Decommissioning Plan	• 12 months prior to decommissioning (CS)	Open
1.4.	Collate a more comprehensive air quality baseline, including data for longer durations. It is recognised that the Project now is in advanced stage of the construction. As such options to address this action may include: <ul style="list-style-type: none">• Collation of relevant longer time period baseline ambient air quality data from other EIA's recently undertaken for the three other power plants with total capacity of 1,125MW that are currently under construction within the APS complex	• UAEL	• Additional air quality baseline data for longer time period than 24hours	• Before start of operations (CS)	Closed
1.5.	A stack height determination based on good international industry practice (GIIP) technique should be undertaken to demonstrate that the installed stack height of 30m is sufficient for proper dispersion and prevention of excessive ground level concentrations.	• UAEL/AECL	• Stack height calculation	• Before start of operations (CS)	Open
1.6.	Provide further information to allow a better understanding of the modelling results; specifically: <ul style="list-style-type: none">• Further details on the frequency of 'maximum' process contributions• Are the reported maximum concentrations absolute maximums or have a limited number of exceedances been allowed for (percentiles)?	• UAEL/AECL	• Updated air quality modelling report/issue addendum information	• Before start of operations (CS)	Open
1.7.	Confirm with IFC that the cumulative impact assessment carried out by the EIA consultant satisfies their expectations	• UAEL/AECL	• Updated air modelling and a corresponding EIA chapter	• Before FC (CP)	Open
1.8.	Provide additional information on selection of ambient noise level. Indicate the distance to the nearest sensitive receptors and indicate the Project contribution at these locations.	• UAEL/AECL	• Noise note/addendum to	• Before start of operations (CS)	Open

No.	Task / measure / corrective action	Responsibility	Deliverable (report/measure of success)	Deadline	Status
	Provide information on guaranteed ground-borne vibration levels		EIA		
1.9.	For the remainder of the construction stage UAEL should: <ul style="list-style-type: none"> Clarify how the EIA and SIA mitigation measures have been implemented throughout the construction stage Provide a formal statement of commitment that all environmental and social mitigation and monitoring measures stated in the EIA, SIA, the requirements listed in the construction permit and the actions presented in the ESAP of this report will be addressed during remaining construction period. 	<ul style="list-style-type: none"> UAEL, EPC contractor 	<ul style="list-style-type: none"> Clarification response and statement of commitment 	<ul style="list-style-type: none"> Immediately and at least before FC (CP) 	No longer relevant
1.10.	Develop and implement an operational OESMP consistent with ISO14001 principles. The OESMP should contain provisions to monitor all mitigation measures identified in the EIA, SIA, DoE operational environmental clearance certificate and the provisions of this Action Plan. OESMP to include details of required operational stage monitoring including that recommended for emissions to air, effluent discharges prior to entering the common outfall, noise and social aspects as recommended in this report. <ul style="list-style-type: none"> The OESMP should include a waste management plan (WMP). The OESMP should include an emergency management plan (EMP). The OESMP should include mitigation and monitoring measures for the prevention of local community exposure to disease. Note – this is separate from UAEL ISO accreditations which is being pursued separately (It is recommended that accreditation to ISO standards within a defined time period is made a condition of financing)	<ul style="list-style-type: none"> UAEL 	<ul style="list-style-type: none"> OESMP Submit to DoE and lenders 	<ul style="list-style-type: none"> (CP) 	Open
1.11.	Submit periodic reports to the Lenders on environmental, social, health and safety performance, including status of each ESAP element and status of issues in the EIA, SIA and OESMP implementation, grievances of workers' and concerns of affected communities. Recommended six-monthly reports to be submitted during operation (may be extended to annual after initial operating period).	<ul style="list-style-type: none"> UAEL 	<ul style="list-style-type: none"> Submission of periodic report on specified schedule 	<ul style="list-style-type: none"> Six months after start of operation (CS) 	Open
1.12.	Submit quarterly periodic monitoring reports to the DoE.	<ul style="list-style-type: none"> UAEL 	<ul style="list-style-type: none"> Submission of periodic report on specified schedule 	<ul style="list-style-type: none"> Three months after start of operation (CS) 	Open
1.13.	UAEL to develop and implement a SEP which specifies consultation and disclosure activities that will occur during the operational phase of the project and which summarises all consultation and disclosure events to date. The SEP should also detail the grievance mechanism as well as identify and analyse stakeholders and detail how external communications are managed. It is recommended that the SEP be developed in line with the IFC's Stakeholder Engagement: A good Practice Handbook for Companies Doing Business in Emerging Markets	<ul style="list-style-type: none"> UAEL 	<ul style="list-style-type: none"> Operational phase SEP Report to Lenders on consultation activities, including notices given 	<ul style="list-style-type: none"> Given the power plant is undergoing test runs, to be developed as soon as possible and at the latest prior to operation (CS) 	Open

No.	Task / measure / corrective action	Responsibility	Deliverable (report/measure of success)	Deadline	Status
	As part of the SEP maintain a register of external communications including minutes of on-going meetings held with stakeholders.		<ul style="list-style-type: none"> Report to Lenders on all grievances received and how addressed/ resolved 	<ul style="list-style-type: none"> To be implemented throughout operation 	
1.14.	Community grievance mechanism for the operational phase of the project to be clearly described within the SEP. This description should include information on timeframes within which grievances must be addressed, identification of the people responsible for managing grievances and provision of their contact details, description of how grievances can be submitted, and, a description of how this grievance mechanism will be disclosed to the public for example through sign posts at the project site's boundaries.	<ul style="list-style-type: none"> UAEL 	<ul style="list-style-type: none"> Operational phase SEP 	<ul style="list-style-type: none"> To be developed as soon as possible and at the latest prior to operation (CS) To be implemented throughout operation 	Open
1.15.	Disclosure of the operational phase impacts and management measures to project stakeholders	<ul style="list-style-type: none"> UAEL 	<ul style="list-style-type: none"> Disclosure of operational phase impacts and management measures 	<ul style="list-style-type: none"> Prior to operation (CS) 	Closed
1.16.	<p>Based on the framework in the EIA develop the Project specific emergency response plan (ERP) (also known as a disaster management plan) for potential emergencies (for example, fire, explosion, flooding, terrorist attack). The ERP should include the impact from emergency events from neighbouring power plants and indicate the details on how coordination with neighbouring facilities will be undertaken in responding to emergency events</p> <p>The flood risk assessment (FRA) should be specific to the Project and include assessment of the 100-year event risk.</p> <p>Community health and safety will need to be coordinated with local municipal bodies such as the fire service, police and ambulance. These commitments will need to be elaborated in the ERP.</p>	<ul style="list-style-type: none"> UAEL 	<ul style="list-style-type: none"> ERP including and FRA 	<ul style="list-style-type: none"> Prior to operation (CS) 	Open
2.	Labour and Working Conditions				
2.1.	<p>Revision of the Service Rules and Regulations document in order to provide more clarity in regards to normal working hours, overtime entitlements and probation periods.</p> <p>It is also requested that UAEL reviews three employment contract copies against IFC PS2. These contracts should consist of one belonging to a junior, mid-level and senior employee.</p>	<ul style="list-style-type: none"> UAEL 	<ul style="list-style-type: none"> Revised Service Rules and Regulations document Three employment contracts reviewed 	<ul style="list-style-type: none"> Prior to operation (CS) 	Open
2.2.	It is recommended that UAEL provide a document describing its retrenchment policy.	<ul style="list-style-type: none"> UAEL 	<ul style="list-style-type: none"> Retrenchment policy 	<ul style="list-style-type: none"> As soon as possible and at the latest prior to operation (CS) 	Open

No.	Task / measure / corrective action	Responsibility	Deliverable (report/measure of success)	Deadline	Status
2.3.	<p>UAEL must document the workers' grievance mechanism immediately and disclose it to its own employees and verify that all contractors have adequate grievance mechanisms in place. Where contractors do not have a workers' grievance mechanism, UAEL should make its grievance procedure available employees of these contractors. At a minimum, the following information should be provided in the document describing the grievance procedure:</p> <ul style="list-style-type: none"> • Person responsible for managing the grievance mechanism • Channels through which workers can log grievances (e.g. comment boxes or grievance forms or a phone number and email address) • Measures for anonymous grievances • Timeframes within which grievances will be managed and closed out • How workers will be informed of the grievance mechanism • Measures workers can take if they do not agree with the response provided • The grievance handling process itself <p>In addition, a workers' grievance register should be set up and be maintained by UAEL. At a minimum, the register should detail when the grievance was raised, whom by, how it was managed and its status (i.e. open or closed).</p>	<ul style="list-style-type: none"> • UAEL 	<ul style="list-style-type: none"> • Workers grievance mechanism, including section on how and when the grievance mechanism is disclosed to all workers • Template workers' grievances log 	<ul style="list-style-type: none"> • As soon as possible at the latest prior to operation (CS) • To be implemented throughout operation 	Open
2.4.	<p>Improve the health and safety performance on site. Comply with occupational health and safety guidelines of IFC PS 2, in particular through identification of potential hazards to workers and provision of preventative and protective measures. Make appropriate personal protective equipment (PPE) mandatory and enforce its use.</p>	<ul style="list-style-type: none"> • UAEL 	<ul style="list-style-type: none"> • Report on actions taken to improve health and safety on site 	<ul style="list-style-type: none"> • CP – prior to FC 	No longer relevant
2.5.	<p>Develop and implement an operational health and safety management plan in line with IFC PS 2 and the principles of OHSAS 18001.</p>	<ul style="list-style-type: none"> • UAEL 	<ul style="list-style-type: none"> • Operational health and safety management plan 	<ul style="list-style-type: none"> • CP – Prior to FC 	Open
2.6.	<p>UAEL to monitor contracts with all third party contractors and verify that contracts have all been contractually obliged to adhere to the IFC PS. UAEL to ensure signing only these types of contractors with all parties involved in the project.</p>	<ul style="list-style-type: none"> • UAEL 	<ul style="list-style-type: none"> • All third party contracts 	<ul style="list-style-type: none"> • Prior to and during operation 	Open
3.	Resource Efficiency and Pollution Prevention				
3.1.	<p>NO_x process contributions of the Project have been assessed to potentially contribute 50% of the of the short-term (1 hour) relevant international air quality standards under worst case conditions, this is greater than the recommended 25% threshold stated in the IFC Thermal Power Plant Guideline (2008). Actions to address this may include:</p> <ul style="list-style-type: none"> • Review the predicted short-term (1 hour) NO_x process contributions with respect to the above air quality related actions. • Provide further information to allow a better understanding of the modelling results; specifically: <ul style="list-style-type: none"> – Further details on the frequency of 'maximum' process contributions 	<ul style="list-style-type: none"> • UAEL/AECL 	<ul style="list-style-type: none"> • Updated air quality modelling report/issue addendum information 	<ul style="list-style-type: none"> • Within three months after FC (CS) 	Open

No.	Task / measure / corrective action	Responsibility	Deliverable (report/measure of success)	Deadline	Status
	<p>– Are the reported maximum concentrations absolute maximums or have a limited number of exceedances been allowed for?</p> <p><i>Notes:</i> 1 This guideline triggers the requirement of operational stage continuous ambient air quality monitoring typically made up of two systems located at the predicted maximum concentration or sensitive receptor and a background point.</p> <p>2 Design mitigations, such as a greater stack height, may have been able to improve dispersion in this regard though, given construction is complete options for mitigation are limited.</p> <p>3 It is recognised that operational stage continuous ambient air quality monitoring may be more appropriate to implement at the APS complex level. For this reason it is recommended UAEL explores the opportunity for collaboration with other power plants in the APS complex area to share the data and operating costs of an ambient air quality monitoring station.</p> <p>In the event that other plant owners/operators are not willing/able to collaborate on installation and operation of an ambient air quality monitoring station(s) UAEL must install a suitable ambient air quality monitoring station. Opportunities to recover some of the capex and opex costs associated with the monitoring station could come from charging other power plant operators for data when it is required.</p>				
3.2.	<ul style="list-style-type: none"> Estimate CO₂ emissions per unit of energy (kWh) generated for the current power plant and compare this value with Bangladeshi and international benchmarks Quantify annual CO₂-equivalent emissions for the plant. If the obtained number exceeds 25,000 tonnes of CO₂-equivalent, commit to computing direct CO₂ emissions from the facilities owned and controlled within the physical Project boundary, as well as indirect CO₂ emissions associated with the off-site production of energy (generation electricity by others) used by the Project (if any). If applicable, quantification shall be conducted annually. 	<ul style="list-style-type: none"> UAEL 	<ul style="list-style-type: none"> GHG emissions note/addendum to EIA 	<ul style="list-style-type: none"> Within 3-months of commencement of operations (CS) 	Open
3.3.	<p>Undertake continuous monitoring of the temperature of their discharges immediately prior to them entering the common outfall channel throughout the operational phase of the Project. Demonstrate compliance of their plant to the national discharge standards separate from the potential influence of the discharges from other plants over which they have no control.</p> <p>Monthly water quality analysis of the discharge water immediately prior to entering the common outfall should be undertaken for parameters in the national and IFC effluent discharge standards.</p> <p>UAEL should confirm discharges can meet with the most stringent standard between Bangladeshi and World Bank standards.</p>	<ul style="list-style-type: none"> UAEL 	<ul style="list-style-type: none"> Discharge monitoring report demonstrating compliance 	<ul style="list-style-type: none"> Start of operation (CS) Continue through operations 	Open
3.4.	<p>A review of available information relating to ground condition/contamination liabilities to be undertaken for the site</p>	<ul style="list-style-type: none"> UAEL 	<ul style="list-style-type: none"> A legal opinion on site contamination risks/liabilities placed on project company 	<ul style="list-style-type: none"> Prior to operations (CS) 	Open
3.5.	<p>Develop a waste management plan (operational phase), potentially as a sub plan to the</p>	<ul style="list-style-type: none"> UAEL 	<ul style="list-style-type: none"> Waste management 	<ul style="list-style-type: none"> Prior to operations 	Open

No.	Task / measure / corrective action	Responsibility	Deliverable (report/measure of success)	Deadline	Status
	OESMP		plan	(CS)	
4.	Community Health, Safety and Security				
4.1.	As a priority, fencing should be installed at the site and access, particularly for children, should be restricted. Community health and safety will need to be coordinated with local municipal bodies such as the fire service, police and ambulance.	• UAEL	• Photographs of erected fencing around the Project were provided	• As soon as possible and at the latest prior to operation (CS)	Closed
4.2.	Mitigation measures identified in the EIA and SIA for prevention of community exposure to disease should be incorporated in the operational stage EMP and SMP, implemented and monitored and reported in line with the requirements of the EMP and SMP by UAEL.	• UAEL	• EMP • SMP	• Given construction is complete, to be developed as soon as possible at the latest prior to operation (CS) • To be implemented throughout operation	Open
5.	Land Acquisition and Involuntary Resettlement				
5.1.	No actions identified				
5.2.	During teleconference calls held on 11 and 12 May it was brought to Mott MacDonald attention that the Lenders discussing directly with UAEL compensation to fishermen for the land acquisition. UAEL should follow up on this issue and update the lenders about progress on this issue	• UAEL	• Update the Lenders on the status	• To be implemented prior to FC (CP)	Open
6.	Biodiversity Conservation and Sustainable Management of Living Natural Resources				
6.1.	No actions identified				
7.	Indigenous Peoples				
7.1.	Not applicable to this Project				
8.	Cultural Heritage				
8.1.	Instruct contractors to have a chance finds procedure for archaeological or paleontological (fossil) artefacts during excavations and to comply with the requirements of IFC PS 8 (Cultural Heritage) in this respect.	• EPC Contractor /reviewed by UAEL	• No adverse impacts on sites of cultural importance • Report to the Lenders on any chance finds	• Prior to start of any further excavations during construction	No longer relevant

Note: Items highlighted in grey are those that are closed or no longer relevant

