Environmental Monitoring Report

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Power System Expansion and Efficiency Improvement Investment Program - Tranche 3

Part A: Ashugonj 400 MW Combined Cycle Power Plant (East)

January – June 2018

Prepared by: Ashugonj Power Station Company Limited (APSCL) for the Asian Development Bank for People's Republic of Bangladesh.

Environmental Monitoring Report

5th Semi Annual (January - June, 2018) Report

ASHUGANJ 400 MW (EAST) COMBINED CYCLE POWER PLANT PROJECT (CCPP)

Ashuganj, Brahmanbaria.

Ashuganj Power Station Company Limited (APSCL)

TABLE OF CONTENTS

EXECUTIVE SUMMARY			**3**
1.0	**INTRODUCTION**		**3**
	1.1	Brief Project Description	4
	1.2	Project Progress Status and Implementation Schedule	4
	A.	Project Progress Status	5
	B.	Implementation Schedule	5
2.0	**COMPLIANCE OF NATIONAL REGULATIONS**		**9**
	2.1	Environmental Conservation Rules 1997	9
	2.1.1	Regulatory Compliance Progress	9
3.0	**COMPLIANCE TO ENVIRONMENTAL COVENANTS FROM THE ADB LOAN AGREEMENT**		**11**
	3.1	Covenants from the ADB Loan Agreement	11
4.0	**COMPLIANCE TO ENVIRONMENTAL MANAGEMENT PLAN**		**14**
	4.1	Major environmental activities of the project	14
	4.2	Semiannually assessment of construction impact on air, water, noise, construction waste and labor camp management	29
	4.2.1	Impact on Air Quality	29
	4.2.2	Impact on Noise	29
	4.2.3	Impact on Water Quality	30
	4.2.4	Impact on waste and labor camp	30
	4.3	Suggestion for mitigation measure	31
	4.3.1	Air Quality	31
	4.3.2	Water Quality	32
	4.3.3	Noise Level	32
	4.3.4	Solid Waste	32
	4.4	Progress of work	32
	4.5	Workshop and Training Meeting and Discussion	34
5.0	**SAFEGUARDS MONITORING RESULTS AND UNANTICIPATED IMPACTS**		**34**
	5.1	Safety assurance of the project site	34
	5.2	Others	34
	5.2.1	Weather condition	34
	5.2.2	Other factors which affect the monitoring results	34
6.0	**IMPLEMENTATION OF GRIEVENCE REDRESS MECHANISM AND COMPLAINTS RECEIVED FROM STAKEHOLDERS**		**35**
	6.1	Grievance Redress Mechanism and Disclosure	**35**
	6.1.1	Grievance Redress Mechanism	**35**
7.0	**CONCLUSION AND RECOMMENDATIONS**		**37**
APPENDIX 1			**38**
List of Tables			
Table: 2.1		Bangladesh Standards for Ambient Air	9
Table: 2.2		Bangladesh Standards for Noise	9
Table: 2.3		Bangladesh Standards for Ambient Air (Revised 19th July in 2005)	10
Table: 2.4		Bangladesh Standards for Noise (Revised 7th September in 2006)	11
Table: 4.1		Identification of Impacts, Mitigation measures, Monitoring and Management during Construction period	15
Table: 4.2		Possible effect of project activities on physico-chemical environmental Parameters during construction phase	31

Semi Annual Monitoring Report

For Ashuganj 400 MW (East) Combined Cycle Power Plant Project (CCPP)

(Ashuganj, Brahmanbaria)

Period: 5th Semi-Annual (January-June, 2018)
Monitoring: Ambient Air, Water & Noise Quality

EXECUTIVE SUMMARY

On 20th March 2018, APSCL signed with China National Technical Import and Export Corporation (CNTIC) as their engineering, procurement and construction (EPC) contractor for the construction of Ashuganj 400 MW (East) Combined Cycle Power Plant Project (CCPP). As per the contract, the EPC will supply and construct Ashuganj 400 MW combined cycle (East) project within next 36 months. The project location consists of Ashuganj 146 MW CCPP which is needed to be demolished by EPC before the construction process start and the demolition work will start from July 2018 according to the work plan. The evaluation of second stage bid, engaging the EPC and preparation and planning of demolishing process were the main tasks during the reporting period. So, there is no negative impact found till now on the environment due to this project. The new plant will be established on the existing site replacing an old combined cycle power plant for which no land acquisition and development activities will be required. So, environmental components like air, water and soil will not be hampered remarkably. The minimal disturbance to the environment during construction phase identified in EIA and other reports will be managed by proper environmental management system following suggestive and recommended measures in the EIA, ADB Environmental Safeguard Policy 2009, IFC/World Bank Thermal Power Plant Guideline 2008 and Department of Environment, Bangladesh guideline.

1.0 INTRODUCTION

The objective of the environmental safeguard management and monitoring is to record environmental impacts resulting from the project activities and to ensure implementation of the "mitigation measures" identified earlier in order to reduce adverse impacts and enhance positive impacts from specific project activities. Besides, it would also address any unexpected or unforeseen environmental impacts that may arise during construction and operation phases of the project.

The EMP (in the EIA) clearly lay out: (a) the measures to be taken during both construction and operation phases of the project to eliminate or offset adverse environmental impacts, or reduce them to acceptable levels; (b) the actions needed to implement these measures; and (c) a monitoring plan to assess the effectiveness of the mitigation measures employed. Environmental management and monitoring activities for the under-construction power plant project could be divided into management and monitoring: (a) during the construction phase, and (b) during the operation phase.

The application of this plan involved an environmental control and monitoring of the work by a technical team to verify compliance with all the indications, limitations or environmental restrictions set forth in the Environmental Management Plan (EMP), EIA

and the Project, with the minimise damage caused by work on the environment.

The information obtained by the implementation of the Environmental Action Plan is required to define preventive measures or define corrective actions.
The information generated as a result of implementing the Environmental Action Plan must be duly forwarded to the Department of Environment (DoE).

1.1 Brief Project Description

A Combined Cycle Power Plant of Total net 400±5% MW capacity at site condition (35 ºC, 1.013 bars, 98% R.H.) is intended to be set by Ashuganj Power Station Company Limited inside the existing premises. The Power Station will be connected with the Ashuganj 400 KV Gas Insulated Switchgear (GIS) Grid Sub-Station with necessary electrical equipment. The basic concept for the Ashuganj 400 MW CCPP (East) project shall be a CCGT Plant based on one Gas Turbine Generator unit (GTG), one Unfired Heat Recovery Steam Generator and one Steam Turbine Generator unit (STG). Water-steam cycle will be a three pressure levels (HP, IP and LP) with reheat. The Ashuganj 400 MW (East) Combined Cycle Power Plant Project complex is located on the Southern bank of Meghna river, just outside and to the East of Bhairab Bridge The power plant is located in Ashuganj under Bhairab Upazila. The entire power plant is completely enclosed, covers an area of about 4.50 acres and is owned by the Ashuganj Power Station Company Limited (APSCL).

1.2 Project Progress Status and Implementation Schedule

The basic concept for the Ashuganj East project shall be a CCGT Plant based on one Gas Turbine Generator unit (GTG), one Unfired Heat Recovery Steam Generator and one Steam Turbine Generator unit (STG).Water-steam cycle will be a three pressure levels (HP, IP and LP) with reheat.

General components of the proposed CCGT project include the following: (i) 400±5% MW CCGT unit complete with necessary auxiliaries including air intake filtration facilities, inlet and exhaust silencers, control systems, main stack with delivery damper, gas fuel treatment system, (ii) Power generator for the gas turbine unit with all auxiliaries including cooling system, control system, excitation system; (iii) one Steam turbine unit complete with necessary auxiliaries including heater, pumps, steam turbine bypass, control systems; (iv) Power generator for the steam turbine unit with all auxiliaries including cooling system, control system; (v) Heat Recovery Steam Generating system with auxiliaries including deaerators, pumps, exhaust stack, control system; (vi) Gas booster compressor system with all auxiliaries and control system; (vii) Di-mineralized water system complete with pumps, tanks, control system (viii) Effluent treatment system with all auxiliaries including, chemical dosing systems, settling units, control system, pumps; (ix) Other essential plant equipment including air compressor, natural gas supply system with 2200 m gas pipeline, circulating water system, cooling water pond, raw water intake structure, condensate system; (x) Construction of internal roads. (xi) Switch room (xii) Emergency generator and transformer.

A. Project Progress Status

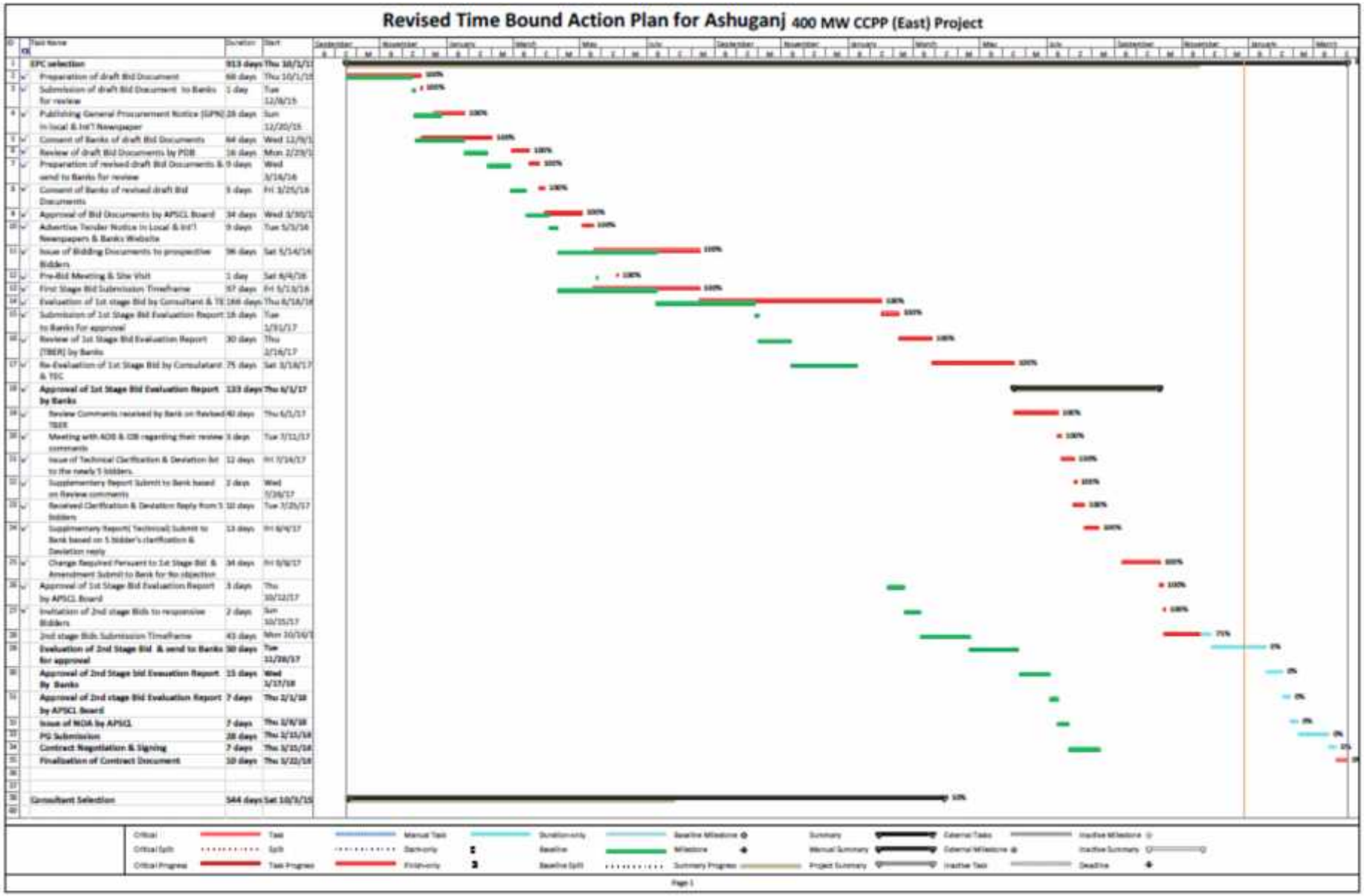
The updated status of Ashuganj 400 Mw (East) Combined Cycle Power Plant Project (CCPP) from January 2018 to June 2018 is given below in Table:

Sl. No.	Work Description	Status
1.	**Consultancy Services** Engineering Consultancy and construction supervision of the Project	Completed 100%
2.	**EPC Selections** Engineering, procurement and construction work of the project	Completed 100%
3.	**Demolition of Exiting Power Plant** Old power plant will be demolish	Not yet started
4.	**Civil Works:** Piling works and superstructure/foundation works for all structures.	Not yet started
	Mechanical and Electrical Facilities Consist of -Erection of HRSG, Steam Turbine, Generator, Cooling Tower, CW Pump House and all other BOP Equipments/Components of Power Plant. -Electrical and I&C works with commissioning	Not yet started

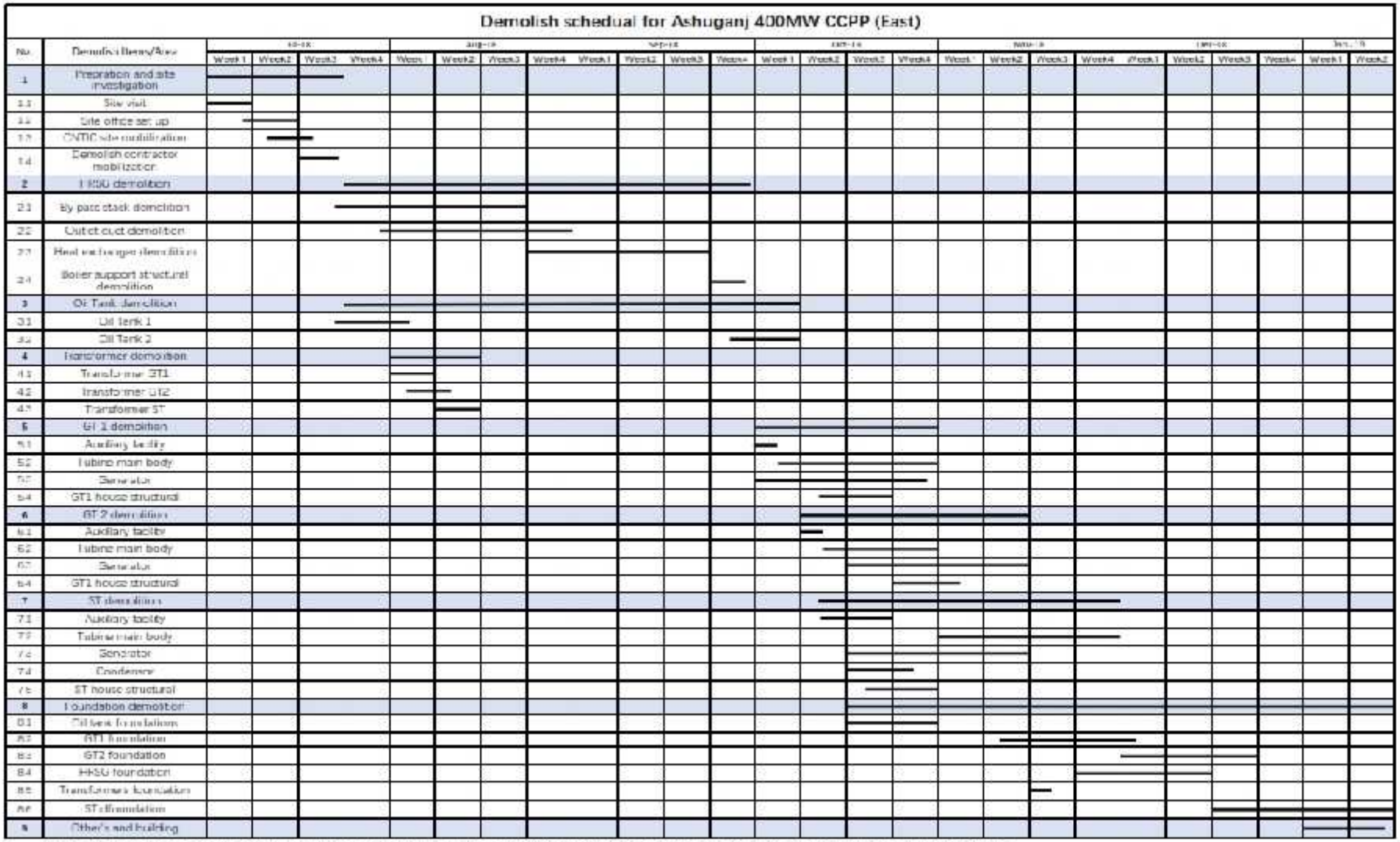
B. Implementation Schedule for the project :

The tentative implementation schedule and demolish schedule for Ashuganj 400MW CCPP (East) Combined Cycle Power Plant Project (CCPP) is given below:

Implementation Schedule (Tentative):



Demolition schedule for Ashuganj 400MW CCPP (East)



Note: This schedual is based on assuming the work beginning time as 16/07/2010, it would be revise according to the effective date of main contract.

A synopsis of work need to be undertaken during the construction period

According to environmental monitoring, during the construction phase and assignment, the main work will be to collect the ambient air samples to measure air pollutants and noise level data from the project area. For river water analysis the water sample will also be collected from the nearby Meghna River.

Description of Work	5th Semiannually (January- June, 2018)	Frequency
Ambient Air Quality	No need to measure	Monthly
Noise Level	No need to measure	Monthly
Drinking water Level	No need to measure	Monthly
River water	No need to measure	Monthly
Groundwater Level	No need to measure	Monthly
Soil quality	No need to measure	Monthly
Process waste	No need to measure	Quarterly
Health checkup	No need to measure	Daily

Project Environmental key personnel, contact names and telephone numbers

Sl. No.	Project Key personnel	Name of Key personnel	Telephone No.
01	Manager (HSE), 400 MW (East) CCPP, APSCL	Md. Atiqur Rahman	01717462670
02	Executive Engineer (Electrical.)	Md. Imrose Islam	01711100873
03	Executive Engineer (Civil.)	Mohammad Asadujjaman	01712238642
04	Manager(Chemical)	Md. Ashraful Islam	01717650871
05	Assistant Manager (HS&E)	A.K.M. Humayan Kabir Dewan	01730025431
06	Assistant Engineer (Electrical)	Aminul Islam	01739653761
07	Assistant Manager(Chemical)	Md. Yasin Molla	01923606305
08	Operator (3 Nos.)	1. Milon Kanti Das 2. Md. Wasi Uddin 3. Ashiq Hasan	
09	Environmental Specialist	Yet not engaged	

2.0 COMPLIANCE OF NATIONAL REGULATIONS

2.1 Environmental Conservation Rules 1997

2.1.1 Regulatory Compliance progress:

Government of Bangladesh **(**GoB) Guidelines for Air and Noise Quality

For carrying out the production, the standard for air and noise quality of the environment shall be determined in accordance with the standard specified in Schedule 2 and Schedule 4 in the Environment Conservation Rules 1997, compiled by DoE, Ministry of Environment and Forest, GoB. Schedule 2 and 4 are presented in the Table 5.1 and Table 5.2 respectively. The revised National Ambient Air Quality Standards Published in the Bangladesh Gazette (19 July 2005) and Noise Level Standard Published in the Bangladesh Gazette (7 September 2006) is shown in Table 2.1 and Table 2.2 respectively.

The guidelines for acceptable noise level, especially outside plant boundary have been considered as levels recommended by internationally acclaimed standards. Bangladesh has categorized the noise by the following levels.

Table 2.1: Bangladesh Standards for Ambient Air

Location	Unit	SPM (Suspended particulate matters)	SO_2 (Sulphur di-oxide)	NO_X (Oxide of Nitrogen)
Industrial and mixed area	mg/m^3	500	120	100
Commercial and mixed area	mg/m^3	400	100	100
Residential and Rural area	mg/m^3	200	80	80
Sensitive area	mg/m^3	100	30	30

*Source: ***(Schedule-2, Rule 12, Environment Conservation Rules 1997)***

Notes:

- Sensitive area includes national monuments, health resorts, hospital, archaeological sites, educational institutions and other government designated area (If any).
- Any industrial unit located not in a designated industrial area will not discharge such pollutants, which may contribute exceed the ambient air quality above in the surrounding areas of residential and sensitive areas.
- Suspended particulate matters mean airborne particles of diameters of 10 micron or less.

Table 2.2: Bangladesh Standards for Noise

Location Category	**Standards determined at dB(A) unit**	
	Day	**Night**
Silent Zone	45	35
Residential Area	50	40
Mixed Area (basically residential and together used for commercial and Industrial purposes)	60	50
Commercial area	70	60
Industrial area	75	70

Source: ECR *Schedule 4, A Compilation of Environmental Laws, DoE

Notes:

- Limits presented are one-hour energy equivalent sound exposure limits;
- 'Daytime' is 06.00 to 21.00 hours, 'nighttime' is 21.00 to 06.00 hour; and
- Sound exposure at a receptor resulting solely from the facility, irrespective of ambient sound levels, should not exceed the presented limits.

Table 2.3: Bangladesh Standards for Ambient Air (Revised 19th July in 2005)

Pollutant	Objective	Averaging Time
$PM_{2.5}$	15 µg /m^3	Annual (f)
	65 µg /m^3	24-hour (h)
PM_{10}	50 µg /m^3	Annual (b)
	150 µg /m^3	24-hours(g)
SPM	200 µg /m^3	8-hours
SO_2	80 µg / m^3; (0.03 ppm)	Annual
	365 µg / m^3; (0.14 ppm)	24-hour (a)
NO_x	100 µg /m^3; (0.053 ppm)	Annual
CO	10mg/m^3; (9 ppm) (a)	8-hours (a)
	40mg/m^3; (35 ppm) (a)	1-hour (a)
Lead	0.5 µg/m^3	Annual (i)
Ozone	157 µg /m^3; (0.08 ppm)	8-hour (e)
	235 µg /m^3; (0.12 ppm)	1-hour(d)

Notes:

a) Not to be exceeded more than once per year
b) The objective is attained when the annul arithmetic mean is less than or equal to 50µg/m^3.
c) The objective is attained when the expected number of days per calendar year with a 24-hour average of 150µg/m^3 is equal to or than 1.
d) The objective is attained when the expected number of days per calendar year with the maximum hourly average of 0.12 ppm is equal to or less than 1.
e) 3-year average of annual 4th highest concentration
f) Spatially averaged over designated monitors
g) From the 99th percentile.
h) From the 98th percentile
i) Annual arithmetic average based on lead analysis of TSP samples operated on an every 6th day schedule.

Table 2.4: Bangladesh Standards for Noise (Revised 7th September in 2006)

Schedule -1 Rules 5(2) (Area Based Noise level value)

Location Category	Standards determined at dB(A) Leq unit	
	Day	Night
Silent Zone	50	40
Residential Area	55	45
Mixed Area (basically residential and together used for commercial and Industrial purposes)	60	50
Commercial area	70	60
Industrial area	75	70

*Source: ECR Schedule 1 (Revised 7th September 2006), A Compilation of Environmental Laws, DoE

3.0 COMPLIANCE OF ENVIRONMENTAL COVENANTS FROM THE ADB LOAN AGREEMENT

3.1 Covenants from the ADB Loan Agreement

Covenants	Reference	Compliance status
Environment		
The borrower shall ensure , or cause APSCL to ensure, that the preparation, design, construction implementation, operation and decommissioning of the project and all project facilities comply with (a) All applicable laws and regulations of the Borrower relating to environment, health , and safety; (b) The environmental safeguards; (c)The EARF; and (d) All measures and requirement set forth in the respective EIA, IEE and EMP, and any corrective or preventive actions set forth in a safeguards monitoring report	LA, Schedule 5, Para 2	The environmental monitoring will have been carried out in all three phase i,e. pre-construction, during construction and post construction phase or operation phase

Land Acquisition and Involuntary Resettlement		
The borrower shall ensure , or cause APSCL to ensure, that all land and all rights-of-way required for the project, and all project facilities are made available to the works contractor in accordance with the schedule agrees under the related works contract and all land acquisition and resettlement activities are implemented in compliance with (a)all applicable laws and regulations of the borrower relating to land acquisition and involuntary resettlement; (b)the involuntary resettlement safeguards; (c)the RF; and (d) All measures and requirement set forth in the respective RP, and any corrective or preventive actions set forth in a safeguards monitoring report.	LA, Schedule 5, Para 3	In case of APSCL this type of issues is not arise due to the project location. The project location is inside the premises of APSCL own land. So, There is no requirements of Land Acquisition and Involuntary Resettlement
Safeguards – Related provisions in bidding documents and works contracts		
The borrower shall ensure, or cause each projects executing agency to ensure , that all bidding documents and contracts for works contain provisions that require contractor to: (a) Comply with the measures and requirements relevant to the contractor set forth in the EIA, IEE, the EMP, the RP and any small ethnic community peoples plan(to the extent they concern impacts on affected people during construction), and any corrective or preventive actions set out in a safeguards monitoring report; (b) Make available a budget for all such environmental and social measures; (c) Provide the borrower with a written notice of any unanticipated environmental, resettlement or small ethnic community people risks or impacts that arise during construction, implementation or operation of the project that were not considered in the EIA, the IEE, the EMP , the RP or any	LA, Schedule 5, Para 7	The safeguards- related provisions in bidding documents and work contracts has been followed strictly and update time to time for further requirements.

small ethnic community peoples plan; (d) Adequately record the condition of roads, agricultural and other infrastructure prior to starting to transport materials and construction; (e) Fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.		
Safeguards- Monitoring and Reporting		
The borrower shall do the following or shall cause APSCL to do the following: (a) Submit semiannual safeguards monitoring reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission; (b) If any unanticipated environmental and or social risks and impacts arise during construction, implementation or operation of the project that were not considered in the EIA, the IEE, the EMP or the RP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan; (c) No later than the mobilization of the turnkey contractor for APSCL,s power plant, engage qualified and experienced external experts or qualified no-governmental organizations under a selection process and terms of reference acceptable to ADB, to verify information produced through the project monitoring process, and facilitated the carrying out of any verification by such external experts; and (d) Report any actual or potential breach of compliance with the measures and requirements set forth in the EMP or the RP promptly after becoming aware of the breach.	LA, Schedule 5, Para 7	The Safeguards monitoring will have been carried out in all three phase i,e. pre-construction, during construction and post construction phase or operation phase

Labor standards		
The borrower shall ensure that all works contract documents to be prepared under the project incorporate provisions and budget to the effect that contractors (a) Comply with all applicable labor laws and related international treaty obligations of the borrower and do not employ child labor as defined under Bangladesh law; (b) Provide safe working conditions for male and female workers; (c) Carry out HIV/ AIDS and human trafficking prevention and awareness campaigns in the campsites and corridors of influence; (d) Engage women worker as wage laborers depending on their skill; and (e) Provide equal wages for equal work between men and women	LA, Schedule 5, Para 10	The labor standards will have been followed strictly.

4.0 COMPLIANCE TO ENVIRONMENTAL MANAGEMENT PLAN

4.1 Major environmental activities of the project

Major Environmental Activities of the project which will be during construction period are given below:

- Influx of workers
- Transportation of equipment, materials and personnel; storage of materials
- Construction activities, including operation of construction equipment.

Table 4.1: Identification of Impacts, Mitigation measures, Monitoring and Management during Construction period

The First Stage bidding procedure is still going on. So, there is no need to follow the environmental monitoring plan at this stage. But when the bidding procedure will be completed and EPC Contractor will start the project then the project management team will follow the environmental monitoring plan as given in the EIA report. Here is the details of the environmental monitoring plan:

Issue/Impact	Mitigation Measures	Implementation Schedule	Monitoring	Responsibility		Monitoring Indicators	Type and Frequency of Reporting/ monitoring	Management and Training	Compliance Status/ Remarks
				Implementation	Supervision				
Pre-Decommissioning and Construction	Develop a decommissioning plan for GT-1, ST and G2-Units as set out in the EIA including risk assessment and management plan for asbestos, PCBs and contaminated soil following the EHS contaminated land guidance and submit to ADB for approval. Undertake additional baseline studies for one year pre-construction to include: • Ambient air quality monitoring at sensitive receptors within the zone of maximum deposition. Notably the settlement and PDB high school and Hazzi Jolli high schools to the west, plus the APSCL dormitory to the east and the local settlement to the south of the project. Identified sensitive receptors within 2- 5 km west of the project site must also be monitored. • Seasonal 24hr noise monitoring at nearest sensitive receptors (in absence of construction work)- Notably the settlement and PDB high school and Hazzi Jolli high	Before decommissioning and construction	A continuous daily visual inspection by trained staff of the contractor is needed. Weekly monitoring and supervision by APSCL is required to ensure the implementation of good site management practices by all contractors during decommissioning.	Implementation of Good Site management practices shall be the responsibility of all contractors on site under supervision of the APSCL nominated Project Manager.	APSCL Project Manager in collaboration with the Consultant's Site Manager & third party consultant	SPM, PM10, PM2.5, NO2, SO2 & CO.	Monthly reporting of Summary results and submitted to the APSCL and any other concerned authorities. (e.g. DOE,ADB, etc.).	APSCL Responsible for the management of the safe decommissioning of old plants. Basic training of persons employed to operate and maintain the monitoring system. APSCL to ensure all contractors And subcontractors working on site are aware of ESMP and all employees are given basic induction training on good construction and site management	N/A

	schools to the west, plus the APSCL dormitory to the east and the local settlement to the south of the project. • Daily monitoring of the existing discharge temperature at the point of discharge on all three outfall channels. • Seasonal monitoring of river water temperature 500m upstream and downstream of the discharge point (away from the influence of the outfall channel). Detailed design for 440MW (East) power plant to incorporate mitigation measures set out in the EIA and the EHS General and Thermal Power Plant Guidance. Detailed design to demonstrate: (i) emission standard of 51mg/m3 (25ppm) NOx will be met through adoption of dry low NOx burner (catalytic removal will be retrofitted if necessary following review of annual ambient air quality data) with dust filters on air intake to ensure no particulate or SO2 emission, (ii) noise level of 70dB can be achieved at the site boundary and that there will be no increase in background noise levels greater than 3dB at the nearest sensitive receptors, (iii) there will be no increase in the temperature of the thermal discharge above the existing discharge temperature, and no increase above 3 degrees C of the upstream background temperature at the edge of the mixing zone in both winter and							Practice.	

	summer, (iv) structural engineering meets the applicable seismic design standards for location of the power plant, and (v) H&S measures per the EHS onshore oil and gas development guidelines are incorporated, undertake quantitative risk assessment of gas related elements to demonstrate there will be no increase in risk level at the nearest sensitive receptors from gas leak, fire or explosion. Detailed design of the inlet structure to incorporate mitigation measures set out in this EIA and the EHS General and Thermal Power Plant Guidance to minimize fish entrainment including reduction of maximum through-screen design intake velocity to 0.5 ft/s. APSCL will develop a decommissioning plan for both Unit 3 (150 MW) and Unit 4 (150 MW) when getting permission from Government in the future. Finalize IEE for associated facilities including grievance redress mechanism and to address hazardous materials including SF6 and waste management. Prepare Construction Environment Management Plan incorporating site waste management plan and emergency response procedures, Construction Health and Safety Plan incorporating emergency response procedures, and								

	Construction Traffic Management Plan.								
Air Quality: Dust emissions caused by construction activities, construction vehicle movements, and transport of construction materials.	Follow mitigation measures set out in this EIA and the EHS Guidelines on Construction. Emissions must be within prescribed limits of National Ambient Air Quality Standards. Mitigation practices including: • appropriate sitting and maintenance of stockpiles of materials so as to minimize dust blow (seek to achieve a distance of at least 500m from nearest sensitive receptors); • minimizing drop heights for material transfer activities such as unloading of materials; • construction phase to begin with construction of access roads; • roads will be kept damp via a water browser; • provide wheel wash for all vehicles leaving the project site; • do not permit any open burning on the project site; • roads will be compacted and graveled if necessary; • site roads will be maintained in good order; • regulation of site access; • sheeting of lorries transporting construction materials and soil; • enforcement of vehicle speed limits on non metal roads to <20 km/h. • no burning in open permitted	Before construction and during construction	Contractor should undertake daily inspections, with weekly inspections by environment officer, and monthly inspections by third party monitor. A continuous daily visual inspection by trained staff of the contractor is needed. Weekly monitoring and supervision by APSCL is required to ensure the implementation of good site management practices by all contractors during construction. Measurements and analysis of different pollutants to be made on a continuous basis (at least monthly) by a third party consultant and the report to be submitted to the APSCL authority. Monitoring to be carried out on site and at the settlement and PDB high school and Hazzi Jolli high schools to the west, plus the APSCL dormitory to the east and the local settlement to the south of the project.	Implementation of Good Site management practices shall be the responsibility of all contractors on site under supervision of the APSCL nominated Project Manager.	APSCL Project Manager in collaboration with the Consultant's Site Manager & third party consultant	SPM, PM10, PM2.5, NO2, SO2 & CO.	Monthly reporting of summary results and submitted to the APSCL and any other concerned authorities. (e.g. DOE, ADB, etc.).	APSCL responsible for the management of the air quality monitoring system. Submission of monthly summary reports to DOE and any concerned authorities. Basic training of persons employed to operate and maintain the monitoring system. APSCL to ensure all contractors and subcontractor s working on site are aware of ESMP and all employees are given basic induction training on good construction and site management practice.	N/A

	and medical attention will be free of charge.								
Contamination of the aquatic environment as a result of construction activities on land e.g. spillages, disposal of liquid wastes; surface run-off, exposure of contaminated soils.	Follow mitigation measures set out in this EIA and the EHS Guidelines on Construction. River water quality must be within prescribed limits of the national ambient water quality standards for classification as source of drinking water as it will be used to provide potable water for the construction workers (for standards see http://faolex.fao.org/docs/ pdf/bgd19918.pdf). Mitigation activities will include the following: • no discharge ofeffluents into the river- all effluents shall be collected and removed off site for treatment by approved firms or disposed after proper treatment at site (records of effluent transfers to be maintained); • no discharge of surfacewater runoff direct into the river – development of a temporary site drainage plan which reduces flow velocity and sediment load by passing discharge through a sediment pond; regular testing of discharged water; • protection of temporary stockpiles of soil from erosion by using a reduced slope angle where practical, sheeting and by incorporating sediment traps	During construction	Contractor should undertake daily inspections, with weekly inspections by environment officer, and monthly inspections by third party monitor. Continuous daily visual inspection will be conducted by trained staff of the contractor. Weekly monitoring and supervision by APSCL is required to ensure the implementation of good site management practices by all contractors during construction. River water sample should be collected monthly by a third party consultant from three locations, 500m upstream and downstream of works and at the works site outfall, if preliminary monitoring campaign shows strong variations in water quality additional locations may be require	Implementation Of Good Site Management practices shall be the responsibility of all contractors on site under supervision of the APSCL Project management.	APSCL Project Director in collaboration with the Consultant's Site Manager & third party Consultant.	Temp., PH, COD. BOD, TOC, DO, TSS, oil & grease etc.	Quarterly reporting of summary results and submitted to the APSCL and other concerned authority, e.g. DOE, ADB, etc., if required.	APSCL to ensure all Contractors and subcontractors working on site are aware of ESMP and all employees are given basic induction training on good construction and site management ractices.	N/A

	in drainage ditches; • at least 100 m safedistance for stockpiles to water body to be achieved; • Maintenance of well-kept construction site. • all fuel, oil and chemicals should be stored in bunded area 110% volume. • impermeable surface should be used for refueling • regular training of allworkers in spill response • provision of spillequipment at easily accessible locations around the site • drainage must beadequately designed to include allowance for climate change Treatment of all wastewater must be consistent with the standards and measures in the EHS guidelines on wastewater and ambient water quality								
Noise: Increased noise in the project area as a result of the use of noisy machinery and increased vehicle movements.	Follow mitigation measures set out in this EIA and the EHS Guidelines on Construction. No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. And no unprotected ear should be exposed to a peak sound pressure level of more than 140 dB(C). The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours	During construction	Contractor should undertake daily inspections, with weekly inspections by environment officer, and monthly inspections by third party monitor. Continuous daily visual inspection will be conducted by trained staff of the contractor. Weekly monitoring and supervision by APSCL is required to ensure the implementation of good site management practices by all	Implementation Of Good Site Management practices shall be the responsibility of all contractors on site under supervision of the APSCL project management .	APSCL Project Director in collaboration with the Consultant's Site Manager & third party consultant.	Noise complaints register to identify concerns. Check the noise level using noise measuring devices.	APSCL will produce a monthly log of valid complaints and actions taken. Monthly reporting of summary results and submitted to the APSCL	APSCL to ensure all Contractors and Subcontractors working on site are aware of ESMP and all employees are given basic induction training on good construction and site management practices.	N/A

	reaches 85 dB(A), the peak sound levels reaches 140 dB(C), or the average maximum sound level reaches 110 dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85dB(A). Emissions at the site boundary and nearest sensitive receptors must be within prescribed limits of the EHS Noise Guidelines. Implementation of good site practices including: • provision of noise barrier around the project site to reduce off-site noise levels; enforcement of vehicle speed limits; • strict controls of vehicle routing; • diesel engine construction equipment to be fitted with silencers; • limited noisy construction activities at night; • prohibition of light vehicle movements at night; • use of protective hearing equipment for workers.		Contractors during construction. Monitoring of 24-hr noise levels to be made on a continuous basis (at least monthly) by a third party consultant at the site boundary and nearest sensitive receptors and the report to be submitted to the APSCL authority. Monitoring to be carried out on site and at the settlement and PDB high school and Hazzi Jolli high schools to the west, plus the APSCL dormitory to the east and the local settlement to the south of the project.				and any other concerned authorities, e.g. DOE, ADB etc., if required.		
Flora and Fauna Site Clearance-Vegetation removal and Habitat	Follow mitigation measures set out in this EIA and the EHS Guidelines on Construction. • Good site management practices will be observed to ensure that disturbance of habitats off-site are minimized.	During construction	Contractor should undertake daily inspections, with weekly inspections by environment officer, and monthly inspections by third party monitor. Continuous daily visual	Implementation Of Good Site Management practices shall be the responsibility of all contractors on site under	APSCL Project Director in collaboration with the Consultant.	Good conservation of floral wealth.	Quarterly reporting No. of floral species conserved or planted, if any.	APSCL to ensure all Contractors and Subcontractors working on site are aware of ESMP and all	N/A

disturbance.	• Specific mitigation measures include restricting personnel and vehicles to within construction site boundaries, lay down areas and access roads.		inspection will be conducted by trained staff of the contractor. Weekly inspection and supervision by APSCL is required to ensure the implementation of good site management practices by all contractors during construction.	supervision of the APSCL project management.				employees are given basic induction training on good construction and Site management practices.	
Soils and Hydrology: Site clearance, excavation and disposal of material, exposure of potentially contaminated soils, spillage or leakage of substances on land, movement of equipment and vehicles on site.	Follow mitigation measures set out in this EIA and the EHS Guidelines on Construction. The potential impacts are largely dependent on management of the construction site and activities. The following mitigation measures will be implemented: • development ofeffective site drainage systems designed to include allowance for climate change; • restriction of access only to construction site areas; • disposal of waste materials unsuitable for reuse on-site, (e.g. for landfilling) at appropriately licensed sites; • provision of oil and suspended solid interceptors; • management of excavations during construction to avoid the generation of drainage pathways to underlying aquifers; • provision of impermeable bases in operational areas to prevent absorption of spillages.	During construction.	Undertake daily inspections, with weekly inspections by environment officer, and monthly inspections by third party monitor. Daily visual inspection is required by trained staff of the contractor to ensure the implementation of good management practices during construction. Weekly inspection and supervision by APSCL is required to ensure the implementation of good site management practices by all contractors during construction. Quarterly monitoring of drinking water in tube wells within 1km of a septic tank location by third party consultant to confirm that national drinking water standards are met.	Implementation Of Good Site Management practices shall be the responsibility of all contractors on site under supervision of the APSCL project management.	APSCL Project Director in collaboration with the Consultant.	• site drainage. • access only To construction site areas. • waste materials. • oily waters. • drainage pathways. • potential spillage in Operational areas. Visual Inspection	Quarterly reporting of summary results submitted to the APSCL and any other concerned authorities (e.g. DOE, ADB etc., if required.	APSCL to ensure all contractors and subcontractor s working on site are aware of ESMP and all employees are given basic induction training on good construction and site management practices.	N/A

	No septic tank will be installed within 500m of a deep or shallow tube well used by the community for drinking water. Septic tank will be installed in well drained and permeable soils well above high groundwater level and where sufficient soil percolation exists for design wastewater loading rate. It will be properly designed to prevent hazard to human health or contamination of land or water. Regular maintenance required. No overflow of septic tank permitted. If monitoring of tube wells identifies contamination (exceedance of national drinking water standards) provide community users with an alternate source of drinking water.								
Socio-Economic Environment: Positive impacts identified.	Follow mitigation measures set out in this EIA and the EHS Guidelines on Construction and Community Health and Safety. Public access to the site must be restricted. All activities related to the construction of the new plant will take place within the area belonging to APSCL, i.e. there will be no off-site activities or associated land acquisition during construction. Transmission lines & gas line will connect the new power plant to the existing substations	During construction.	Record local employment provided by the project. Daily visual inspection is required by trained staff of the contractor to ensure the implementation of good management practices during construction. Weekly inspection and supervision by APSCL is required to ensure the implementation of good site management practices by all contractors during construction. Daily monitoring of	APSCL Project management	APSCL Project Director in collaboration with the Consultant.	Workers satisfaction as measured by staff interviews and complaints reported. Visual Inspection	Quarterly reporting	Responsibility of APSCL.	N/A

	and RMS. Ensure H&S measures per the EHS electric power and distribution guidelines and EHS onshore oil and gas development guidelines are incorporated The entire labor force will be daily commuters, thus no worker housing or associated facilities will be erected on site during construction. If any offsite accommodation for the labor force needs to be developed the EIA and EMP should be updated accordingly. Legality of employees should be ensured. No forced or child labor (under age 18) to be employed. All employees to be legal. Regular talks on communicable diseases including HIV to be held for all workers. The contractors will be responsible for relevant temporary water/toilet facilities during construction and the need to provide appropriate services will be specified in their contracts. Provide adequate supplies of drinking water that is compliant with the national drinking water quality standards to all workers. Provide adequate sanitation facilities as outlined in the EIA. Toilets and bathrooms must be		drinking water provided to construction staff to confirm national drinking water standards are met.						

	properly equipped including hand washing facilities with hot water and with separate facilities for men and women. Regular talks on sanitation to be held for all workers to encourage cleanliness. Public access to the site must be restricted. Disease prevention and traffic safety measures should be adopted.								
Traffic and Transport: Disruption, noise and increased air pollution due to increased traffic, light loads and abnormal loads. Traffic Management Plan of the project is given as the Annexure-14(a).	Follow mitigation measures set out in this EIA and the EHS Guidelines on Construction and Community Health and Safety. Standard good practice measures will be implemented as follows: • adherence of abnormal load movements to prescribed routes, outside peak hours and advance publication of	During construction.	Contractor should undertake daily inspections, with weekly inspections by environment officer, and monthly inspections by third party monitor. Daily monitoring of traffic entering the site during morning & evening peaks to ensure the implementation of good site management practices by trained staff of the contractor. Weekly inspection and supervision by APSCL is required to ensure the implementation of good site management practices by all contractors during Construction. Quarterly monitoring of road and bridge condition by third party consultant to ensure maintenance being kept up.	Implementation Of Good Site Management practices shall be the responsibility of all contractors on site under supervision of the APSCL project management.	APSCL Project Director in collaboration with the Consultant.	Increased congestion Travel time (compared to reasonable daily commute) Visual Observation	Quarterly reporting of summary results submitted to the APSCL and any other concerned authorities (e.g. DOE, ADB etc.), if required.	APSCL to ensure all contractors and subcontractor s working on site are aware of ESMP and all employees are given basic induction training on good construction and Site management practices.	N/A
Archaeology: Potential chance	The project site does not lie on, or in the immediate vicinity of any known archaeological areas	During construction.	Contractor should undertake daily inspections, with weekly inspections by	APSCL project management will allocate	APSCL Project Director in	Visual observation	Quarterly reporting of summary	APSCL to ensure that all workers on	N/A

finds of archaeological remains during construction.	of interest. If remains are found APSCL is committed to: • cease activities and consult Archaeological department; • protection in situ if possible; •excavation of areas where protection not feasible following discussion and agreement of archaeological		environment officer, and monthly inspections by third party monitor. Daily visual inspection is required by trained staff of the contractor to ensure the implementation of good management practices during construction. Weekly supervision of construction activities by APSCL is required to ensure the implementation of good site management practices by all contractors during construction.	responsibilities in accordance with the construction site plan.	collaboration with the Consultant.		results And submitted to the APSCL and any other concerned authorities (e.g. DOE, ADB etc.), if required	site are aware of the importance of archaeological remains and must report any potential finds immediately.	
Natural Disasters Flash flooding.	Good engineering design Will incorporate the following mitigation measures: • drainage system designed to direct flood water from main plant areas into the river and direct potentially contaminated waters through the oil interceptor.	During construction.	Continuous daily visual inspection will be conducted by trained staff of the contractor. Weekly monitoring and supervision by APSCL is required to ensure the implementation of good site management practices by all contractors during Construction. River water sample should be collected monthly by a third party consultant from three locations, 500m upstream and downstream of works and at the works site outfall, if preliminary monitoring campaign shows strong variations in water quality additional locations may be required	APSCL project management	APSCL Project Director in collaboration with the Consultant.	Visual observation	Quarterly reporting of summary results submitted to the APSCL and any other concerned authorities (e.g. DOE, ADB etc.), if required	APSCL to ensure that all workers on site receive training in emergency preparedness and response procedures.	N/A
Solid Waste	Follow mitigation measures set out in this EIA and the EHS	During	Contractor should	Implementation	APSCL	Management	Quarterly	APSCL to	N/A

Management	Guidelines on Construction and Waste Management. Good practice measures such as the following: (1) all waste taken offsite will be undertaken by a licensed contractor and APSCL will audit disposal procedure; (2) collection and segregation of wastes and safe storage; (3) recording of consignments for disposal; (4) prior agreement of standards for storage, management and disposal with relevant authorities; It is of highest importance that final disposal of wastes shall be strictly adhered to environment friendly disposal Contract.APSCL will plan a decommissioning plan for the disposal of old units.	construction.	undertake daily inspections, with weekly inspections by environment officer, and monthly inspections by third party monitor. Contractor to keep daily records of all waste transfers. Weekly monitoring by APSCL is required to ensure the implementation of good site management practices by all contractors during construction.	of Good Site Management practices shall be the responsibility of all contractors on site under supervision of the APSCL project management	Project Director in collaboration with the Consultant	contract in place	reporting of summary results submitted to the APSCL and any other concerned authorities (e.g. DOE, ADB etc.), if required	ensure all contractors and subcontractors working on site are aware of ESMP and all Employees are given basic induction training on good construction and site Management practices.	
Occupational Health & Safety	Good local and international construction practice (as per the EIA and EHS Construction and Occupational H&S Guidelines) in Environment, Health and Safety (EHS) will be applied at all times and account will be taken of local customs, practices and attitudes. Regular H&S training will be conducted for all construction staff, including training on good housekeeping, cleanup of debris and spills, and working in confined spaces and at height. Measures include: • implementation of EHS procedures as a condition of contract all contractors and subcontractors;	During construction.	Contractor should undertake daily inspections, with weekly inspections by environment officer, and monthly inspections by third party monitor. Daily inspection is required to ensure the implementation of EHS Policies, plans and practices during construction. Weekly monitoring and supervision by APSCL is required to ensure the implementation of good site management practices by all contractors during construction .Record all	Implementation of good site management practices and the EHS policies Shall be the responsibility of all contractors on site under the supervision of the APSCL project management.	APSCL Project Director in collaboration with the Consultant.	Management procedures in place. Workers Health and safety as measured by number of incidents.	Daily inspection Quarterly reporting of summary results submitted to the APSCL and any other concerned authorities (e.g. DOE, ADB etc.), if required	APSCL to ensure all contractors And subcontractors for workers on site include reference to the requirement of the ESMP and are aware of the EHS policies of the project. All employees will be given basic induction training on EHS Policies and	N/A

	• clear definition of the EHS roles and responsibilities for all construction companies and staff; • management, supervision, monitoring and recordkeeping as set out in plant's operational manual; • pre-construction and operation assessment of the EHS risks and hazards; • completion and implementation of Fire Safety Plan prior to commissioning any part of the plant; • provision of appropriate training on EHS issues for all workers; • provision of health and safety information; • regular inspection, review and recording of EHS performance; • appointment of site nurse and provision of free on-site medical care for all construction staff; • pest and vector control; • maintenance of a high standard of housekeeping at all times; • provision of first aid equipment at easily accessible locations around the site; • H&S training including for confined spaces and working at height, planning with preparation of a H&S plan prior to work, drills, signage, first aid, etc.; • provision of harnesses and scaffold barriers for work at height, segregation of pedestrians and traffic on-site.		fatalities, accidents and near misses that occur during construction work and implement corrective action to ensure such incidents are not repeated in future.					practices. Contractors are Responsible for ensuring that a Fire Safety Plan, is prepared and implemented prior to commissioning of any part of the plant under supervision of APSCL project management	

4.2 Semiannually Assessment of Construction Impact on Air, Water, Noise, Construction Waste and Labor Camp Management

4.2.1 Impact on Air Quality

During the construction phase of the proposed power plant project, the important sources of emissions will include those from the operations of construction equipment and machineries, vehicles carrying construction materials to the site and taking construction debris out of the site. If construction equipment, such as stone (aggregate) crusher is used at the site, this may result in significant emission of particulate matter during its operation. But to control it, batching plant will be situated in an isolated place outside of project area which will have no impacts on the project and also its adjacent places.

Since construction of the proposed power plant project will most likely involve significant earthworks, increase in particulate matter in the air from wind-blown dust is also a concern, to the project site. Ambient Air Quality will be monitored from four different places at Ashuganj 400 MW (East) Combined Cycle power plant project such as East, West, North and south side of the plant. Test Results of Ambient Air Quality from these different places will be presented in Table.

The result for ambient air quality monitoring will show the SPM, PM_{10}, $PM_{2.5}$, concentrations of the ambient air. From the analysis it will be observed that the concentration of SPM, PM_{10}, and $PM_{2.5}$ is within the allowable limit or not. So, the SPM and PM_{10} may be found higher level during movement of vehicle, surrounding rice husk mills but after spraying of water the dust level will be reduced remarkably low. Having construction activities many diesel vehicles will move around and few cranes will also be under operation, so it can be though that the NOx level would be higher level. $PM_{2.5}$ is composed of a mixture of primary and secondary particles, Primary particles are emitted directly into the atmosphere and include soil-related particles and carbon particles from fossil fuel combustion, and secondary particles are sulphate, nitrate, organic and elemental carbon, trace elements and ammonium. The upcoming project is at Ashuganj in Brahmanbaria district which will be in unplanned urban and planned industrial area, so the cumulative air pollution may be high in this area during the construction period.

Mitigation measures as outlined in **Section 4.3** will be adopted to minimize the possible adverse impacts of project activities on air quality.

4.2.2 Impact on Noise

During construction stage major source of noise is expected to stem from transport vehicles which include barges and trucks. Also noise is expected to be produced from plant construction activities. The construction phase may be broadly classified into two different groups:

- General Site and Plant Construction,
- Water and Effluent Treatment Plant construction, and
- Access Road Construction.

SN	Location	GPS Locations
01	L1	Will be selected during construction work
02	L2	Will be selected during construction work
03	L3	Will be selected during construction work
04	L4	Will be selected during construction work

To assess the noise generated by different activities it is essential to identify the equipment to be used at various stages of the construction work. Therefore, an inventory of the probable equipment will be used and their reference noise generation data are of utmost importance. Measured noise level in the construction site will be summarized in table.

4.2.3 Impact on Water Quality

The drinking, surface and ground water sample will be collected from the supplied water, Meghna River and ground water. The tested results will be presented in Table respectively.

The Meghna River passes through from East to West direction near the project area and there are few industries at the right bank of this river. So the water of this river is less polluted that was also found from environmental monitoring. The DO level of this water is more than 6.5 mg/L which is within DoE standard level. The BOD_5 is also in lower level than DoE standards. These values are given in the EIA report as the baseline survey. During the project construction and operational phase it will be monitored to assess the deviation and effect of project activities on water quality.

4.2.4 Impact on waste and labor camp

Construction debris and wastes to be generated during the construction phases will be normally scrap iron, packing materials, steel, wooden frames, piping, and other solid wastes. Most of them will be generated toward the end of the construction phase during carrying out of the finishing works, while the site will be cleared of waste materials. The volume of such construction wastes will likely to be significant. Indiscriminate storage and disposal of these construction debris and wastes can create local water logging and ponding by blocking drainage lines and will be aesthetically displeasing. Proper disposal of these wastes will be described in Section 4.3.

Solid waste of domestic nature that will be generated in the temporary labor sheds at the construction site will not likely to be significant in volume. But indiscriminate disposal of such solid waste may create environmental pollution and unhealthy situation at the project site. These solid wastes will be disposed properly as outlined in Section 4.3.

Assessment of construction impact on air, water, noise, construction waste and labor camp management

Table 4.1 will summarize the effect of project activities on physico-chemical environmental parameters during construction phase of the project. The physico-chemical environmental parameters that can be affected by the project activities include water, air quality and noise level. As discussed above, water quality can be affected mainly by

project activities such as mobilization of equipment and personnel (e.g., solid and liquid waste from labor sheds), and site preparation. Effects of solid and liquid wastes generated during construction phase would not be very significant, especially if mitigation measures as outlined in Section 4.3 are adopted. The overall negative impact of such activities will likely to be "short-term (Sh)" and of "low" intensity.

Deterioration of air quality during construction phase may result from increased concentration of particulate matter in the air from construction activities such as vehicular movement and wind-blown dust. However, these adverse impacts will greatly minimized by adopting mitigation measures as outlined in Section 4.3.

The likely noise level to be generated for different construction activities and its impact on the surrounding environment will be assessed using a noise meter. Results of the assessment will be presented in table to show that how different construction activities will generate significant noise and can produce some adverse impacts.

Similarly, the cumulative noise caused by the heavy trucks and excavator simultaneously during the construction of the access road will also of some concern. The adverse effect of project activities on noise level will therefore be categorized as "short term (Sh)" and of "moderate" intensity.

Table 4.2: Possible Effect of project activities on physico-chemical environmental parameters during construction phase

Physico-chemical parameters	**Environmental Examination**						
	Positive Impact			**No Impact**	**Negative Impact**		
	Low	**Moderate**	**High**		**Low**	**Moderate**	**High**
Air Quality					X (Sh)		
Noise Level						X (Sh)	
Drinking Water Quality					X (Sh)		
River Water Quality					X (Sh)		
Ground Water Quality					X (Sh)		

Note: Sh=Short-term; Lo=Long-term

4.3 Mitigation measure

4.3.1 Air Quality

Construction materials at the site will be properly covered while hauled and stored, roads properly cleaned and water sprayed in order to minimize concentration of dust in air when dust increases. Vehicle movement to and from the site will be properly managed to ensure that it does not significantly aggravate the traffic problem and air pollution. Stone (aggregate) crushing activities will be properly done in fine tune batching plant which will be far away from the construction site and not allowed within the Ashuganj plant premises. Health status of all workers will be monitored regularly at the Health Center which will be established at

the project site.

4.3.2 Water Quality

The human wastes from the labour camp will be appropriately disposed of through construction of sanitary latrines connected to appropriately designed septic tank system (consisting of septic tank and soakage pit). Wastewater generated from different construction activities will not likely to be significant in volume. Disposal of such wastewater will be carried out by draining them in shallow pits dug in the ground at appropriate locations, and filling them up with sand at the end of the construction phase. In all cases, the wastewater streams will be separated from the storm water stream, which will be disposed of separately utilizing the existing storm water disposal system at the Ashuganj complex.

4.3.3 Noise Level

- Will use "quiet" equipment (i.e., equipment designed with noise-control elements);
- Route truck traffic away from noise-sensitive areas, where feasible;
- Install sound barriers for pile driving activity, where practicable (e.g., use an acoustic curtain or blanket around the point of impact);
- Unnecessary vehicle movement will be avoided
- Switch off the engines while remain unused.

4.3.4 Solid Waste

The solid wastes of domestic nature generated mainly in the labor sheds will be collected and stored separately (i.e., without mixing it with construction wastes/debris) in appropriate containers within the construction site. The solid wastes will be disposed of away from the site (e.g., in a municipal landfill/waste dumping ground) outside the complex, at the responsibility of the Contractor & monitored by APSCL.

4.4 Progress of Work

Ambient air quality monitoring: Measurements of selected air quality parameters for $PM_{2.5}$, PM_{10} and SPM will be carried out during the ongoing construction work. Air samples will be collected for measurements of selected air quality parameters for $PM_{2.5}$, PM_{10} and SPM.

Drinking water monitoring: Drinking water sample will be collected from supply water in for analyzing pH, Ammonia, nitrate, phosphate, As, Fe, Mn, Fecal and total coliform. Test report will also be shown in the table.

River water monitoring: River water sample will be collected from Meghna River in for analyzing temperature, dissolved oxygen (DO) along with BOD_5, COD, Oil and Grease, and selected heavy metals (Cr, Cd, Pb). Test report will also be shown in the table.

Ground water monitoring: Ground water sample will be collected from supply water for analyzing pH, TDS, Ammonia, nitrate, phosphate, As, Fe, Mn, Fecal and Total coliform. Test report will also be shown in the table.

Noise level monitoring: Noise level monitoring is also necessary during construction period, because use of heavy construction equipment may increase the noise level at the work location. So, Noise level data will be collected from selected 4 locations.

Waste management and process waste monitoring: Disposal of construction debris away the site and their appropriate disposal sanitary landfill will be ensured. Hazardous waste and non-

hazardous waste will also be disposed by proper way.

Trees cutting: The project site is in existing combined cycle power plant site. So, there is no scope of tree cutting. But tree plantation program and landscaping is going on for providing the better environment at the project site and APSCL area.

Others: There is no significant impact on the existing road network in the project area. Major transportation of plant and construction material will be done by the Meghna River with unloading of materials by crane owned by APSCL and at the jetty which is within the existing APSCL complex.

All slopes will be protected and suitable erosion protection measures will be employed to reduce any impact from runoff during the monsoon rainy season.

Health and Safety: The general health and safety of workers will be safeguarded with the provision of medical and health facilities on-site, the provision of personal protective equipment (hard hats, safety belt, full body safety harness, ear plugs, ear muff, welding shield, grinding shield, safety shoe, safety goggle, welding apron, hand gloves, safety jacket, anti-dust masks, anti-gas masks etc. as required). There will be an emergency response system and workers and supervisors will receive training on any accident and immediate medical facility in its own round the clock medical center. There will be a full time emergency ambulance to provide immediate service if required. Safe drinking water and sanitation facilities will be established and provided to all project related employees (officer, staff and workers) at the site.

Set up of in-house monitoring system

APSCL is being set up of in-house monitoring system and require manpower with its own staffs. In-house environmental monitoring system with man power is as follows.

Manpower for Environmental Management Plan.

1. Manager (Health, Safety & Environment) – 1 nos.
2. Asst. Manager (Health, Safety & Environment), for ambient air, stacks emission and noise etc.-01 no’s
3. Manager (Chemical) For ETP, WTP, etc. -1 nos.
4. Assistant Manager (Chemical) For ETP, WTP, etc. - 1 no’s.
5. Operator – 3 Nos.

EIA approval Certificate /Environmental Clearance Certificate /Renewal of Environment Clearance:

ASPCL received exemption of IEE and approval of Term of Reference (ToR) for EIA for Implementation of APSCL 400 MW CCPP (East) from DoE. APSCL also received the EIA approval letter from the DoE, Bangladesh on 08.10.2015.

Based on the EIA approval letter from DoE, APSCL has started bidding work and after successful completion of that construction activities will be started. After completion of construction work APSCL will apply for environmental clearance certificate for operation of the plant. DoE did not provide any environmental certificate or any condition in the EIA approval letter, hence no renewal issue is arises.

4.5 WORK SHOP AND TRAINING MEETING AND DISCUSSION

During the construction phase an environmental team headed by Md. Atiqur Rahman, Manager (Health, Safety & Environment of APSCL) will look after and overall supervise the monitoring of 400 MW East CCPP environmental issues. Training will be conducted on environmental issues for APSCL personnel and EPC contractors.

A training program for capacity building program of APSCL personnel and EPC contractors will be arranged upon availability of require manpower. There will be environmental meeting performed in every month and will be discussed the overall performance of the environmental issues of under construction power plant.

5.0 SAFEGUARD MONITORING RESULTS AND UNANTICIPATED IMPACTS

5.1 Safety assurance of the project site

Personal Safety Equipment (PSE): Use of proper safety materials will be mandatory for all at project site. Workers will use appropriate personal protective equipment, such as safety boots, helmet, safety jacket, safety belt, safety harness, gloves, protective clothing, goggles, grinding shield, welding shield, anti-dust mask, anti-gas mask and ear protection etc. Daily toolbox meeting before starting of work will be a mandatory practice at the project site. So long as safety will not suffer due to this action. The target is that there will be no fatality and other casualty (Zero accident) and detail of safety issue will be described in the HSE Statistics chart.

5.2 OTHERS

5.2.1 Weather condition

The weather condition during the ambient air quality and noise monitoring will be described during the sampling.

5.2.2 Other factors which can affect the monitoring results

Air monitoring: Factors which can affect the air monitoring results including:

- Topography
- Congested Space
- Physical and chemical properties of pollutants
- Air Pressure
- Air Turbulence

Water monitoring: Factors which can affect the water monitoring results including:

- Soil erosion
- Waste discharge
- Surface runoff
- Large numbers of bottom feeders (such as carp), which stir up bottom sediments
- Excessive algal growth.

Noise Monitoring: Factors which can affect the noise monitoring results including:

- Type of source (point or line)
- Distance from source

- Atmospheric absorption
- Obstacles such as barriers and buildings
- Ground absorption
- Reflections
- Humidity

6.0 IMPLEMENTATION OF GRIEVANCE REDRESS MECHANISM AND COMPLAINTS RECEIVED FROM STAKEHOLDERS

6.1 Grievance Redress Mechanism and Disclosure

6.1.1 Grievance Redress Mechanism

Public participation, consultation and information disclosure undertaken as part of the local EIA process have discussed and addressed major community environmental concerns. Continued public participation and consultation has been emphasized as a key component of successful project implementation. As a result of this public participation during the initial stages of the project, major issues of grievance are not expected. During the operational phase of the project, the complaints that may be anticipated are mostly related to noise & vibration of the engines. However, unforeseen issues may occur. To settle such issues effectively, an effective and transparent channel for lodging complaints and grievances will be established. The grievance redress mechanism should be scaled to the risks and adverse impacts of the project. It should address affected people's concerns and complaints promptly, using an understandable and transparent process. It should also be readily accessible to all sections of the community at no cost and without retribution.

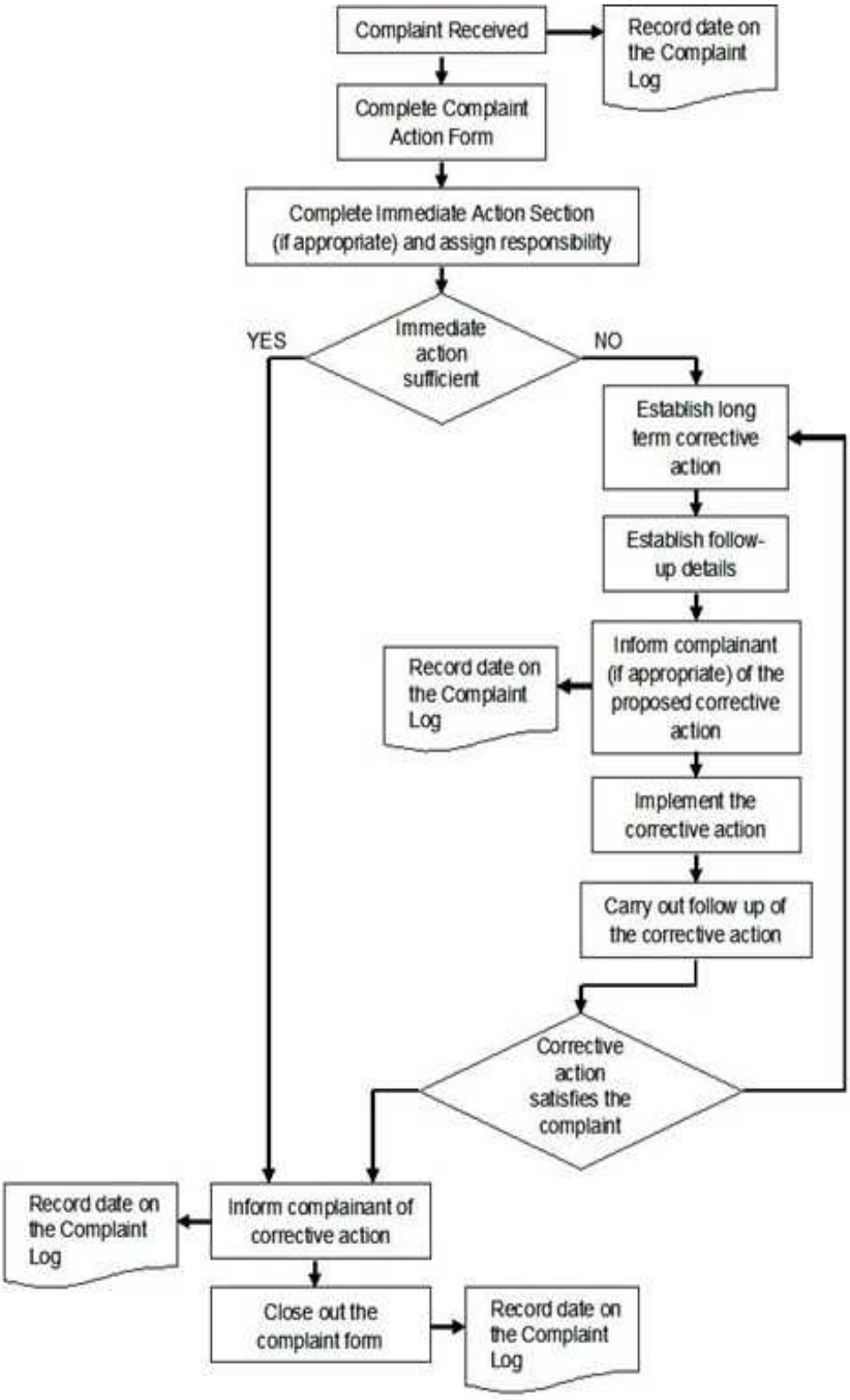
The Grievance Mechanism will be implemented during both the construction and operational period of the project to ensure that all complaints from local communities are dealt with appropriately, with corrective actions being implemented, and the complainant being informed of the outcome. It will be applied to all complaints from affected parties.

The mechanism will be accessible to diverse members of the community, including more vulnerable groups such as women and youth. Multiple means of using this mechanism, including face-to-face meetings, written complaints, telephone conversations should be available. Confidentiality and privacy for complainants should be honored where this is seen as necessary or important.

A grievance redress mechanism and procedures is setup to provide opportunity for project affected persons to settle their complaints and grievances amicably. The established grievances redress procedures and mechanism ensures that project affected persons are provided with the appropriate compensations and that all administrative measures are in line with the law. It also allows project affected persons not to lose time and resources from going through lengthy administrative and legal procedures. Grievances are first preferred to be settled amicably.

APSCL shall set-up a grievance redress committee that will address any complaints during both the construction and operational period of the project.

Flowchart of compliant /Grievance Procedure



The representation in the committee makes project affected persons to have trust and build confidence in the system. The grievance redress committee reports its plan and activities to the Implementation committee. The following list presents members of the committee.

Table 11.1: Members of the Committee of Grievance Redress (GRC)

Sl No	Designation
1.	Project Director (Chief Engineer), 400 MW (East) Project, APSCL.
2.	Chief Engineer (O&M), APSCL.
3.	Manager (HRM), APSCL.
4.	Manager (HS&E), APSCL.
5.	Deputy Manager (Security & Discipline), APSCL.
6.	Assistant Manager (Security & Discipline), APSCL.
7.	Chairman, Ashuganj Union Parishod, Member.

GRC will maintain a Complaints Database, which will contain all the information on complaints or grievances received from the communities or other stakeholders. This would include: the type of complaint, location, time, actions to address these complaints, and final outcome.

The procedures to be followed and adopted by the grievance redress should be transparent and simple to understand or uniform process for registering complaints provide project affected persons with free access to the procedures. The response time between activating the procedure and reaching a resolution should be as short as possible. An effective monitoring system will inform project management about the frequency and nature of grievances. GRC will arrange half yearly meetings where the activities and the outcomes/measures taken according to the Complaints Database are to be monitored and reviewed by third party consultant to ensure the required transparency. In addition to the above, if there are any grievances related to environmental management issues in the project area, the GRC will record these grievances and suggestions and pass it on to the relevant consultant for necessary action and follow-up.

GRC will be responsible to response for the grievances within a time limit. The initial movement to identify the causes should be taken within 48 hours. The GRC will not take more than two weeks to take the final initiative.

In case a dispute is not resolved by arbitrational tribunal, then if any of the Party disagrees, the aggrieved party has the right to appeal to the ordinary courts of law.

However, the preferred option of dispute settlement ought to be the option of settling the dispute amicably because recourse to courts may take a very long time even years before a final decision is made and therefore, should not be the preferred option for both parties.

7.0 CONCLUSION AND RECOMMENDATION

The environmental monitoring report consists of 5th Semiannually environmental monitoring reporting based on identified parameters in EIA during construction phase. But till now the

project construction activities is not started. So, no negative impact was found on the environmental due to this project. During construction activities all of the mitigation measures will be taken following ADB Environmental Safeguard Policy 2009, IFC/World Bank Thermal Power Plant Guideline 2008 and DoE, Bangladesh guideline and suggestive and recommended measures in the EIA.

Finally it can be concluded that the project has no detrimental impact for short period on the environment in terms of ambient air, ambient noise and water during the period from January to June, 2018.

APPENDIX 1
PHOTOS

Meeting with site management

Site Condition

Signing a Subcontract

Meeting with subcontractor

09.08.2018

Md. Atiqur Rahman

Manager (Health, Safety & Environment)

Ashuganj Power Station Co. Ltd.

Ashuganj, Brahmanbaria