

Environmental Monitoring Report

12th Semi-Annual (July – December 2021) Report



ASHUGANJ 400 MW (EAST) COMBINED CYCLE POWER PLANT PROJECT
At Ashuganj, Brahmanbaria



Ashuganj Power Station Company Limited (APSCCL)

Rev	Date	Prepared By	Approved By	Description
00	December 2021	Md. Dilshad-Ibne-Baqui Assistant Manager (HS&E) Ashuganj 400 MW CCPP (East) Project, APSCL.	Md. Atiqur Rahman, Manager (HS&E), APSCL.	12 th Semi-Annual Environmental Monitoring Report

Contents

EXECUTIVE SUMMARY	6
-------------------------	---

1.0 INTRODUCTION.....	8
1.1 Location of the Project.....	8
1.2 Context of the monitoring report	9
1.3 Project Progress Status	9
1.4 Environmental management implementation work schedule	10
1.5 Progress status on implementation of environment management activity	11
1.6 Corrective Action Plan (CAP)	13
2.0 ENVIRONMENTAL RESPONSIBILITIES AND INSTITUTIONAL SETUP	13
3.0 Safeguard Compliance Performance of the Project	15
3.1 Compliance with the Environmental Provisions of National Legal Instruments	15
3.2 SPS, 2009 compliance status	17
3.3 Compliance of environmental covenants from the ADB loan agreement	17
4.0 ENVIRONMENTAL STATUS	21
4.1 Analytical Monitoring and Observations	22
4.1.1 Air Quality Monitoring	22
4.1.2 Noise Measurement	25
4.1.3 Water Quality Analysis.....	29
4.1.3.1 Drinking Water Quality Analysis	29
4.1.3.2 River Water Quality Analysis	32
4.1.3.3 Ground Water Quality Analysis.....	35
4.2 Visual Monitoring and Observations	37
4.2.1 Traffic Volume.....	37
4.2.2 Site Security	38
4.2.3 Personal Protective Equipment	39
4.2.4 Incident Record & Reporting	40
4.2.5 Solid Waste	40
4.2.5.1 Solid Waste Management Plan	41
4.2.6 Worker’s Health and COVID Response	42
4.2.7 Grievance Redress mechanism	43
4.2.8 Safety orientation & training of workers	45
4.2.9 Sanitation & Drinking Water Facility	46
4.2.10 Site Drainage.....	47
4.2.11 Dust Control.....	47
4.2.12 Oily Waste Generation & Disposal System.....	48
5.CONCLUSION AND RECOMMENDATION.....	48
ANNEX-I: PHOTO APPENDIX.....	50
ANNEX-II: MONITORING LOCATIONS	52

ANNEX-III: MONITORING LOCATIONS MAP	54
ANNEX-IV: LABORATORY TEST RESULT	55
ANNEX-V: CALIBRATION CERTIFICATE.....	81
ANNEX-VI: DoE CLEARANCE of EIA RENEWAL (Applied for Next Renewal)	88
ANNEX VII: CARBON FOOTPRINT ANALYSIS.....	90
ANNEX VIII: GRM REGISTER FORM.....	91

List of Tables

Table 1: Project Progress Status	9
Table 2: Environmental management implementation work schedule for next six months working plan (January 2022 to June 2022).....	11
Table 3: Implementation of environmental management activity during construction phase (analytical)	11
Table 4: Implementation of environmental Monitoring Plan during Construction Phase of the Project (Visual)	12
Table 5: Implementation of environmental Monitoring Plan during Construction Phase of the Project (Visual/).....	13
Table 6: Project Environmental Key Personnel, Contact Names and Telephone Numbers	14
Table 7: National Legal Instruments Related to the Emergency Assistance Project.....	15
Table 8: ADB Safeguards Policy compliance Status for the Projects	17
Table 9: Compliance with Environmental Considerations of Loan Agreements	17
Table 10: Test Result of Ambient Air Quality	23
Table 11: Test Result of Noise Quality	28
Table 12: Drinking Water Quality Test Result.....	30
Table 13: River Water Quality Test Result	33
Table 14: Ground Water Quality.....	36
Table 15: Total number of vehicles based on their categories.....	38
Table 16: List of Personal Protective Equipment Used in Project Site	39
Table 17: Waste Inventory Log of CNTIC-CCOEC Consortium	40
Table 18: Members of the Committee of Grievance Redress (GRC).....	44
Table 19: Summary of HSE Management	46

List of Figures

Figure 1: Location Map of APSCL 400 MW CCPP (East) project.....	8
Figure 2: Construction Works.....	10
Figure 3: Latest Picture of the Project Site (Construction going on).....	10
Figure 4: SEMP Organizational Structure	14
Figure 5: Air quality monitoring.....	23
Figure 6: Noise level monitoring (Day time; 6.00 AM-9.00 PM).....	26
Figure 7: Noise level monitoring (Night time; 9.00 PM-6.00 AM).....	27
Figure 8: Drinking Water Sampling	29
Figure 9: River Water Sampling	33
Figure 10: Ground water sampling	36
Figure 11: Site Security & Safety Instruction Board.....	39
Figure 12: Use of Proper PPEs	40
Figure 13: Photograph of Solid waste disposal location.....	41
Figure 14: On-site Ambulance and furnished First Aid box.....	42
Figure 15: Daily Body Temperature Monitoring and COVID-19 sign	43
Figure 16: On-site Wash, Sanitation and Hygiene facilities.....	43

Figure 17: Photograph of Suggestion/Complain Box	44
Figure 18: Toolbox meeting & training of workers	45
Figure 19: Pure Drinking Water & Sanitation facility to workers	47
Figure 20: Photograph of Site Drainage	47
Figure 21: Water spraying for dust control.....	48

EXECUTIVE SUMMARY

During the period from July to December 2021, Super structure construction of Bypass stack, Exhaust stack, cooling water, Oily waste water treatment station, Turbine Generator, Air compressor building, Central control Building (CCB), Power control center, Main Building has been completed. Similarly, Installation of equipment & pipe for gas booster and regulating station, RMS, drain water treatment system, site processing and foundation work for emergency Oil pit, sewage treatment station, and unit auxiliary transformer has been completed too. On the contrary, the construction work of plant road construction, electrical system, thermal control system, installation of W/S pipe, ST and HRSG is currently under progress. Commissioning work of the closed water system, CW system, fire alarm system air compressor system, DCS control (grid auxiliary transformer electrify), grid auxiliary transformer and plant electricity system has been completed. Whereas commissioning work of the gas booster regulating station & RMS, GT equipment in cold state, GUST electrify and 400kV GIS system is currently under progress.

In this period there is no discharge and for this, there is no impact on the living things in the water body. Air Pollution caused by dust emission during construction traffic activities is controlled by good management practices like continuous water spray over the unpaved or bare surfaces, covering soil materials pile. Soil and water pollutions are also prevented by proper management like spill prevention and well drainage system. Solid waste is managed by the waste management plan. Noise pollution is also a regarding the issue during Steel Structure Erection activities for using of demolition equipment's and for traffic and transport. Noise level is reduced by using fine-tuned low noise level construction equipment's and by the proper traffic management system. Every personnel use personal protective equipment to ensure their safety. The remarkable achievement in this period is that till now there is no record of loss time accident or injury.

Besides this, visual monitoring included traffic volume, site security, personal protective equipment, incident record and reporting, solid and oily wastes generation and disposal, worker's health, complaints from neighbors, safety orientation and training of workers, sanitation and drinking water facilities to the worker's and site drainage is covered during this period and its found that all aspects regarding visual monitoring were found in line with the environmental management plan and required environmental guidelines.

APSCL is committed to keeping the accident level in Zero by implementing its proper occupational health and safety management system. This project also has a positive effect on the socio-economic condition. Local skilled and semi-skilled peoples are engaged in different levels of construction activities and they are happy about getting employment opportunities. On March 8, Bangladesh confirmed three cases of novel coronavirus on its territory. After that, APSCL has been paying close attention to the latest situation of COVID-19 spreading in

Bangladesh and we are currently creating awareness & taking preventive action as a continuous process on this matter. During this critical period, APSCL immediately took the necessary precautions to protect all of its staff against virus infection and has taken immediate action on EPC contractors to prevent the spread of Covid-19 from new project activities like under construction 400 MW CCPP (East) Project by controlling of movement of foreigners, local workers and other construction & maintenance activities of APSCL.

APSCL follows WHO & Govt. of Bangladesh guidelines to prevent COVID-19 situation. Besides this, APSCL has taken its own policy to protect its community from COVID-19 and it is also mandatory for EPC contractor of this project to follow APSCL's policy, WHO and Government of Bangladesh guidelines on this issue. EPC contractor is also following its own stringent COVID-19 policy to prevent this disease at the project site.

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. ADB environmental safeguards objectives are: (i) to ensure the environmental soundness and sustainability of projects and (ii) to support the integration of environmental considerations into the project decision-making process. ADB environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts.

1.1 Location of the Project

The power plant is setting up at the existing power plant area of Ashuganj Power Station Company Ltd. (APSCL) at Ashuganj, Brahmanbaria, Bangladesh. Ashuganj is located on the east bank of the Meghna River about 91 km Northeast to Dhaka & is connected by railway & highway way with Dhaka. There also exists good waterway connection to the site by seaports of Chittagong and Mongla. The project is located in Sonaram Mouza of Ashuganj Upazila, Brahmanbaria District. The location map of APSCL 400 MW (East) is shown in Figure 1. Bangladesh UK Friendship Bridge across the river Meghna (Meghna Bridge) connects both the banks of Bhairab and Ashuganj which connects with Dhaka-Sylhet highway which passes at the south side of the project. Meghna River is in the north side of the project. A khal is situated in the east side of the project and the total APSCL complex including APSCL office is located on the west side of the project.

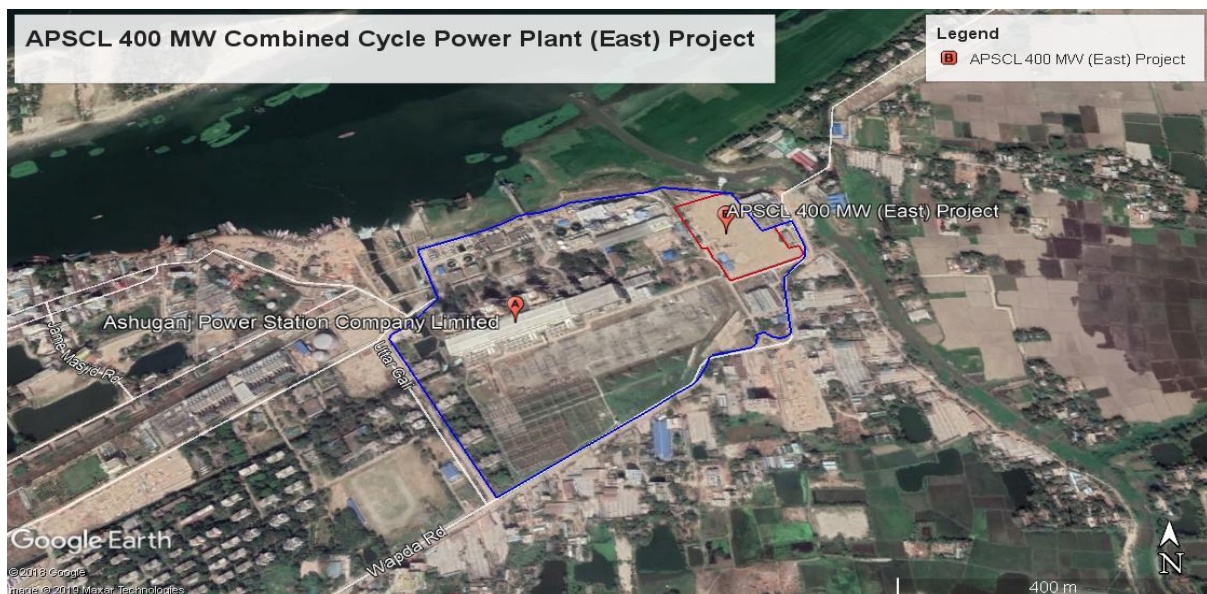


Figure 1: Location Map of APSCL 400 MW CCPP (East) project

1.2 Context of the monitoring report

The present environmental monitoring report period is July to December 2021 to submit as semiannual basis. In this period, analytical monitoring like air quality, noise quality, water quality (surface, ground and drinking) and soil quality are done by APSCL. Besides this, visual monitoring included traffic volume, site security, personal protective equipment, incident record and reporting, solid and oily wastes generation and disposal, worker's health, complaints from neighbors, safety orientation and training of workers, sanitation and drinking water facilities to the worker's and site drainage is covered during this period.

1.3 Project Progress Status

APSCL and CNTIC are working so hard to reach the target within the timeframe. About 88% of work has been done where 22% was done in this semi-annual. Majority of work was related to the erection of auxiliary system, structural work of main building, civil work of hydrogen generation station, installation of Main stack, civil work of Control building, equipment installation of gas station etc.

Super structure construction of Bypass stack, Exhaust stack, cooling water, Oily waste water treatment station, Turbine Generator, Air compressor building, Central control Building (CCB), Power control center, Main Building has been completed. Similarly, Installation of equipment & pipe for gas booster and regulating station, RMS, drain water treatment system, site processing and foundation work for emergency Oil pit, sewage treatment station, and unit auxiliary transformer has been completed too. On the contrary, the construction work of plant road construction, electrical system, thermal control system, installation of W/S pipe, ST and HRSG is currently under progress. Commissioning work of the closed water system, CW system, fire alarm system air compressor system, DCS control (grid auxiliary transformer electrify), grid auxiliary transformer and plant electricity system has been completed. Whereas commissioning work of the gas booster regulating station & RMS, GT equipment in cold state, GUST electrify and 400kV GIS system is currently under progress. A photo index of progress status is attached in Annex I. The updated status of Ashuganj 400 MW (East) Combined Cycle Power Plant Project (CCPP) from July to December 2021 is given below in Table 1 & **Figure 2, 3** shows the present site condition wherein construction work is going on.

Table 1: Project Progress Status

Sl No.	Task Name	Progress till June 2021	Progress from July- November 2021	Cumulative Progress
1	Design	100%	-	100%
2	Procurement	100%	-	100%
3	Demolition work of old plant	100%	-	100%
4	Construction	71%	25%	96%
6	Commissioning	13%	41%	54%

Note: Monthly progress report for December 2021 is yet to be prepared



Figure 2: Construction Works



Figure 3: Latest Picture of the Project Site (Construction going on)

1.4 Environmental management implementation work schedule

Environmental management implementation work schedule for next six months working plan (January 2022 to June 2022) is shown in Table 2.

Table 2: Environmental management implementation work schedule for next six months working plan (January 2022 to June 2022)

SI No.	Works Description	Date					
		3 rd January	7 th February	5 th March	2 nd April	7 th May	4 th June
1	Ambient Air Quality (2 Locations) & Noise Level (Day & Night)- 2 Locations	3 rd January	7 th February	5 th March	2 nd April	7 th May	4 th June
2	Ambient Air Quality (2 Locations), Noise Level (Day & Night)-3 Location	4 th January	8 th February	6 th March	3 rd April	8 th May	5 th June
3	Ambient Air Quality (1 Locations), Sampling of River Water (3 Locations) and Drinking Water (4 Locations) and on-site test. Visual Monitoring.	5 th January	9 th February	7 th March	4 th April	9 th May	6 th June

1.5 Progress status on implementation of environment management activity

Progress status on implementation of environmental management activity during construction phase of the project (analytical and visual) is shown in Table 3 and 4.

Table 3: Implementation of environmental management activity during construction phase (analytical)

SI No.	Issue	Key aspects	Monitoring Frequency	¹ Compliance status			Remarks
				C	PC	NC	
1.	Ambient air Quality	PM10, PM2.5 SPM, SO _x , NO _x , CO, CO ₂ .	Monthly	√			
2.	River water	Temp., DO, BODs, COD, Oil and Grease and heavy metals (Cr, Cd, Pb)	Monthly	√			
3.	Groundwater	Ground water level, pH, TDS, Ammonia, Nitrate, Phosphate, As, Fe, Mn and Total Coliforms, Faecal coliform, faecal streptococci, vibrio cholera	Once in 3 months	√			
4.	Soil quality	Cr, Cd, Grease, Pb and Oil and Grease	Once in 12 months	√			
5.	Noise level	Noise at different locations	Monthly	√			
6.	Drinking water	pH, Ammonia, Nitrate, Phosphate, As, Fe, Mn and Total Coliforms, Faecal coliform, faecal streptococci, vibrio cholera	Monthly	√			

C- Compliance, PC- Partially Compliance, NC- Non Compliance

Table 4: Implementation of environmental Monitoring Plan during Construction Phase of the Project (Visual)

SI No.	Issue	Key aspects	Monitoring Frequency	¹ Compliance status			Remarks/ Mitigation measures
				C	PC	NC	
1.	Traffic volume	Incoming & outgoing traffic, traffic movement records	Monthly	√			
2.	Site Security	Proper fencing, isolation of site from general access, marked passage for workers and visitors	Monthly	√			
3.	Personal Protective Equipment	Ensure every single person involved in the construction activity wear proper PPE	Monthly	√			
4.	Incident record & reporting	Documented record of all incident, accident, near misses etc. and its remedial process.	Monthly	√			
5.	Solid waste	Quantity of solid waste, segregation and disposal process	Monthly	√			
6.	Oily waste generation & disposal system	Quantity of oily waste, storage and disposal process	Monthly	√			
7.	Worker's health	Monitoring process of worker's health	Monthly	√			
8.	Complain from neighbours	Any significant complain from neighbours and its remedial procedure	Monthly	√			
9.	Safety orientation & training of workers	Frequency of training & orientation of workers for safety	Monthly	√			
10.	Sanitation & drinking water facility to workers	Availability of safe drinking water and sanitation to the workers	Monthly	√			
11.	Site Drainage	Maintaining proper drainage	Monthly	√			Need to improve <ul style="list-style-type: none"> • Should be kept it clean regularly.

C- Compliance, PC- Partially Compliance, NC- Non Compliance

1.6 Corrective Action Plan (CAP)

A time bound corrective action plan (CAP) is needed for further improvement as per recommendation or mitigation measures. A time bound corrective action plan (CAP) is shown in Table 5.

Table 5: Implementation of environmental Monitoring Plan during Construction Phase of the Project (Visual/)

SI No.	Issue	Mitigation measures	Time
2.	Oily waste generation & disposal system	For temporary solution please kept it at bounded place and not to dispose directly in solid and water.	Immediately / weekly basis
		Permanent oily waste disposal system should construct as early as possible.	Already rectify
3.	Site Drainage	For temporary solution please kept it clean regularly.	Immediately / weekly basis
		Permanent site drain should construct as early as possible.	Already rectify
4.	Drinking water	D4 drinking water source is ground water well and is contaminated with Fe. So, as mitigation measure all workers are suggested not to drink water from location D4.	Already done

2.0 ENVIRONMENTAL RESPONSIBILITIES AND INSTITUTIONAL SETUP

For ensuring proper implementation of Site Specific Environmental Management Plan (SEMP) role and responsibilities are delegated among personals from both project proponent and contractor at all stages of the project implementation

Key SEMP responsibilities are defined and communicated to the relevant stakeholders. Sufficient management sponsorship, human and financial resources are also allotted to achieve effective and continuous SEMP performance.

Management of environmental and social impacts during construction period is primary responsibility of the EPC Contractor as per the EPC contract. During the construction phase, APSCL will review and monitor EPC Contractors performance in accordance with the SEMP.

The overall Project organizational structure for the implementation of the SEMP is shown in Figure 4 and key roles for implementation and supervision of the SEMP are described in Table 6.

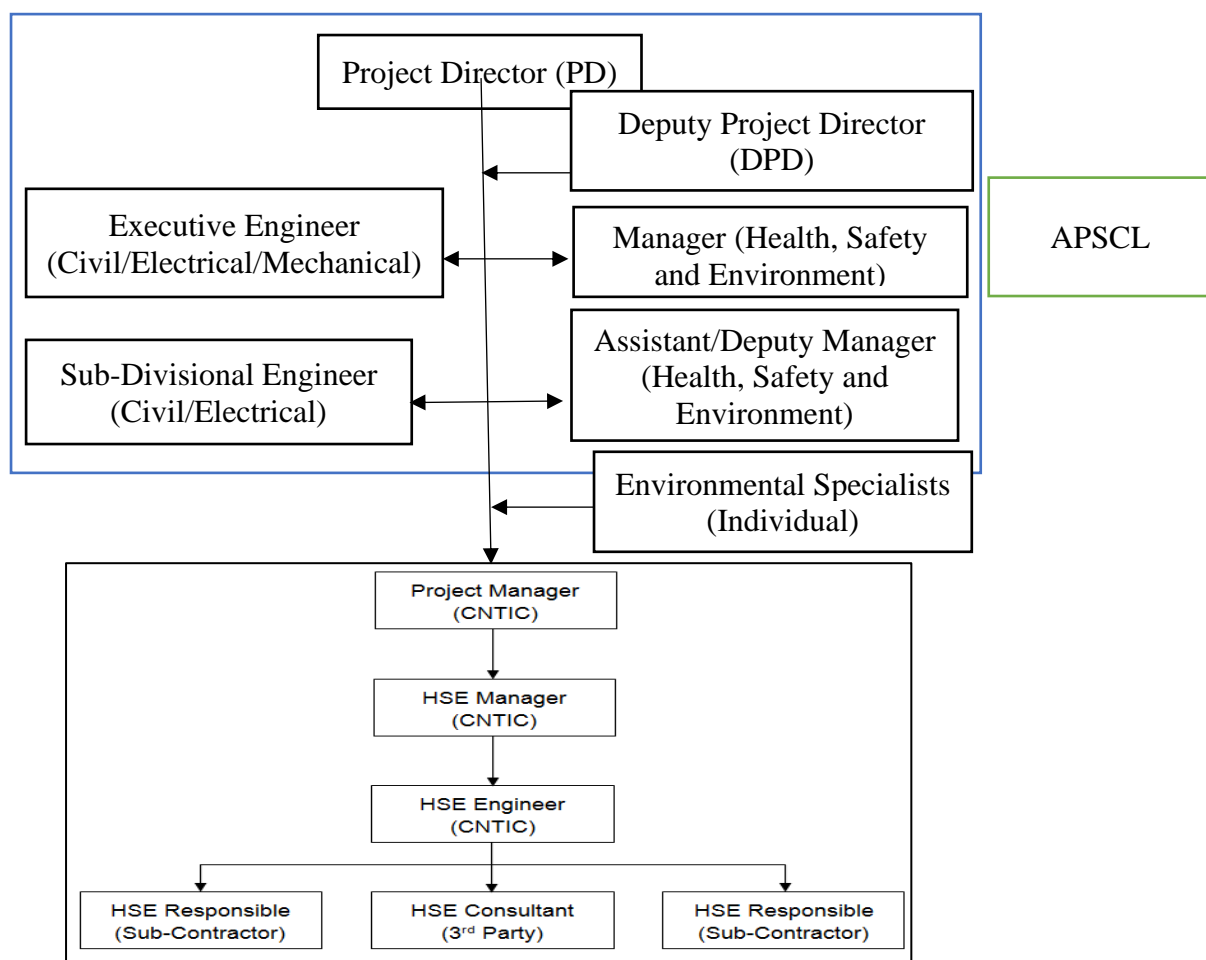


Figure 4: SEMP Organizational Structure

Table 6: 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, APSC	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)	Md. Dilshad Ibne Baqui	01730026795
06	Assistant Engineer (Elect.)	Aminul Islam	01739653761
07	Assistant Manager (Chem.)	Md. Yasin Molla	01923606305
08	Operator (3 Nos.)	1. Milon Kanti Das 2. Md. Wasi Uddin 3. Ashiq Hasan	
09	Environmental Specialist	Mohammad Arifur Rahman	01711128593

3.0 Safeguard Compliance Performance of the Project

3.1 Compliance with the Environmental Provisions of National Legal Instruments

Status of Compliance with the environmental provisions of the National Legal Instruments Related to the project are Shown in Table 7.

Table 7: National Legal Instruments Related to the Emergency Assistance Project

Policies, Laws and Regulations	Responsible Agency/Ministry/ Authority	Potential Applicability	Compliance Status
National Environmental Policy, 1992	Ministry of Environment and Forest; Department of Environment	<ul style="list-style-type: none"> ➤ The policy sets out policies to prevent environmental pollution and natural resource degradation. ➤ The Policy states that Environmental Impact Assessments (EIAs) must be conducted before projects are undertaken. 	Complied with: EIA report was prepared and approved by DoE. DoE clearance of EIA renewal is attached in Annex V.
The Environment Conservation Act, 1995	Ministry of Environment and Forest; Department of Environment	<ul style="list-style-type: none"> ➤ According to this law no industrial unit or project shall be established or undertaken without obtaining, in the manner prescribed by rules, an Environmental Clearance Certificate from the Director General. 	Complied with: EIA report was prepared and approved by DoE that was expired on 7 th October 2021. Application done for further renewal of the approved EIA.
Environment Conservation Rules, 1997	Ministry of Environment and Forest; Department of Environment	<ul style="list-style-type: none"> ➤ The Rule sets out procedure for issuing Environmental Clearance Certificate. ➤ According to the Rule, proposed project is Red category project and needs to fulfill following requirements <ul style="list-style-type: none"> ❖ Prepare Initial Environmental Examination report. ❖ Report on the Environmental Management Plan (EMP). 	Complied with: EIA report was prepared and approved by DoE that was expired on 7 th October 2021. Application done for further renewal of the approved EIA. EMP was prepared. Obtain No objection certificate

		<ul style="list-style-type: none"> ❖ Prepare Environmental Impact Assessment report. ❖ Obtain No objection certificate of the local authority. 	of the local authority and DoE.
National Land Use Policy, 2001	Ministry of Land	➤ The policy provides guidelines for the protection of agricultural land, water bodies and the optimal use of other land, as well as for restriction or minimization of the acquisition of land for non-productive use.	Complied with. The project area does not evolve any land acquisition.
Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009	Ministry of Environment and Forest	➤ This strategy prioritizes adaptation and disaster risk reduction. The climate change action plan is built on six pillars. One of them is research and knowledge management to predict the likely scale and timing of climate change impacts on different sectors.	Complied with.
Bangladesh Labour Act 2006	Ministry of Labour and Employment	➤ The Act provides the guidance of employer's extent of responsibility and workmen's extent of right to get compensation in case of injury by accident while working. Provides for safety of work force during construction period.	Complied with. Occupational Health and Safety issues are addressed both in the EMP and Impacts and Mitigation measures are suggested there.
Bangladesh National Building Code, 2006	Ministry of Housing and Public Works	➤ Any planning, design and supervision of construction, repair, maintenance, modification and alteration of buildings, or any other work regulated by the Code shall be certified by a licensed engineer, architect or planner for its compliance with the provision of Code.	Complied with. Clearances from local authorities before start of any construction activity.

3.2 SPS, 2009 compliance status

The status of the respective component sub-projects with regard to compliance status to ADB's policy statement (APS 2009) is shown in Table 8.

Table 8: ADB Safeguards Policy compliance Status for the Projects

ADB Safeguard Policy Statement	Status
Involuntary resettlement will be avoided whenever feasible.	complied
Where population displacement is unavoidable, it should be minimized.	No displacement
All lost assets acquired or affected will be compensated. Compensation is based on the principle of replacement cost.	NA
Each involuntary resettlement is conceived and executed as part of a development project or program. Affected persons need to be provided with sufficient resources to re-establish their livelihoods and homes with time bound action in co-ordination with civil works.	NA
Affected persons are to be fully informed and closely consulted.	complied
Affected persons are to be assisted to integrate economically and socially into host communities so that adverse impacts on the host communities are minimized and social harmony is promoted.	NA
The absence of a formal title to land is not a bar to ADB policy entitlements.	NA
Affected persons are to be identified and recorded as early as possible to establish their eligibility, through a census, which serves as a cut-off date, and prevents subsequent influx of encroachers.	NA
Particular attention will be paid to vulnerable groups including those without legal title to land or other assets; households headed by women; the elderly or disabled; and indigenous groups. Assistance must be provided to help them improve their socioeconomic status.	NA
The full resettlement costs will be included in the presentation of project costs and benefits.	NA

3.3 Compliance of environmental covenants from the ADB loan agreement

Status of Compliance with the environmental provisions of the ADB loan agreement are Shown in Table 9.

Table 9: Compliance with Environmental Considerations of Loan Agreements

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	LA, Schedule 5, Para 2	a) All applicable laws and regulations of the Borrower relating to the environment, health, and safety were followed strictly in the project.

<p>with</p> <p>(a) All applicable laws and regulations of the Borrower relating to the environment, health, and safety;</p> <p>(b) The environmental safeguards;</p> <p>(c) The EARF; and</p> <p>(d) All measures and requirements set forth in the respective EIA, IEE and EMP, and any corrective or preventive actions set forth in a safeguards monitoring report</p>		<p>b) The environmental safeguards and its related all safety measure were maintained in the project. Environmental Quality was monitored and report was submitted each month by EPC which was verified by an independent environmental Consultant to evaluate the environmental and social safeguard policy performance.</p> <p>c) The EARF is followed as per requirements.</p> <p>d) All measures and requirements set forth in the respective EIA, IEE and EMP, and any corrective or preventive actions set forth in a safeguard monitoring report is followed and maintained properly and updated time to time.</p>
Land Acquisition and Involuntary Resettlement		
<p>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</p> <p>(a) all applicable laws and regulations of the borrower relating to land acquisition and involuntary resettlement;</p> <p>(b) the involuntary resettlement safeguards;</p> <p>(c) the RF; and</p> <p>(d) All measures and requirements set forth in the respective RP, and any</p>	<p>LA, Schedule 5, Para 3</p>	<p>In the case of APSCL, this type of issues does not arise due to the project location. The project location is inside the premises of APSCL own land. So, There was no requirement of Land Acquisition and Involuntary Resettlement throughout the project period.</p>

corrective or preventive actions set forth in a safeguards monitoring report.		
Safeguards – Related provisions in bidding documents and works contracts		
<p>The borrower shall ensure, or cause each projects executing agency to ensure, that all bidding documents and contracts for works contain provisions that require the contractor to:</p> <ul style="list-style-type: none"> (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 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 	LA, Schedule 5, Para 7	<ul style="list-style-type: none"> (a) APSCL complied 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) Proper budget was allocated for all such environmental and social measures. (c) APSCL followed that properly as per requirements and standard of ADB Social Safeguard Policy. (d) it was maintained as given guideline. (e) it was followed as per requirements.

<p>agricultural land to at least their pre-project condition upon the completion of construction.</p>		
<p>Safeguards- Monitoring and Reporting</p>		
<p>The borrower shall do the following or shall cause APSCL to do the following:</p> <ul style="list-style-type: none"> (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 non-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 	<p>LA, Schedule 5, Para 7</p>	<ul style="list-style-type: none"> a) The proper Safeguards monitoring already being carried out during pre-construction stage and is going on in construction and will be continued for post-construction phase or operation phase. b) It is followed as per the ADB guideline. c) One Environmental Expert is engaged already, and he is monitoring and giving valuable comments and feedback to APSCL. d) As per SEMP, we will follow the instruction.

<p>forth in the EMP or the RP promptly after becoming aware of the breach.</p>		
<p>Labor standards</p>		
<p>The borrower shall ensure that all works contract documents to be prepared under the project incorporate provisions and budget to the effect that contractors</p> <ul style="list-style-type: none"> (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 	<p>LA, Schedule 5, Para 10</p>	<ul style="list-style-type: none"> a) APSCL complies exiting all labor laws and related international treaty obligations of the borrower and not engaged any child labor at the project site. b) APSCL is committed to provide safe working condition both for male and female workers and follow up regularly. c) APSCL arrange this type awareness program at the foundation training of the worker. d) The women were engaged on the basis of their skill and there was no discrimination between man and women in terms of wage of equal work. e) It was maintained strictly.

4.0 ENVIRONMENTAL STATUS

The APSCL 400 MW (East) project is classified as Environmental Category A as per the ADB’s SPS 2009, as significant impacts are envisioned. The related initial environmental examination (IEE) report, Environmental Impact Assessment Report (EIA) and Site specific Environmental Management Plan (SEMPs) has been prepared in accordance with ADB SPS 2009 requirements for environment category A projects and provide mitigation and monitoring measures, for no envisaged significant impacts, as a result of implementing the project. The environmental mitigation measures, as stipulated in the SEMP’s and in the obtained environmental permit, are monitored during the implementation of the program. The environmental mitigation measures, as stipulated in SEMP’s for the current construction activity were monitored as a part of this EMR (July to December 2021). Environmental compliance report has been prepared based on site visit, sampling analysis and follow up

were tracked to observe corrective measures and desired progress. Monitoring locations and Sampling locations map are attached in Annex II and Annex III.

Until date 12 environmental safeguards monitoring visits have been conducted at different times during the current cycle (July to December 2021) of monitoring period. Environmental compliance report has been prepared based on site visit and follow ups were tracked to observe corrective measures and desired progress.

4.1 Analytical Monitoring and Observations

Laboratory Test results are attached in Annex IV.

4.1.1 Air Quality Monitoring

During the construction phase of the power plant project, the important point sources of emissions were operations of construction equipment and machinery, vehicles carrying construction materials to the site and taking out construction debris from 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, the batching plant is situated in an isolated place outside of project area which has no impacts on the project and also to its adjacent places. Since the construction of the project involves significant earthworks that accelerate the increases the concentration of particulate matter in the air is also a concern. Ambient Air Quality was monitored by sampling from five different places (Figure 5) at Ashuganj 400 MW CCPP (East) project and the test results are presented in Table 10.





Air Quality Monitoring Location at TSK (L3)

Air Quality Monitoring Location at near APSCCL dormitory (L4)

Air Quality Monitoring Location at Govt. Haji Abdul Jalil High School (L5)

Figure 5: Air quality monitoring

Table 10: Test Result of Ambient Air Quality

JULY 2021								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	Baseline for L1 (July 2014) **	L2	L3	L4	L5
PM 2.5	65 µg/m ³	75 µg/m ³	19.54	34	17.38	21.29	18.31	16.56
PM 10	150 µg/m ³	150 µg/m ³	41.66	62	43.90	49.36	34.61	39.71
SPM	200 µg/m ³	NF	70.28	179	66.10	68.28	59.55	55.10
SO ₂	365 µg/m ³	125 µg/m ³	6.64	19	7.38	7.15	6.10	7.73
NO _x	NF	200 µg/m ³	11.55	24	9.26	10.47	9.73	10.12
CO	35 ppm	NF	2	1.4	2	0	1	0
AUGUST 2021								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	Baseline for L1 (Aug 2014) **	L2	L3	L4	L5
PM 2.5	65 µg/m ³	75 µg/m ³	24.47	49	29.17	22.75	31.10	19.44
PM 10	150 µg/m ³	150 µg/m ³	56.66	134	64.15	48.59	71.34	48.36
SPM	200 µg/m ³	NF	82.37	290	91.36	77.68	99.20	73.68
SO ₂	365 µg/m ³	125 µg/m ³	8.23	27	7.07	9.39	8.30	7.10

NO _x	NF	200 µg/m ³	14.23	39	14.66	15.71	13.73	17.56
CO	35 ppm	NF	2	3.6	6	1	1	1
SEPTEMBER 2020								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	Baseline for L1 (Sep 2014) **	L2	L3	L4	L5
PM 2.5	65 µg/m ³	75 µg/m ³	24.46	52	29.72	18.29	24.44	23.79
PM 10	150 µg/m ³	150 µg/m ³	51.12	126	56.89	40.22	46.18	61.19
SPM	200 µg/m ³	NF	81.17	247	91.22	63.34	77.30	94.48
SO ₂	365 µg/m ³	125 µg/m ³	8.89	25	10.47	9.23	10.27	11.49
NO _x	NF	200 µg/m ³	10.44	31	13.39	12.47	14.55	13.64
CO	35 ppm	NF	0	3.2	1	1	1	2
OCTOBER 2021								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	Baseline for L1 (Oct 2014)**	L2	L3	L4	L5
PM 2.5	65 µg/m ³	75 µg/m ³	46.28	44	43.84	33.10	44.93	38.26
PM 10	150 µg/m ³	150 µg/m ³	81.36	119	88.79	65.18	78.36	71.30
SPM	200 µg/m ³	NF	132.74	266	139.30	108.48	126.88	118.48
SO ₂	365 µg/m ³	125 µg/m ³	12.22	27	12.47	14.36	11.89	14.55
NO _x	NF	200 µg/m ³	18.75	36	16.19	20.34	16.58	22.41
CO	35 ppm	NF	2	2.9	8	3	5	2
NOVEMBER 2021								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	Baseline for L1 (Nov 2014) **	L2	L3	L4	L5
PM 2.5	65 µg/m ³	75 µg/m ³	38.34	61	48.56	43.29	40.56	45.27
PM 10	150 µg/m ³	150 µg/m ³	71.10	139	67.38	69.45	74.19	80.21
SPM	200 µg/m ³	NF	116.38	310	124.40	119.30	121.52	133.26
SO ₂	365 µg/m ³	125 µg/m ³	12.37	31	12.66	10.52	12.88	9.37
NO _x	NF	200 µg/m ³	17.34	39	23.93	15.54	19.55	16.28
CO	35 ppm	NF	1	3.1	3	0	1	2
DECEMBER 2021								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	Baseline for L1 (Dec 2014)**	L2	L3	L4	L5
PM 2.5	65 µg/m ³	75 µg/m ³	44.66	63	43.63	53.75	62.18	53.75
PM 10	150 µg/m ³	150 µg/m ³	81.43	141	73.78	81.40	93.49	81.40
SPM	200 µg/m ³	NF	136.38	307	123.40	142.71	169.10	142.71
SO ₂	365 µg/m ³	125 µg/m ³	9.52	29	8.87	12.84	15.71	12.84
NO _x	NF	200 µg/m ³	16.28	36	16.23	21.51	29.55	21.51
CO	9 ppm	NF	4	2.9	1	3	2	3

*The Bangladesh National Ambient Air Quality Standards have been taken from the Environmental Conservation Rules, 1997 which was amended on 19th July 2005 vide S.R.O. No. 220-Law/2005.

**EIA of Ashuganj 400 MW Combined Cycle Power Plant (East) project.

PM2.5: PM2.5 are 2.5 micrometers in diameter or smaller, and can only be seen with an electron microscope. Fine particles are produced from all types of combustion, including motor vehicles, power plants, residential wood burning, forest fires, agricultural burning, and some industrial processes. The test result shows that the values of PM2.5 are within the standards.

PM10: Particle pollution, also called particulate matter or PM, is a mixture of solids and liquid droplets floating in the air. Some particles are released directly from a specific source, while others form in complicated chemical reactions in the atmosphere. PM10 are 2.5 to 10 micrometers in diameter. Sources include grinding operations and dust stirred up by vehicles on roads. From the above table of test results, it is seen that, for all the locations, the values are within the standard.

SOx: Sulfur oxides (SOx) are compounds of sulfur and oxygen molecules. Sulfur dioxide (SO₂) is the pre-dominant form found in the lower atmosphere. It is a colorless gas that can be detected by taste and smell in the range of 1,000 to 3,000 micrograms per cubic meter (µg/m³). Concentration of SO₂ ranges from 6.10 to 15.71 µg/m³ which are within the standard for air quality.

NOx: In atmospheric chemistry, NOx is a generic term for the nitrogen oxides that are most relevant for air pollution, namely nitric oxide (NO) and nitrogen dioxide (NO₂). These gases contribute to the formation of smog and acid rain, as well as tropospheric ozone. For all the location the values of NOx ranges from 9.26 to 29.55 µg/m³ which is within the standard.

CO: High levels of carbon monoxide are poisonous to humans and, unfortunately, it cannot be detected by humans as it has no taste or smell and cannot be seen. The main sources of additional carbon monoxide are motor vehicle exhaust and some industrial activities, such as making steel. Cigarette smoking and cooking is the major indoor sources of carbon monoxide. Concentration of CO was within the standard for all the sampling locations.

From the analysis of reporting period, it is observed that the concentrations of all these parameters are within the allowable limit according to DoE and IFC/World Bank Standard and baseline data. So, the project construction activities do not hamper the air quality in the project area.

4.1.2 Noise Measurement

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.

The measured noise level in the construction site is summarized in Table 11. Noise level monitoring (Day time) are shown in Figure 6 and Figure 7.



Figure 6: Noise level monitoring (Day time; 6.00 AM-9.00 PM)

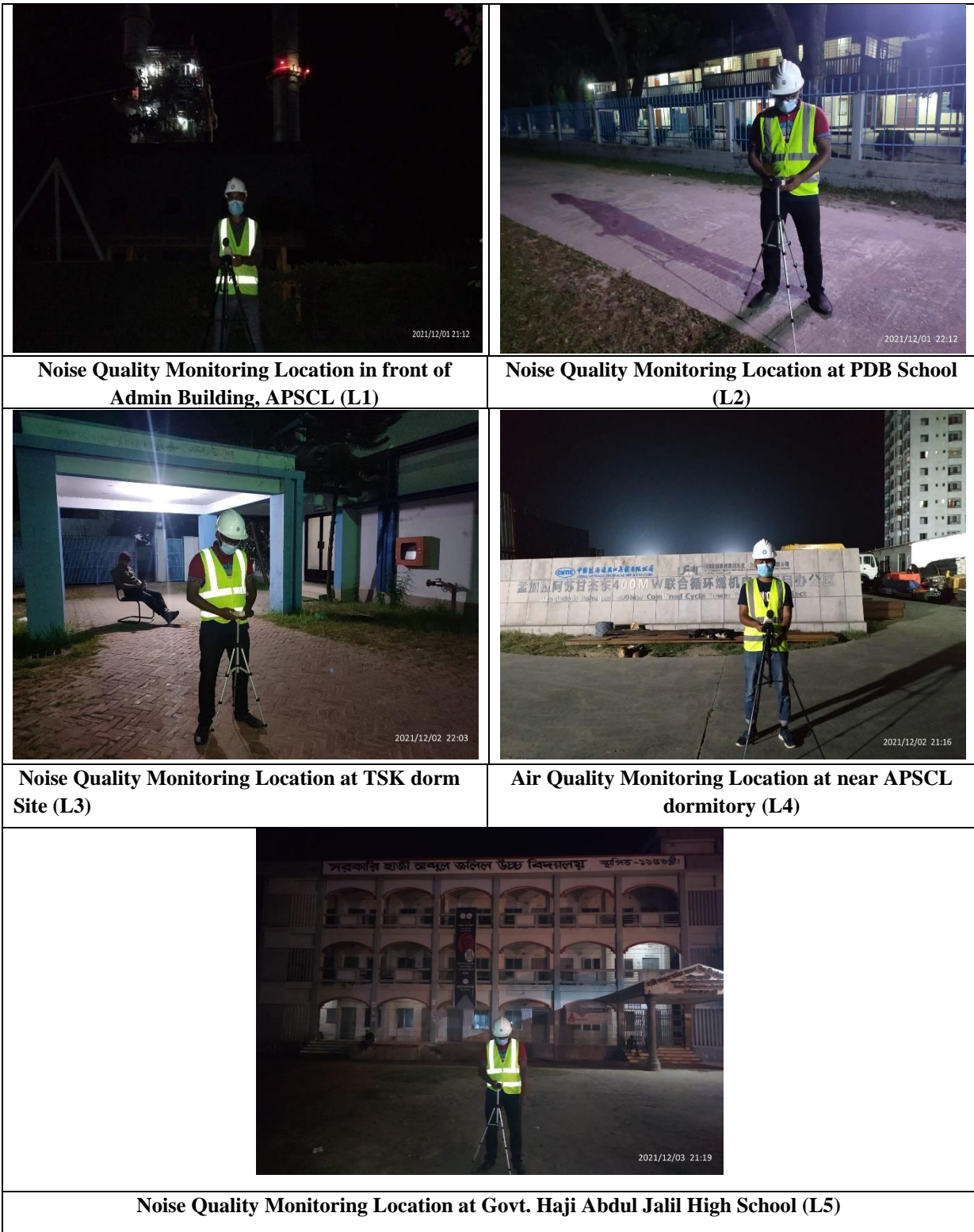


Figure 7: Noise level monitoring (Night time; 9.00 PM-6.00 AM)

From the analysis, it was found that the ambient noise qualities of the Project area were found within the allowable limit of DoE, Bangladesh & IFC Standard and baseline. So, the project construction activities do not hamper the noise quality in the project area.

Table 11: Test Result of Noise Quality

JULY 2021								
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	**Baseline Data of EIA Date: 30/4/2015
Day (Min)	75	70	51.7	56.2	54.1	56.1	53.3	69.08
Day(Max)	75	70	66.8	66.7	65.4	64.8	63.6	76.4
Night (Min)	70	70	50.1	47.4	49.3	50.2	51.0	66.6
Night(Max)	70	70	61.2	63.1	57.9	63.0	56.8	69.93
AUGUST 2021								
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	**Baseline Data of EIA Date: 30/4/2015
Day (Min)	75	70	53.2	52.1	51.4	53.2	53.8	69.08
Day(Max)	75	70	65.4	64.2	64.2	66.4	66.1	76.4
Night (Min)	70	70	52.5	49.2	50.9	48.1	46.2	66.6
Night(Max)	70	70	58.5	61.3	57.9	59.4	58.2	69.93
SEPTEMBER 2021								
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	**Baseline Data of EIA Date: 30/4/2015
Day (Min)	75	70	52.3	53.3	51.2	53.1	59.4	69.08
Day(Max)	75	70	67.2	62.8	64.1	59.3	66.8	76.4
Night (Min)	70	70	41.8	48.2	52.1	42.1	49.3	66.6
Night(Max)	70	70	53.3	56.3	59.3	59.3	58.5	69.93
OCTOBER 2021								
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	**Baseline Data of EIA Date: 30/4/2015
Day (Min)	75	70	42.5	47.1	49.6	49.6	49.3	69.08
Day(Max)	75	70	68.9	59.8	66.4	54.8	60.5	76.4
Night (Min)	70	70	47.3	43.2	51.3	43.2	48.9	66.6
Night(Max)	70	70	57.9	58.7	60.9	53.7	56.7	69.93
NOVEMBER 2021								
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	**Baseline Data of EIA Date: 30/4/2015
Day (Min)	75	70	51.9	53.3	57.6	56.4	57.6	69.08
Day(Max)	75	70	59.9	62.3	64.5	66.3	66.9	76.4
Night (Min)	70	70	38.7	42.0	40.2	46.9	47.6	66.6
Night(Max)	70	70	46.8	48.8	50.3	54.8	54.9	69.93
DECEMBER 2021								
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	**Baseline Data of EIA Date: 30/4/2015
Day (Min)	75	70	42.5	47.1	49.6	49.6	52.1	69.08
Day(Max)	75	70	58.9	59.8	56.4	54.8	55.9	76.4
Night (Min)	70	70	47.3	43.2	49.3	43.2	52.2	66.6
Night(Max)	70	70	58.9	58.7	60.5	58.7	49.5	69.93

*According to the Department of Environment (ECR'1997), the standard for ambient noise level in the industrial zone is 75 and 70 decibels at day & night time respectively.

**EIA of Ashuganj 400 MW Combined Cycle Power Plant (East) project.

4.1.3 Water Quality Analysis

Health, Safety & Environment Division of APSCCL has provided pure drinking water at several locations in APSCCL plant area that also covers the under construction 400 MW CCPP (East) project to supply pure and safe drinking water to all the workers of this project and also to other employees, contractors and visitors of APSCCL. Inside the project, drinking water jars are also filled with this pure drinking water for workers' convenience. The drinking, surface and groundwater sample were collected from the supplied drinking water, Meghna River and groundwater. 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.

4.1.3.1 Drinking Water Quality Analysis

The Drinking Water samples collected from different points as prescribed have been analyzed and shown in Table 12. Drinking water sampling is shown in Figure 8.



Figure 8: Drinking Water Sampling

Table 12: Drinking Water Quality Test Result

JULY 2021							
PARAMETER	DoE (Bangladesh) Standard *	Baseline (24.08.15)**	IFC/World Bank Standard	D1	D2	D3	D4
pH	6.5-8.5	6.8	6.5-8.5	7.28	7.22	6.99	7.21
Ammonia	0.5 mg/l	-	---	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	<1	<1	<1	<1
Phosphate	6 mg/l	-	---	0.07	0.07	0.07	0.07
As	0.05 mg/l	-	0.01 mg/l	<0.003	<0.003	<0.003	<0.003
Fe	0.3 -1 mg/l	0.13	0.3 mg/l	0.4	0.32	0.16	0.3
Mn	0.1 mg/l	-	0.5 mg/l	<0.01	<0.1	<0.1	<0.1
Total Coliform	0/100 ml	0	0/100 ml	0	0	0	0
Faecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0
AUGUST 2021							
PARAMETER	DoE (Bangladesh) Standard *	Baseline (24.08.15)**	IFC/World Bank Standard	D1	D2	D3	D4
pH	6.5-8.5	6.8	6.5-8.5	7.14	7.08	7.04	7.3
Ammonia	0.5 mg/l	-	---	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	<1	1	<1	<1
Phosphate	6 mg/l	-	---	0.07	0.07	<0.07	0.07
As	0.05 mg/l	-	0.01 mg/l	<0.003	<0.003	<0.003	<0.003
Fe	0.3 -1 mg/l	0.13	0.3 mg/l	0.33	0.34	0.2	0.32
Mn	0.1 mg/l	-	0.5 mg/l	<0.01	<0.1	<0.1	<0.1
Total Coliform	0/100 ml	0	0/100 ml	0	0	0	0
Faecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0
SEPTEMBER 2021							
PARAMETER	DoE (Bangladesh) Standard *	Baseline (24.08.15)**	IFC/World Bank Standard	D1	D2	D3	D4
pH	6.5-8.5	6.8	6.5-8.5	7.31	6.99	7.12	7.07
Ammonia	0.5 mg/l	-	---	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	<1	1	<1	<1
Phosphate	6 mg/l	-	---	<0.07	<0.07	<0.07	<0.07
As	0.05 mg/l	-	0.01 mg/l	<0.003	<0.003	<0.003	<0.003
Fe	0.3 -1 mg/l	0.13	0.3 mg/l	0.28	0.3	0.21	0.24
Mn	0.1 mg/l	-	0.5 mg/l	<0.1	<0.1	<0.1	<0.1
Total Coliform	0/100 ml	0	0/100 ml	0	0	0	0
Faecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0

OCTOBER 2021							
PARAMETER	DoE (Bangladesh) Standard *	Baseline (24.08.15)**	IFC/World Bank Standard	D1	D2	D3	D4
pH	6.5-8.5	6.8	6.5-8.5	7.43	7.19	7.13	7.29
Ammonia	0.5 mg/l	-	---	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	<1	1	<1	<1
Phosphate	6 mg/l	-	---	<0.07	<0.07	<0.07	<0.07
As	0.05 mg/l	-	0.01 mg/l	<0.003	<0.003	<0.003	<0.003
Fe	0.3 -1 mg/l	0.13	0.3 mg/l	0.42	0.33	0.2	0.12
Mn	0.1 mg/l	-	0.5 mg/l	<0.1	<0.1	<0.1	<0.1
Total Coliform	0/100 ml	0	0/100 ml	0	0	0	0
Faecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0
NOVEMBER 2021							
PARAMETER	DoE (Bangladesh) Standard *	Baseline (24.08.15)**	IFC/World Bank Standard	D1	D2	D3	D4
pH	6.5-8.5	6.8	6.5-8.5	7.24	7.32	7.19	7.31
Ammonia	0.5 mg/l	-	---	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	<1	1	<1	<1
Phosphate	6 mg/l	-	---	<0.07	<0.07	<0.07	<0.07
As	0.05 mg/l	-	0.01 mg/l	<0.003	<0.003	<0.003	<0.003
Fe	0.3 -1 mg/l	0.13	0.3 mg/l	0.26	0.2	0.43	0.29
Mn	0.1 mg/l	-	0.5 mg/l	<0.1	<0.1	<0.1	<0.1
Total Coliform	0/100 ml	0	0/100 ml	0	0	0	0
Faecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0
DECEMBER 2021							
PARAMETER	DoE (Bangladesh) Standard *	Baseline (24.08.15)**	IFC/World Bank Standard	D1	D2	D3	D4
pH	6.5-8.5	6.8	6.5-8.5	7.39	7.19	7.21	7.34
Ammonia	0.5 mg/l	-	---	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	<1	1	<1	<1
Phosphate	6 mg/l	-	---	<0.07	<0.07	<0.07	<0.07
As	0.05 mg/l	-	0.01 mg/l	<0.003	<0.003	<0.003	<0.003
Fe	0.3 -1 mg/l	0.13	0.3 mg/l	0.18	0.16	0.21	0.15
Mn	0.1 mg/l	-	0.5 mg/l	<0.1	<0.1	<0.1	<0.1
Total Coliform	0/100 ml	0	0/100 ml	0	0	0	0
Faecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0

*ECR'1997

**EIA of Ashuganj 400 MW Combined Cycle Power Plant (East) project.

pH: pH is a measure of the hydrogen ion concentration in water and indicates whether the water is acidic or alkaline. The measurement of alkalinity and acidity of pH is required to determine the corrosiveness of the water. From the test result of the drinking water, it is observed that pH values are within national standard ranges from 6.99 to 7.43.

Arsenic: Arsenic is a natural component of the earth's crust and is widely distributed throughout the environment in the air, water and land. It is highly toxic in its inorganic form. People are exposed to elevated levels of inorganic arsenic through drinking contaminated water, using contaminated water in food preparation and irrigation of food crops, industrial processes, having contaminated food and smoking cigarettes. The test result shows that the concentration of Arsenic is within the national standards for the project area.

Iron (Fe): Natural waters contain variable amounts of iron depending on the geological area and other chemical components of the waterway. Iron in groundwater is normally present in the ferrous or bivalent form [Fe⁺⁺] which is soluble. It is easily oxidized to ferric iron [Fe⁺⁺⁺] or insoluble iron upon exposure to air. The concentration of iron is within the national standard for the project area. The value varies between <0.01 and 4.3 mg/l.

Manganese (Mn): Mn values indicate the general nature of water quality. The values of Mn in all tested drinking water samples are within the Bangladesh Standard for Drinking Water Quality.

Total Coliform (TC): Total coliforms are a group of bacteria that are widespread in nature. All members of the total coliform group can occur in human feces, but some can also be present in animal manure, soil, and submerged wood and in other places outside the human body. Thus, the usefulness of total coliforms as an indicator of fecal contamination depends on the extent to which the bacteria species found are fecal and human in origin. The values of TC were nil for the project area.

Faecal Coliform (FC): The presence of fecal coliform bacteria in aquatic environments indicates that the water has been contaminated with the fecal material of man or other animals. Faecal Coliform bacteria indicate the presence of sewage contamination of a waterway and the possible presence of other pathogenic organisms. The values of FC were nil for the project area.

From the analysis, it was found that all parameters of drinking water within standard limit of DoE, Bangladesh. Pure drinking water is supplied by HS&E division by six stages purification systems with alkaline RO and UV disinfection system of APSCL water plant. All employees and worker of the project are using the purified water for drinking purpose.

4.1.3.2 River Water Quality Analysis

The river water samples collected from different points as prescribed have been analyzed and shown in Table 13. River water sampling is shown in Figure 9.



Figure 9: River Water Sampling

Table 13: River Water Quality Test Result

JULY 2021					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38°C	-	21.4	22.0	22.7
Dissolved Oxygen (DO)	7.3 mg/l	-	6.5	6.1	5.9
BOD5	7 mg/l	-	0.1	0.1	0.5
COD	32 mg/l	-	1.6	1.7	4.3
Chromium (Total)	-	-	<0.02	<0.02	<0.02
Cadmium	-	-	<0.002	<0.002	<0.002
Lead (Pb)	<0.05 mg/l	-	<0.05	<0.05	<0.05
Oil & Grease	<5.5 mg/l	-	<1.0	<1.0	<1.0
AUGUST 2021					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38°C	-	22.1	21.8	22.7
Dissolved Oxygen (DO)	7.3 mg/l	-	6.6	6.3	6.4

BOD5	7 mg/l	-	0.2	0.1	0.6
COD	32 mg/l	-	1.2	1.1	3.2
Chromium (Total)	-	-	<0.02	<0.02	<0.02
Cadmium	-	-	<0.002	<0.002	<0.002
Lead (Pb)	<0.05 mg/l	-	<0.05	<0.05	<0.05
Oil & Grease	<5.5 mg/l	-	<1.0	<1.0	<1.0
SEPTEMBER 2021					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38°C	-	23.4	23.2	24.0
Dissolved Oxygen (DO)	7.3 mg/l	-	6.5	6.3	6.2
BOD5	7 mg/l	-	0.2	0.3	0.8
COD	32 mg/l	-	1.0	1.2	4.1
Chromium (Total)	-	-	<0.02	<0.02	<0.02
Cadmium	-	-	<0.002	<0.002	<0.002
Lead (Pb)	<0.05 mg/l	-	<0.05	<0.05	<0.05
Oil & Grease	<5.5 mg/l	-	<1.0	<1.0	<1.0
OCTOBER 2021					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38°C	-	23.1	23.3	23.9
Dissolved Oxygen (DO)	7.3 mg/l	-	6.6	6.2	6.2
BOD5	7 mg/l	-	0.2	0.2	1.5
COD	32 mg/l	-	1.4	0.8	3.2
Chromium (Total)	-	-	<0.02	<0.02	<0.02
Cadmium	-	-	<0.002	<0.002	<0.002
Lead (Pb)	<0.05 mg/l	-	<0.05	<0.05	<0.05
Oil & Grease	<5.5 mg/l	-	<1.0	<1.0	<1.0
NOVEMBER 2021					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38°C	-	21.8	20.4	21.6
Dissolved Oxygen (DO)	7.3 mg/l	-	6.5	6.0	6.1
BOD5	7 mg/l	-	0.1	0.2	2.2
COD	32 mg/l	-	1.8	2.1	3.8
Chromium (Total)	-	-	<0.02	<0.02	<0.02
Cadmium	-	-	<0.002	<0.002	<0.002
Lead (Pb)	<0.05 mg/l	-	<0.05	<0.05	<0.05
Oil & Grease	* <5.5 mg/l	-	<1.0	<1.0	<1.0
DECEMBER 2021					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38°C	-	20.1	21.0	19.8
Dissolved Oxygen (DO)	7.3 mg/l	-	6.0	6.0	5.9

BOD5	7 mg/l	-	0.1	0.1	3.6
COD	32 mg/l	-	2.0	2.1	2.9
Chromium (Total)	-	-	<0.02	<0.02	<0.02
Cadmium	-	-	<0.002	<0.002	<0.002
Lead (Pb)	<0.05 mg/l	-	<0.05	<0.05	<0.05
Oil & Grease	<5.5 mg/l	-	<1.0	<1.0	<1.0

* EIA of Ashuganj 400 MW Combined Cycle Power Plant (East) project.

Dissolved Oxygen (DO): Dissolved oxygen is necessary for life of aquatic inhabitants. Decrease in DO values below the critical level of 3 mg/l causes death of most fishes and other aerobic aquatic organisms. The concentration of DO in water samples collected from the project site does not cross the baseline survey result obtained during EIA.

Biochemical Oxygen Demand (BOD5): Biochemical Oxygen Demand is supposed to measure the amount of food (or organic carbons) that bacteria can oxidize. The test results indicate the water has lower level of organic content.

Chemical Oxygen Demand (COD): Chemical Oxygen Demand is the total measurement of all chemicals in the water that can be oxidized. The value of COD was ranges from 0.8 to 4.3 mg/l.

From the above analysis result it can be concluded that there is a low negative impact of the project to the aquatic ecosystem.

4.1.3.3 Ground Water Quality Analysis

The Ground water samples collected from different points as prescribed have been analyzed and shown in Table 14. Ground water sampling is shown in Figure 10.



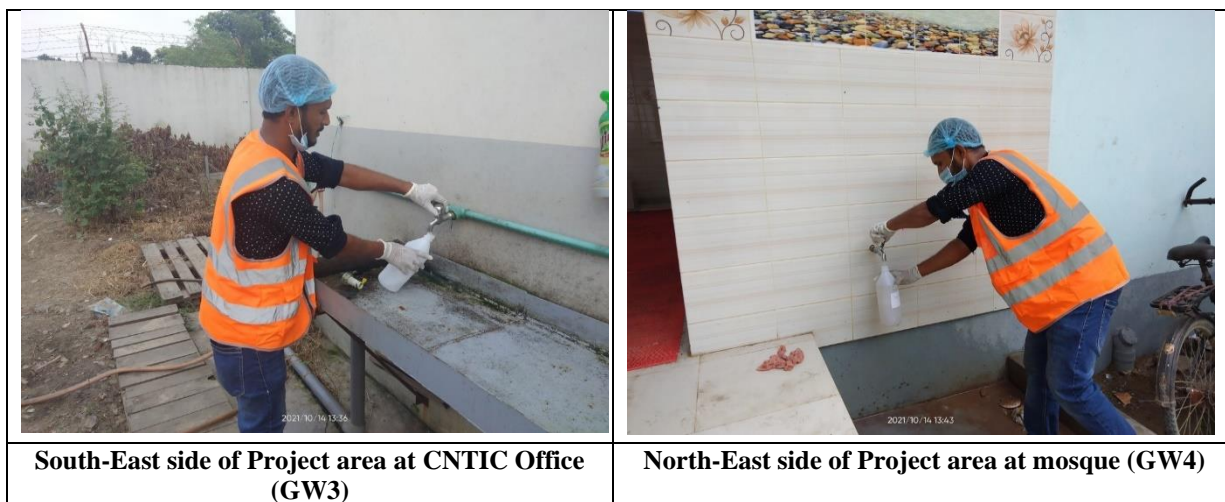


Figure 10: Ground water sampling

Table 14: Ground Water Quality

JULY 2021						
PARAMETER	Baseline Data from EIA (G1) 30.4.2015	DoE/IFCStandard	G1	G2	G3	G4
pH	6.9	-	7.07	7.16	7.08	6.96
TDS	-	-	392	340	386	408
Ammonia	0.35 mg/l	-	<0.01	<0.01	<0.01	<0.01
Nitrate	2.15 mg/l	-	<1.5	<1.0	<1.0	<1.0
Phosphate	3.65 mg/l	-	0.1	<0.05	<0.05	0.05
As	0.003 mg/l	-	<0.003	<0.003	<0.003	<0.003
Fe	0.4 mg/l	-	0.1	<0.1	0.2	0.1
Mn	-	-	<0.1	<0.1	<0.1	<0.1
Total coliform	0/100 ml	-	0	0	0	0
Faecal Coliform	0/100 ml	-	0	0	0	0
OCTOBER 2021						
PARAMETER	Baseline Data from EIA (G1) 30.4.2015	DoE/IFCStandard	G1	G2	G3	G4
pH	6.9	-	6.92	6.98	7.32	7.06
TDS	-	-	292	341	341	297
Ammonia	0.35 mg/l	-	<0.01	<0.01	<0.01	<0.01
Nitrate	2.15 mg/l	-	<1.0	<1.0	<1.0	<1.0
Phosphate	3.65 mg/l	-	0.06	0.07	0.07	0.07
As	0.003 mg/l	-	<0.003	<0.003	<0.003	<0.003
Fe	0.4 mg/l	-	0.11	<0.1	0.34	0.2
Mn	-	-	<0.1	<0.1	<0.1	<0.1
Total coliform	0/100 ml	-	0	0	0	0
Faecal Coliform	0/100 ml	-	0	0	0	0

**EIA of Ashuganj 400 MW Combined Cycle Power Plant (East) project.

pH: pH is a measure of the hydrogen ion concentration in water and indicates whether the water is acidic or alkaline. The measurement of alkalinity and acidity of pH is required to determine the corrosiveness of the water. From the test result of the ground water, it is observed that pH value ranges from 6.92 to 7.32.

Arsenic: Arsenic is a natural component of the earth's crust and is widely distributed throughout the environment in the air, water and land. It is highly toxic in its inorganic form. People are exposed to elevated levels of inorganic arsenic through drinking contaminated water, using contaminated water in food preparation and irrigation of food crops, industrial processes, having contaminated food and smoking cigarettes. The test result shows that the project has no negative influence on Arsenic concentration.

Iron (Fe): Natural waters contain variable amounts of iron depending on the geological area and other chemical components of the waterway. Iron in groundwater is normally present in the ferrous or bivalent form [Fe⁺⁺] which is soluble. It is easily oxidized to ferric iron [Fe⁺⁺⁺] or insoluble iron upon exposure to air. The concentration of iron varies from 0.1 and 0.34 mg/l.

Manganese (Mn): Mn values indicate the general nature of water quality. The values of Mn in all tested drinking water samples are within the Bangladesh Standard for drinking Water Quality.

Total Coliform (TC): Total coliforms are a group of bacteria that are widespread in nature. All members of the total coliform group can occur in human feces, but some can also be present in animal manure, soil, and submerged wood and in other places outside the human body. Thus, the usefulness of total coliforms as an indicator of fecal contamination depends on the extent to which the bacteria species found are fecal and human in origin. The values of TC were nil for the project area.

Faecal Coliform (FC): The presence of fecal coliform bacteria in aquatic environments indicates that the water has been contaminated with the fecal material of man or other animals. Faecal Coliform bacteria indicate the presence of sewage contamination of a waterway and the possible presence of other pathogenic organisms. The values of FC were nil for the project area.

4.2 Visual Monitoring and Observations

4.2.1 Traffic Volume

The Project is under construction phase now. The daily traffic details on day to day basis are being monitored (Table 15) and recorded in the registered book properly. To maintain the traffic register, the detail traffic management measures shall include:

- ✓ Recording details of regular inspections/audits for traffic management measures of cargoes/packages weighing more than 20 Tons and long-body trailers from port to project site.
- ✓ Recording the delays and other disruptions resulting from slow-moving heavy-lift and/or oversized cargoes.
- ✓ Reporting of any incident/accident occurs during transportation of goods.

Table 15: Total number of vehicles based on their categories

Name of vehicle	Number of Vehicles
Truck	104
Tailor (load>20T)	46
Microbus	105
Cars	91
Total	351

4.2.2 Site Security

CNTIC-CCOEC Consortium already constructed of site boundary fencing (Figure 11) to isolate the project site. Before entrance into project site, the employees were checked properly to restrict their entry with cigarette or other narcotics. Proper sign boards and pictorial safety instructions (Figure 11) were posted at different place of plant including the storing area of petroleum, highly flammable materials. With the incorporation of the security system at the main entry gate, overall site security system is come into a good shape and eventually will be under proper control.





Figure 11: Site Security & Safety Instruction Board

4.2.3 Personal Protective Equipment

The working personnel involved in the construction activities has to be under the safeguard of personal protective equipment (PPE) properly. Everyone was instructed to use proper PPE strictly. Figure 12 shows that, the workers involved in construction were using applicable PPEs. A list of PPEs that are supplied are listed in Table 16.

Table 16: List of Personal Protective Equipment Used in Project Site

SI No.	Type of work	Personal Protective Equipment used in site
1	Excavation	Safety Jacket, Safety Shoes, Helmet, Respiratory protection and Hand Gloves.
2	Construction	Safety Jacket, Safety Shoes, Helmet, Respiratory protection and Hand Gloves.
3	Welding	Helmet, Safety shoes, Eye face protection, protective clothing, Hand Gloves, Ear defence, Respiratory protection etc.
4	Scaffolding	Safety vests, Headwear, Safety footwear, Eye face protection, Slush Boots, Safety belt, Rain Suits, Hand protection.





Figure 12: Use of Proper PPEs

4.2.4 Incident Record & Reporting

Coordination of CNTIC-CCOEC Consortium with APSCL authority has developed to monitor any incident, accident, near misses, first aid recording and reporting system with proper format. It is observed that the Incident Record & Reporting are being properly monitored and recorded in the register book. There was no accident in the reporting time. However, some first aid recording was found. There is no Accident free Record Boards (displaying accident free days number, date, hours and time etc.) at the project site. If any incidental issue arises, immediately it has to be reported & recorded properly in the prescribed format.

4.2.5 Solid Waste

Solid wastes were generated from construction works (construction waste) and workers activities (kitchen waste, paper waste) at the project site. The main solid waste is construction waste i.e. plastic pipe, brick, rubbish, scab, cable and broken bricks. Waste inventory was properly maintained and Table 17 describes the amount of waste generated according to their character during the reporting time. Generated solid and domestic waste are disposed in designated Municipal area of Ashuganj gool Chottor.

**Table 17: Waste Inventory Log of CNTIC-CCOEC Consortium
(From July to December 2021)**

SI	Wastage Name	Wastage Classification	Wastage Type	Source of wastage	Wastage storage area	Storage quantity (kg)	Delivery quantity (kg)	Agreement	Remarks
1	Plastic Pipe	Hazardous	Solid	Construction Site	On site	15.3	15.3	Ok	Ok
2	Brick	Non-Hazardous	Solid	Construction Site	On site	25.1	25.1	Ok	Ok
3	Rubbish	Non-Hazardous	Solid	Construction Site	On site	36.1	36.1	Ok	Ok

4	Scrap	Hazardous	Solid	Construction Site	On site	3120.2	3120.2	Ok	Ok
5	Cable	Non-Hazardous	Solid	Construction Site	On site	4.5	4.5	Ok	Ok
6	Aggregate	Non-Hazardous	Solid	Construction Site	On site	47.2	47.2	Ok	Ok

4.2.5.1 Solid Waste Management Plan

Step-01: Collection System: All solid wastes including construction wastes, waste generated by workers activities (kitchen waste, paper waste) and other waste will be accumulated on site after collecting from the source of generation.

Step-02: Segregation: There are various types of solid wastes; these will be segregated in the project site according to their natures as described below.

Construction waste: Electrical wiring, rebar, wood, plaster, and scrap metal, cement, and bricks.

Organic waste: Kitchen waste, vegetables, flowers, leaves, fruits.

Toxic waste: Old medicines, paints, chemicals, bulbs, spray cans, fertilizer and pesticide containers, batteries, shoe polish.

Recyclable waste: Paper, glass, metals, plastics.

Step-03: Transportation: After segregation of solid waste from the project site, proper solid waste log is maintained and transported to disposal point by trucks.

Step- 04: Disposal System: From the transported solid waste, the recyclable inorganic solid waste will be recycled and biodegradable organic solid waste will be disposed in the disposal location. From this location, the Municipal Authority collect this waste to dump their location. Remaining non-biodegradable waste will be sold to secondary vendors. The disposal location has been shown in Figure-13.



Figure 13: Photograph of Solid waste disposal location

4.2.6 Worker's Health and COVID Response

The CNTIC-CCOEC consortium will provide all kinds of treatment facilities and pay compensation according to Bangladesh Labor Law 2018. A medical center is already installed with first aid facility and an ambulance (Figure 14) is always available for any kind of emergency. Besides, an understanding with a local hospital for the emergency incident related to the worker's health of the plant and CNTIC-CCOEC Consortium has been established. To monitor the health condition of workers, body temperature (Figure 15) of each worker was checked two times a day and record was kept. Use of mask is mandatory and the entire worker was encouraged to sanitize their hand. Hand wash facilities were installed at different locations of project site and adequate materials were made available (Figure 16). During the period 92 Chinese people arrived and the last one arrived on 25th December 2021. After completing quarantine for 14 days and confirming COVID19 negative they were allowed to enter the site. List of equipment and medicines in the first aid box is available with all the first aid box. First Aid Box medicine list are adhesive tape, Face Mask, Hand Gloves, Hand Sanitizer, adhesive bandages (Band-Aids) in several sizes, elastic bandage, Splint, antiseptic wipes, antibiotic ointment, antiseptic solution (like hydrogen peroxide), hydrocortisone cream (1%), acetaminophen and ibuprofen, tweezers, sharp scissors, safety pins, calamine lotion, alcohol wipes or ethyl alcohol, thermometer, saline.



Figure 14: On-site Ambulance and furnished First Aid box



Figure 15: Daily Body Temperature Monitoring and COVID-19 sign

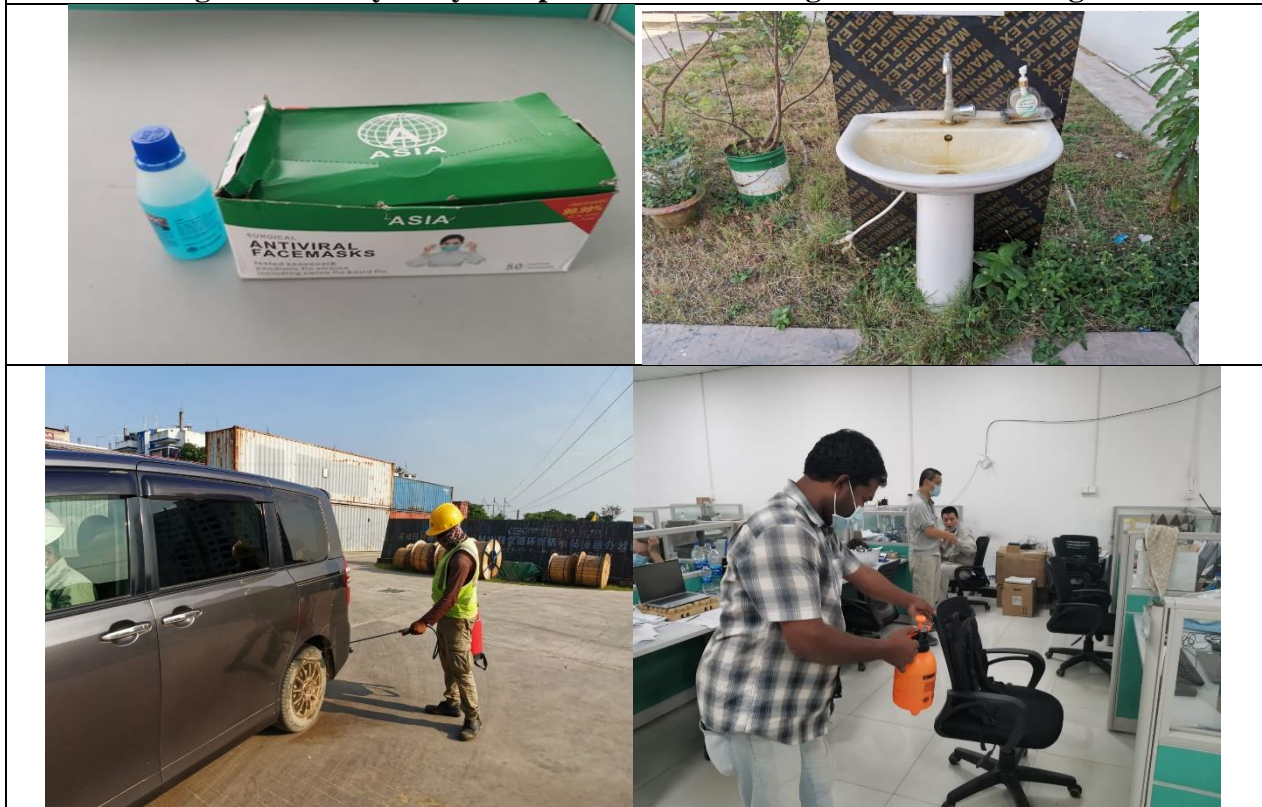


Figure 16: On-site Wash, Sanitation and Hygiene facilities.

4.2.7 Grievance Redress mechanism

During the construction phase of a project, the complaints that may be anticipated are mostly related to poor environmental quality, lack of job opportunity, discrimination of wage and gender, unsafe working condition and so on. However, unforeseen issues may occur. CNTIC-CCOEC consortium has already established grievance redress mechanism. Complain from neighbours are duly recorded & adequate measures are taken accordingly. Though the project site is within the APSCL boundary, the North West side of the project site is near to some houses of neighbors. CNTIC-CCOEC Consortium has already set up a suggestion box (Figure 17) in front of the project site to facilitate the neighbours to rise complains and take immediate measure to resolve the complaints. However, no such complaine was raised to resolve. APSCL as a project proponent also set a grievance redress committee (GRC) has

been formed with following personals (Table 18) to rectify issue from different stakeholders if raised. GRM register form is attached in Annex VII.

Beside this as per Labor Law 2018 and Clause no 81 of Labor Rules 2015, APSCL has an active ‘Safety Committee’ to address and solve the internal grievance regarding Health, Safety and Environmental issues. APSCL has established and published ‘Citizen’s Charter’ System to address any grievance related to it and to rectify the problem rapidly by proper system. The web link of this is: https://apscl.portal.gov.bd/site/view/citizen_charter/.

APSCL has also online Grievance Redress System. The useful links of these are: <http://apscl.gov.bd/site/page/929f626c-752c-4724-9680-845d0414883f/Process-Map> & <http://www.grs.gov.bd/>.



Figure 17: Photograph of Suggestion/Complain Box

If anybody is affected by this 400 MW CCPP (East) project activities of APSCL can give complain here. However, no grievance was recorded regarding this project.

Table 18: Members of the Committee of Grievance Redress (GRC)

SI No	Designation
1.	Project Director (Chief Engineer), Ashuganj 400 MW East Project
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 Parishad, Member.

4.2.8 Safety orientation & training of workers

Training is essential to maintain the employee health and safety. Both theoretical and practical training (Figure 18) are conducted for the employees on the hazards, precautions, and procedures for the safe storage, handling, and use of all potentially harmful materials. Safety orientation & training for the workers are provided to all working personnel during the fresh enrolment /employment. CNTIC-CCOEC Consortium arrange routine safety training (Figure 18) at definite time interval for the workers throughout the construction phase of the project. In addition, Training procedure will incorporate information from the Material Safety Data Sheets (MSDS) for potentially harmful materials. Toolbox meeting is arranged in regular basis. CNTIC arrange epidemic prevention knowledge trainings that teach the correct method of wearing face masks, hand washing and other protective measures considering the present condition of Corona Virus. CNTIC has taken some protective measures for safety of worker and other employee–Wear face masks in public area. Cover the mouth and nose with bent elbow or tissue when cough or sneeze, and dispose of the used tissue immediately.

- Wash hands frequently and thoroughly with soap and water or using alcohol-based hand rub to kill viruses that may be on hands.
- Maintain at least 1meter (3 feet) distance from others in public area such as workplace, corridors and canteen.
- Avoid touching eyes, nose and mouth with hands, which can transfer virus from the hands to eyes, nose or mouth and then enter the body.
- Keep the dormitory and workplace ventilated.



Figure 18: Toolbox meeting & training of workers

To improve the environmental, health & safety performance, monthly safety meeting was conducted each month with CNTIC and NEPC. Last safety meeting was conducted on 21/12/2021. About 25 issues were discussed to resolve within a set deadline. Responsibilities were also delegated to different persons from both CNTIC and NEPC for proper implementation of work. A summary of HSE management and monitoring is illustrated in Table 19.

Table 19: Summary of HSE Management

Areas to improve:		Housekeeping all area, Proper Safety, Housekeeping, Confined Space entry, toolbox, drainage system, Use of PPE, Incident reporting		
SI	Description	From July-December 2021	Till December 2021	Remarks
1	Total Man-hour	651748	2717712	
2	Safe man hours	651748	2717712	
3	Fatal Accidents	0	0	
4	Lost Time Injury (LTI)	0	0	
5	Medical Treatment (MT)	0	4	
6	First Aid Cases (FAC)	184	698	First aid cases are increased compared to previous period due to work volume
7	Health Incidents	0	0	
8	Property Damage (PD)	0	0	
9	Fire/Explosion	0	1	
10	Security Incident	2	4	
11	Near Miss	0	5	
13	Environment (EN)	0	0	
14	Job Transfer days	0	0	
15	Total Days Lost	0	0	
17	Tool Box Talks	170	980	
18	Grievance	0	0	

4.2.9 Sanitation & Drinking Water Facility

Ground water is being supplied through the arrangement of piping network in the construction site and this water is available for the workers for the washing and toilet facilities. Besides, CNTIC-CCOEC Consortium Management supplies drinking water Jar for drinking purpose of the workers. Furthermore, robust drinking water purification system with reverse osmosis, UV disinfection system with ambient and cold water facility (Figure 19) has installed at three different suitable locations of this plant site by HS&E division of APSCL. Adequate toilets for male and female workers have already been constructed and cleaned time to time.



Figure 19: Pure Drinking Water & Sanitation facility to workers

4.2.10 Site Drainage

Proper outer/inter drainage system has been developed in the project site. The construction work of necessary outer/inner drainage (Figure 20) has been completed.



Figure 20: Photograph of Site Drainage

4.2.11 Dust Control

Dust poses negative impact of air quality as well as health especially in dry season. To control the dust water were sprayed regularly at least 3 times but if need more we spray that time. (Figure 21) and stock materials were kept covered.



Figure 21: Water spraying for dust control

4.2.12 Oily Waste Generation & Disposal System

Oily waste generation & disposal system is not required significantly during construction phase. However, CNTIC-CCOEC Consortium has assured that they will take necessary measures for the disposal of oily waste, when or if necessary.

5.0 CONCLUSION AND RECOMMENDATION

The environmental monitoring report is consist of 12th Semiannually environmental monitoring reporting based on monthly measured ambient air, noise, drinking water, ground and river water quality parameters. The work has been assigned EPC contractor CNTIC-CCOEC Consortium performed for the period of July to December 2021. Ambient air quality parameters were determined in the site with the help of high volume sampler and noise quality was done by noise level meter. Drinking water, ground and surface water quality parameters were analyzed in the laboratory. All of the mitigation measures are taken following ADB Environmental Safeguard Policy 2009, IFC/World Bank Thermal Power plant guideline 2008 and 2017 and DoE, Bangladesh guideline.

From the analysis, it is found that the ambient air quality results found within DoE standards. This value are cumulative with surrounding ambient air and noise level. SO_x and CO are not a problem of the construction period of the power plant. But SPM, PM_{2.5}, PM₁₀ level during the construction period of the power plant is controlled by taking proper mitigation measures and spraying of water.

Noise level quality of Ashuganj CCPP has also been measured by EPC contractor. According to the measurement, the noise level around the plant area found within the allowable limit of Industrial zone both day and also at night time. The noise level is controlled by using modern, new and fine-tuned equipment.

Surface water quality parameter at Meghna River was performed to evaluate whether this plant poses any detrimental effect on the water environment. From the analysis, it has been found that the project does not contaminate water pollution to the natural environment. Otherwise, any spill is not detected next to riverbeds around the worksite (oils, concrete waste or conglomerate asphalt, any colour changes of the water, etc.). Drinking and groundwater quality is also found good.

House-keeping is also in good condition at the plant site. All solid, liquid and hazardous waste are disposed of the designated container at the plant site. Most of the solid wastes are disposed of by landfill. The usable solid wastes are handed over to proper party for recycling.

Finally, it can be concluded that the plant has a minor detrimental impact for short period on the environment in terms of ambient air during the construction period. The plant provides a good working environment for the workers.

ANNEX-I: PHOTO APPENDIX



Fig. 1.2.1: Construction of Central Control Building (CCB)



Fig.1.2.2: Construction of Turbine & Generator Hall



Fig. 1.2.3: Superstructure Construction of HRSG and Exhaust Stack



Fig. 1.2.4: Construction of Plant Inner Road



Fig. 1.2.5: Service and Fire Water Tank



Fig. 1.2.6: Power Control Center



Fig. 1.2.7: Construction of watertreatment plant



Fig. 1.2.8: RMS area



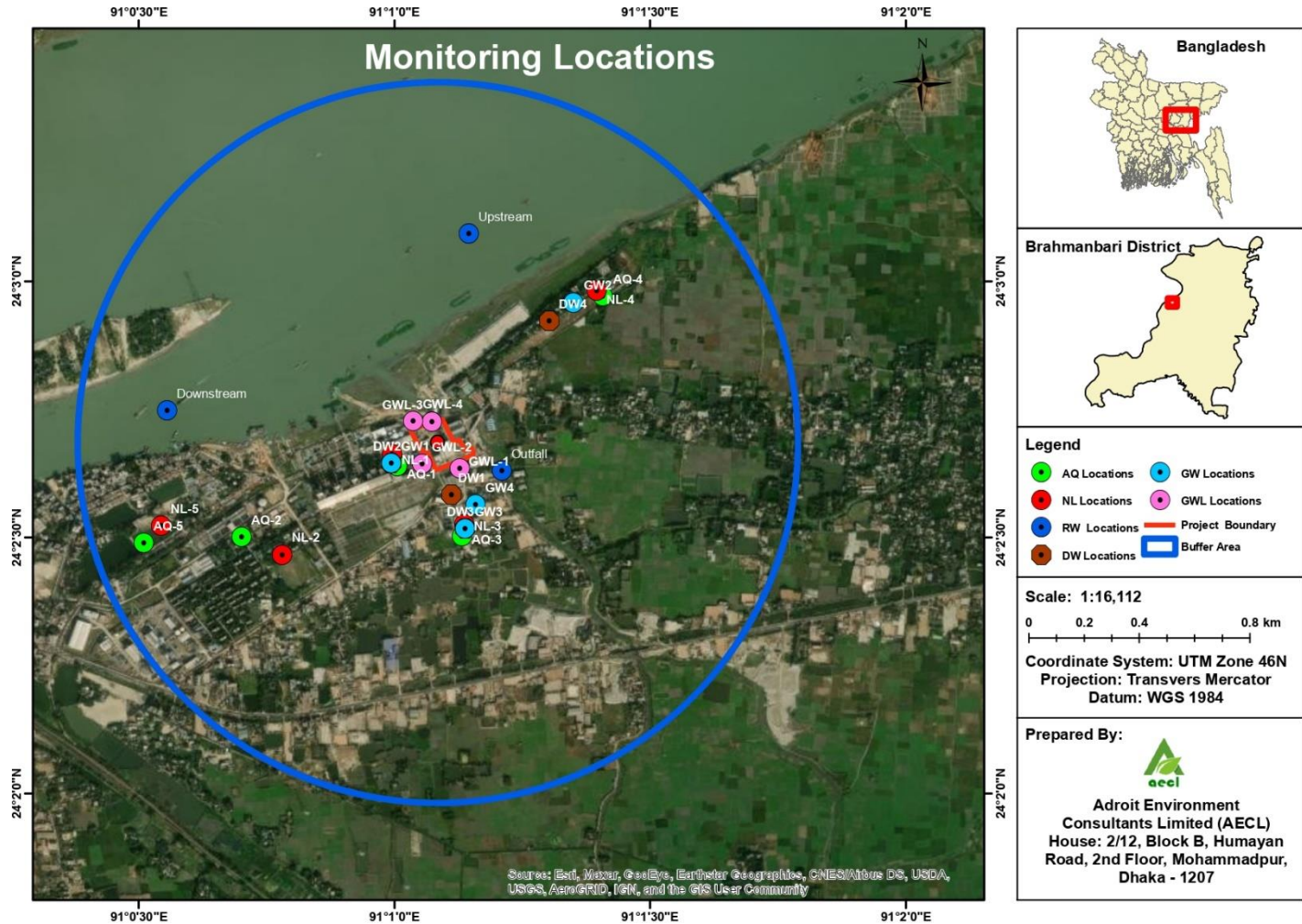
Fig. 1.2.9: Sewage treatment station

ANNEX-II: MONITORING LOCATIONS

Category	Indication of Location	GPS Co-ordinate		Specific Location	Distance (m)
		Latitude	Longitude		
Ambient air quality	Location-1 (L1)	24°02'38.5'' N	91°1'0.0'' E	South-West side of Project area near APSCL Admin building.	182
	Location-2 (L2)	24°02'30.5'' N	91°0'42.2'' E	South-west side of Project area near PDB High School.	702
	Location-3 (L3)	24°02'34.7'' N	91°01'8.7'' E	South-East side of Project area at TSK.	756.3
	Location-4 (L4)	24°02'58.5'' N	91°01'23.9'' E	North-East side of Project area near APSCL dormitory.	750
	Location-5 (L5)	24°02'31.7'' N	91°0'30.3'' E	South-West side of Project area near Haji Abdul Jalil High School.	1045
Noise Level	Location-1	24°02'38.5'' N	91°1'0.0'' E	South-West side of Project area near APSCL Admin building.	183
	Location-2	24°02'30.5'' N	91°0'42.2'' E	South-west side of Project area near PDB High School.	712.5
	Location-3	24°02'34.7'' N	91°01'8.7'' E	South-East side of Project area at TSK.	756.3
	Location-4	24°02'58.5'' N	91°01'23.9'' E	North-East side of Project area near APSCL dormitory.	751.3
	Location-5	24°02'31.7'' N	91°0'30.3'' E	South-West side of Project area near Haji Abdul Jalil High School.	1048.2
River Water	Upstream	24°02'53.1'' N	91°01'3.1'' E	North-West side of Project area near the project location	385.87
	Downstream	24°02'44.0'' N	91°00'33.2'' E	North-West side of Project area and near Ashuganj Chor Sonarampur.	905.93
	Outfall	24°02'40.3'' N	91°01'10.8'' E	South-East side of Project area near APSCL power plant area.	138.71

Category	Indication of Location	GPS Co-ordinate		Specific Location	Distance (m)
		Latitude	Longitude		
Drinking Water	Location-1 (D1)	24° 2'39.43"N	91° 0'58.29"E	North-West side of the project area at canteen	60.3
	Location-2 (D2)	24° 2'35.47"N	91°01'6.38"E	South-west side of Project area at admin building (Purifier)	41.53
	Location-3 (D3)	24°02'38.86'' N	91°01'.10'' E	South-west side of Project area near PDB High School.	56.51
	Location-4 (D4)	24° 2'38.51"N	91°01'1.10"E	South-West side of Project area at Haji Abdul Jalil High School.	55.63
Ground Water	Location 1: G1	24°02'38.1''N	91°0'58.0''E	Inside the project area	60.3
	Location 2: G2	24° 2'30.5"N	91°00'42.2"E	South-west side of Project area near PDB High School	56.51
	Location 3: G3	24°02'34.1''N	91° 1' 9.3''E	South-East side of the project	56.51
	Location 4: G4	24°02' 47.2''N	91° 1'12.3''E	North-East side of the project area	55.63

ANNEX-III: MONITORING LOCATIONS MAP



ANNEX-IV: LABORATORY TEST RESULT
(July 2021)



Adroit Environment Consultants Ltd.



A House of Complete Environmental Management Solutions



AECL LABORATORY ANALYSIS REPORT
AMBIENT AIR QUALITY TEST REPORT

Memo # AECL : **844**
Project Name : **Ashuganj 400MW CCPP (East)**
Project Location : **Ashuganj, Brahmanbaria.**

Description of Sample : **Ambient Air**
Sample Collector : **Adroit Environment Consultants Ltd. (Monitoring team).**
Sampling date : **15th to 18th July, 2021**
Reporting date : **3rd August, 2021**

Description of analysis

S N	Param- eters	Method	Test Duration (Hours)	Unit	24°2'3	24°2'3	24°2'3	24°2'58.	24°2'31.	Respirable (DoE) Standard	IPC /World Bank Standard
					8.5° N 91°1' 0.0° E (L1)	0.5° N 91°0'4 2.2° E (L2)	4.7° N 91°1'8 .7° E (L3)	5° N 91°1'23. 9° E (L4)	7° N 91°00'3 0.3° E (L5)		
1	PM _{2.5}	Gравimetric	24	µg/m ³	19.54	17.38	21.29	18.31	16.56	65	75
2	PM ₁₀	Gравimetric	24	µg/m ³	41.66	43.90	49.36	34.61	39.71	150	150
3	SPM	Gравimetric	8	µg/m ³	70.28	66.10	68.28	59.55	55.10	200	NF
4	SO ₂	West-Gaske	24	µg/m ³	6.64	7.38	7.15	6.10	7.73	365	125
5	NO _x	Jacob and Hochheiser	1	µg/m ³	11.55	9.26	10.47	9.73	10.12	NF	200
6	CO	CO/O ₂ Meter	1	ppm	2	2	0	1	0	35	NF

(NF – not found, DoE – Department of Environment.), *1-hour standard Not Found

Note: This monitoring report was usually accomplished by - Respirable Dust Sampler (Model-Envirotech India APM-460BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).

- | | |
|--|---|
| 1. Fine Particulate Matter (PM _{2.5}). | 4. Oxides of Nitrogen (NO _x). |
| 2. Respirable Dust Content (PM ₁₀). | 5. Oxides of Sulfur (SO ₂). |
| 3. Suspended Particulate Matter (SPM). | 6. Carbone Mono-Oxide (CO). |

Comment: From the aforementioned results it is discernible that, all the parameters are inside the allowable limits.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

2/12, Humayun Road (2nd Floor), Block-B, Mohammadpur, Dhaka-1207 Tel: +88-02-9116712-13
Mob: 01733376609-10, Fax: +88-02-9116714, Email: nukhan05@gmail.com, aecldhaka@gmail.com

WWW.Aecl-bd.org



AECCL LABORATORY ANALYSIS REPORT **AMBIENT NOISE QUALITY TEST REPORT**



Memo # AECCL : **B44**
Project Name : **Ashuganj 400MW CCPP (East)**
Project Location : **Ashuganj, Brahmanbaria**
Description of Sample : **Ambient Noise**
Sample Collector : **Adroit Environment Consultants Ltd. (Monitoring team)**
Sampling date : **15th to 17th July, 2021**
Reporting date : **3rd August, 2021**

Description of analysis

SN.	Site Location	Site Condition	Concentration present (LA _{eq}) dBA.			
			Day Time		Night Time	
			Minimum	Maximum	Minimum	Maximum
01	Test Result in South-West side of Project area near APSCL Admin building, (location # 01) N- 24°02'38.5" E-091°01'0.0"	Construction Stage	51.7	66.8	50.1	61.2
02	Test Result in South-West side of Project area near PDB High School, (location # 02) N-24°02'30.5" E-091°0'42.2"	Construction Stage	56.2	66.7	47.4	63.1
03	Test Result in South-East side of Project area near TSK, (location # 03) N- 24°02'34.7" E-091°0'18.7"	Construction Stage	54.1	65.4	49.3	57.9
04	Test Result in North-East side of Project area near APSCL dormitory, (location # 04) N- 24°02'58.5" E-091°01'23.9"	Construction Stage	56.1	64.8	50.2	63.0
05	Test Result in South-West side of Project area near Heji Abdul Jellil High School, (location # 05) N- 24°02'31.7" E-091°00'30.3"	Construction Stage	53.3	63.6	51.0	56.8
DoE (Bangladesh) Standard for Industrial area			75		70	
IFC/International Standard for Industrial/Commercial Zone			70		70	

Note: This noise data was usually accomplished by – CEM Sound Level Meter (Model – DT 8850)

Comment: According to the Department of Environment (ECR'1997), the standard for ambient noise level in the industrial zone is 75 and 70 decibels at day & night time respectively. The results were found within the limit as per DoE Standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT SURFACE WATER QUALITY TEST REPORT

Memo # AECL : 844
Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
Project Location : Ashuganj, Brahmanbaria.
Sample Collector : Adroit Environment Consultants Ltd (Monitoring team)
Description of Sample : River Water
Sample Location : Ashuganj, Brahmanbaria (Near project area)
Sampling date : 17th July, 2021
Reporting date : 15th August, 2021

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	21.4	22.0	22.7	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	6.5	6.1	5.9	mg/l	DO meter
BOD ₅	0.1	0.1	0.5	mg/l	5-day BOD test
COD	1.6	1.7	4.3	mg/l	Open Reflux
Chromium	<0.02	<0.02	<0.02	mg/l	Atomic Absorption Spectrophotometer
Cadmium	<0.002	<0.002	<0.002	mg/l	Atomic Absorption Spectrophotometer
Pb	<0.05	<0.05	<0.05	mg/l	Atomic Absorption Spectrophotometer
Oil & Grease	<1.0	<1.0	<1.0	mg/l	APHA 5520.B

***No standard was found for River Water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT DRINKING WATER QUALITY TEST REPORT

Memo # AECL : 844
 Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
 Project Location : Ashuganj, Brahmanbaria.
 Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
 Description of Sample : Drinking Water
 Sample Location : Ashuganj, Brahmanbaria
 Sampling date : 17th July, 2021
 Reporting date : 15th August, 2021

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.28	7.22	6.99	7.21	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Photometric
Nitrate	<1	<1	<1	<1	10	50	mg/l	Potentiometric
Phosphate	0.07	0.07	0.07	0.07	6	-	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	0.4	0.32	0.16	0.3	0.3-1.0	-	mg/l	Spectrophotometer
Mn	<0.01	<0.1	<0.1	<0.1	0.1	0.5	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique

* DoE Standard for drinking water.

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Salful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT GROUND WATER QUALITY TEST REPORT



Memo # AECL : 544
 Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
 Project Location : Ashuganj, Brahmanbaria.

Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
 Description of Sample : Ground Water
 Sample Location : Ashuganj, Brahmanbaria. (Inside project area)
 Sampling date : 17th July, 2021
 Reporting date : 15th August, 2021

Description of analysis

Name of the Parameter	Concentration Present				Unit	Method of analysis
	(G1)	(G2)	(G3)	(G4)		
pH	7.07	7.16	7.08	6.96	-	pH Meter
TDS	392	340	386	408	Mg/l	TDS Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	mg/l	Photometric
Nitrate	<1.5	<1.0	<1.0	<1.0	mg/l	Potentiometric
Phosphate	0.1	<0.05	<0.05	0.05	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	mg/l	Atomic Absorption Spectrophotometer
Fe	0.1	<0.1	0.2	0.1	mg/l	Spectrophotometer
Mn	<0.1	<0.1	<0.1	<0.1	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	n/100 ml	Membrane Filter Technique

* No standard found for ground water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

(August 2021)



Adroit Environment Consultants Ltd.



A House of Complete Environmental Management Solutions



AECL LABORATORY ANALYSIS REPORT **AMBIENT AIR QUALITY TEST REPORT**

Memo # AECL : 848
Project Name : Ashuganj 400MW CCPP (East)
Project Location : Ashuganj, Brahmanbaria.

Description of Sample : Ambient Air
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
Sampling date : 14th to 16th August, 2021
Reporting date : 6th September, 2021

Description of analysis

S N	Param eters	Method	Test Duration (hours)	Unit	24°2'3	24°2'3	24°2'3	24°2'58.	24°2'31.	Regulation (DoE) Standard	IPC /World Bank Standard
					8.5° N 91°1' 0.0° E (11)	0.5° N 91°0'4 2.2° E (12)	4.7° N 91°1'8 .7° E (13)	5° N 91°1'23. 9° E (14)	7° N 91°00'3 0.3° E (15)		
1	PM _{2.5}	Gravimetric	24	µg/m ³	24.47	29.17	22.75	31.10	19.44	65	75
2	PM ₁₀	Gravimetric	24	µg/m ³	56.66	64.15	48.39	71.34	48.36	150	150
3	SPM	Gravimetric	8	µg/m ³	82.37	91.36	77.68	99.20	73.68	200	NF
4	SO ₂	West-Gaska	24	µg/m ³	8.23	7.07	9.39	8.30	7.10	365	125
5	NO _x	Jacob and Hochheiser	1	µg/m ³	14.23	14.66	15.71	13.73	17.56	NF	200
6	CO	CO/O ₂ Meter	1	ppm	2	6	1	1	1	35	NF

(NF – not found, DoE – Department of Environment.), *1-hour standard Not Found

Note: This monitoring report was usually accomplished by - Respirable Dust Sampler (Model-Envirotech India APIA-460BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).

1. Fine Particulate Matter (PM_{2.5}).
2. Respirable Dust Content (PM₁₀).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_x).
5. Oxides of Sulfur (SO₂).
6. Carbene Mono-Oxide (CO).

Comment: From the aforementioned results it is discernible that, all the parameters are inside the allowable limits.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

2/12, Humayun Road (2nd Floor), Block-B, Mohammadpur, Dhaka-1207 Tel: +88-02-9116712-13
Mob: 01733376609-10, Fax: +88-02-9116714, Email: nurhan05@gmail.com, aecldhaka@gmail.com

WWW.Aecl-bd.org



AECL LABORATORY ANALYSIS REPORT AMBIENT NOISE QUALITY TEST REPORT



Memo # AECL : **B48**
Project Name : Ashuganj 400MW CAPP (East)
Project Location : Ashuganj, Brahmanbaria

Description of Sample : Ambient Noise
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team)
Sampling date : 14th to 16th August, 2021
Reporting date : 6th September, 2021

Description of analysis

SN.	Site Location	Site Condition	Concentration present (LA _{eq}) dBA.			
			Day Time		Night Time	
			Minimum	Maximum	Minimum	Maximum
01	Test Result in South-West side of Project area near APSCL Admin building, (location # 01) N-24°02'38.5" E-091°01'0.0"	Construction Stage	53.2	65.4	52.5	58.5
02	Test Result in South-West side of Project area near PDB High School, (location # 02) N-24°02'30.5" E-091°0'42.2"	Construction Stage	52.1	64.2	49.2	61.3
03	Test Result in South-East side of Project area near TSK, (location # 03) N-24°02'34.7" E-091°0'18.7"	Construction Stage	51.4	64.2	50.9	57.9
04	Test Result in North-East side of Project area near APSCL dormitory, (location # 04) N-24°02'58.5" E-091°01'23.9"	Construction Stage	53.2	66.4	48.1	59.4
05	Test Result in South-West side of Project area near Heji Abdul Jellil High School, (location # 05) N-24°02'31.7" E-091°00'30.3"	Construction Stage	53.8	66.1	46.2	58.2
DoE (Bangladesh) Standard for Industrial area			75		70	
IFC/International Standard for Industrial/Commercial Zone			70		70	

Note: This noise data was usually accomplished by - CEM Sound Level Meter (Model - DT 8850)

Comment: According to the Department of Environment (ECR'1997), the standard for ambient noise level in the industrial zone is 75 and 70 decibels at day & night time respectively. The results were found within the limit as per DoE Standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT SURFACE WATER QUALITY TEST REPORT

Memo # AECL : 848
Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
Project Location : Ashuganj, Brahmanbaria.
Sample Collector : Adroit Environment Consultants Ltd (Monitoring team)
Description of Sample : River Water
Sample Location : Ashuganj, Brahmanbaria (Near project area)
Sampling date : 16th August, 2021
Reporting date : 6th September, 2021

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	22.1	21.8	22.7	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	6.6	6.3	6.4	mg/l	DO meter
BOD ₅	0.2	0.1	0.6	mg/l	5-day BOD test
COD	1.2	1.1	3.2	mg/l	Open Reflux
Chromium	<0.02	<0.02	<0.02	mg/l	Atomic Absorption Spectrophotometer
Cadmium	<0.002	<0.002	<0.002	mg/l	Atomic Absorption Spectrophotometer
Pb	<0.05	<0.05	<0.05	mg/l	Atomic Absorption Spectrophotometer
Oil & Grease	<1.0	<1.0	<1.0	mg/l	APHA 5520.B

***No standard was found for River Water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT DRINKING WATER QUALITY TEST REPORT

Memo # AECL : 848
 Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
 Project Location : Ashuganj, Brahmanbaria.
 Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
 Description of Sample : Drinking Water
 Sample Location : Ashuganj, Brahmanbaria
 Sampling date : 16th August, 2021
 Reporting date : 6th September, 2021

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.14	7.08	7.04	7.3	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	Photometric
Nitrate	<1	1	<1	<1	10	50	mg/l	Potentiometric
Phosphate	0.07	0.07	<0.07	0.07	6	-	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	0.33	0.34	0.2	0.32	0.3-1.0	-	mg/l	Spectrophotometer
Mn	<0.01	<0.1	<0.1	<0.1	0.1	0.5	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique

* DoE Standard for drinking water.

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

(September 2021)



**AECL LABORATORY ANALYSIS REPORT
AMBIENT AIR QUALITY TEST REPORT**

Memo # AECL : 853
Project Name : Ashuganj 400MW CCPP (East)
Project Location : Ashuganj, Brahmanbaria.

Description of Sample : Ambient Air
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
Sampling date : 1st to 4th September, 2021
Reporting date : 29th September, 2021

Description of analysis

S N	Param- eters	Method	Test Duration (Hours)	Unit	24°23	24°23	24°23	24°2'58.	24°2'31.	Bangladesh (DoE) Standard	IPC /World Bank Standard
					8.5" N 91°1' 0.0" E (L1)	0.5" N 91°0'4 2.2" E (L2)	4.7" N 91°1'8 .7" E (L3)	5" N 91°1'23. 9" E (L4)	7" N 91°00'3 0.3" E (L5)		
1	PM _{2.5}	Gravimetric	24	µg/m ³	24.46	29.72	18.29	24.44	23.79	65	75
2	PM ₁₀	Gravimetric	24	µg/m ³	51.12	56.89	40.22	46.18	61.19	150	150
3	SPM	Gravimetric	8	µg/m ³	81.17	91.22	63.34	77.30	94.48	200	NF
4	SO ₂	West-Gaska	24	µg/m ³	8.89	10.47	9.23	10.27	11.49	365	125
5	NO _x	Jacob and Hochheiser	1	µg/m ³	10.44	13.39	12.47	14.55	13.64	NF	200
6	CO	CO/O ₂ Meter	1	ppm	0	1	1	1	2	35	NF

(NF – not found, DoE – Department of Environment.), *1-hour standard Not Found

Note: This monitoring report was usually accomplished by - Respirable Dust Sampler (Model-Envirotech India APM-450BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).

1. Fine Particulate Matter (PM_{2.5}).
2. Respirable Dust Content (PM₁₀).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_x).
5. Oxides of Sulfur (SO₂).
6. Carbene Mono-Oxide (CO).

Comment: From the aforementioned results it is discernible that, all the parameters are inside the allowable limits.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

2/12, Humayun Road (2nd Floor), Block-B, Mohammadpur, Dhaka-1207 Tel: +88-02-9116712-13
Mob: 01733376609-10, Fax: +88-02-9116714, Email: nukhan05@gmail.com, aecldhaka@gmail.com

[WWW. Aecl-bd.org](http://www.Aecl-bd.org)



AECL LABORATORY ANALYSIS REPORT AMBIENT NOISE QUALITY TEST REPORT



Memo # AECL : 853
Project Name : Ashuganj 400MW CCPP (East)
Project Location : Ashuganj, Brahmanbaria

Description of Sample : Ambient Noise
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team)
Sampling date : 1st to 4th September, 2021
Reporting date : 29th September, 2021

Description of analysis

SN.	Site Location	Site Condition	Concentration present (LA _{eq}) dBA.			
			Day Time		Night Time	
			Minimum	Maximum	Minimum	Maximum
01	Test Result in South-West side of Project area near APSCL Admin building, (location # 01) N- 24°02'38.5" E-091°01'0.0"	Construction Stage	52.3	67.2	41.8	52.3
02	Test Result in South-West side of Project area near PDB High School, (location # 02) N-24°02'30.5" E-091°0'42.2"	Construction Stage	53.3	62.8	48.2	58.3
03	Test Result in South-East side of Project area near TSK, (location # 03) N- 24°02'34.7" E-091°0'18.7"	Construction Stage	51.2	64.1	52.1	59.3
04	Test Result in North-East side of Project area near APSCL dormitory, (location # 04) N- 24°02'58.5" E-091°0'23.9"	Construction Stage	53.1	59.3	42.1	59.3
05	Test Result in South-West side of Project area near Heji Abdul Jalil High School, (location # 05) N- 24°02'31.7" E-091°00'30.3"	Construction Stage	59.4	66.8	49.3	58.5
DoE (Bangladesh) Standard for Industrial area			75		70	
IFC/International Standard for Industrial/Commercial Zone			70		70	

Note: This noise data was usually accomplished by – CEM Sound Level Meter (Model – DT 8850)

Comment: According to the Department of Environment (ECR'1997), the standard for ambient noise level in the industrial zone is 75 and 70 decibels at day & night time respectively. The results were found within the limit as per DoE Standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT SURFACE WATER QUALITY TEST REPORT

Memo # AECL : 853
Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
Project Location : Ashuganj, Brahmanbaria.

Sample Collector : Adroit Environment Consultants Ltd (Monitoring team)
Description of Sample : River Water
Sample Location : Ashuganj, Brahmanbaria (Near project area)
Sampling date : 1st & 3rd September, 2021
Reporting date : 5th October, 2021

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	23.4	23.2	24.0	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	6.5	6.3	6.2	mg/l	DO meter
BOD ₅	0.2	0.3	0.8	mg/l	5-day BOD test
COD	1.0	1.2	4.1	mg/l	Open Reflux
Chromium	<0.02	<0.02	<0.02	mg/l	Atomic Absorption Spectrophotometer
Cadmium	<0.002	<0.002	<0.002	mg/l	Atomic Absorption Spectrophotometer
Pb	<0.05	<0.05	<0.05	mg/l	Atomic Absorption Spectrophotometer
Oil & Grease	<1.0	<1.0	<1.0	mg/l	APHA 5520.B

***No standard was found for River Water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT DRINKING WATER QUALITY TEST REPORT

Memo # AECL : 853
 Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
 Project Location : Ashuganj, Brahmanbaria.
 Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
 Description of Sample : Drinking Water
 Sample Location : Ashuganj, Brahmanbaria
 Sampling date : 1st & 3rd September, 2021
 Reporting date : 5th October, 2021

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.31	6.99	7.12	7.07	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	Photometric
Nitrate	<1	1	<1	<1	10	50	mg/l	Potentiometric
Phosphate	<0.07	<0.07	<0.07	<0.07	6	-	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	0.28	0.3	0.21	0.24	0.3-1.0	-	mg/l	Spectrophotometer
Mn	<0.1	<0.1	<0.1	<0.1	0.1	0.5	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique

* DoE Standard for drinking water.

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

(October 2021)



Adroit Environment Consultants Ltd.



A House of Complete Environmental Management Solutions



AECL LABORATORY ANALYSIS REPORT AMBIENT AIR QUALITY TEST REPORT

Memo # AECL : 864
Project Name : Ashuganj 400MW CCPP (East)
Project Location : Ashuganj, Brahmanbaria.

Description of Sample : Ambient Air
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
Sampling date : 12th to 14th October, 2021
Reporting date : 20th October, 2021

Description of analysis

S N	Param- eters	Method	Test Duration (Hours)	Unit	24°2'3	24°2'3	24°2'3	24°2'58.	24°2'31.	Bangladesh (DoE) Standard	IPC /World Bank Standard
					8.5° N 91°1' E 0.0° E (L1)	0.5° N 91°0'4 2.2° E (L2)	4.7° N 91°1'8 .7° E (L3)	5° N 91°1'23. 9° E (L4)	7° N 91°00'3 0.3° E (L5)		
1	PM _{2.5}	Gravimetric	24	µg/m ₃	46.28	43.84	33.10	44.93	38.26	65	75
2	PM ₁₀	Gravimetric	24	µg/m ₃	81.36	88.79	65.18	78.36	71.30	150	150
3	SPM	Gravimetric	8	µg/m ₃	132.74	139.30	108.48	126.88	118.48	200	NF
4	SO ₂	West-Gaske	24	µg/m ₃	12.22	12.47	14.36	11.89	14.55	365	125
5	NO _x	Jacob and Hochhalter	1	µg/m ₃	18.75	16.19	20.34	16.58	22.41	NF	200
6	CO	CO/O ₂ Mebor	1	ppm	2	8	3	5	2	35	NF

(NF – not found, DoE – Department of Environment.), *1-hour standard Not Found

Note: This monitoring report was usually accomplished by - Respirable Dust Sampler (Model-Envirotech India APIH-400BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).

1. Fine Particulate Matter (PM_{2.5}).
2. Respirable Dust Content (PM₁₀).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_x).
5. Oxides of Sulfur (SO₂).
6. Carbone Mono-Oxide (CO).

Comment: From the aforementioned results it is discernible that, all the parameters are inside the allowable limits.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

2/12, Humayun Road (2nd Floor), Block-B, Mohammadpur, Dhaka-1207 Tel: +88-02-9116712-13
Mob: 01733376609-10, Fax: +88-02-9116714, Email: nukhan05@gmail.com, aecldhaka@gmail.com

[WWW. Aecl-bd.org](http://WWW.Aecl-bd.org)



AECL LABORATORY ANALYSIS REPORT AMBIENT NOISE QUALITY TEST REPORT



Memo # AECL : **B64**
Project Name : Ashuganj 400MW CCPP (East)
Project Location : Ashuganj, Brahmanbaria

Description of Sample : Ambient Noise
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team)
Sampling date : 12th to 14th October, 2021
Reporting date : 20th October, 2021

Description of analysis

SN.	Site Location	Site Condition	Concentration present (LA _{eq}) dBA.			
			Day Time		Night Time	
			Minimum	Maximum	Minimum	Maximum
01	Test Result in South-West side of Project area near APSCL Admin building, (location # 01) N- 24°02'38.5" E-091°01'0.0"	Construction Stage	42.5	68.9	47.3	57.9
02	Test Result in South-West side of Project area near POB High School, (location # 02) N-24°02'30.5" E-091°0'42.2"	Construction Stage	47.1	59.8	43.2	58.7
03	Test Result in South-East side of Project area near TSK, (location # 03) N- 24°02'34.7" E-091°0'18.7"	Construction Stage	49.6	66.4	51.3	60.9
04	Test Result in North-East side of Project area near APSCL dormitory, (location # 04) N- 24°02'58.5" E-091°01'23.9"	Construction Stage	49.6	54.8	43.2	53.7
05	Test Result in South-West side of Project area near Haji Abdul Jalil High School, (location # 05) N- 24°02'31.7" E-091°00'30.3"	Construction Stage	49.3	60.5	48.9	56.7
DoE (Bangladesh) Standard for Industrial area			75		70	
IFC (International Standard for Industrial/Commercial Zone)			70		70	

Note: This noise data was usually accomplished by - CEM Sound Level Meter (Model - DT 8850)

Comment: According to the Department of Environment (ECR'1997), the standard for ambient noise level in the industrial zone is 75 and 70 decibels at day & night time respectively. The results were found within the limit as per DoE Standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT SURFACE WATER QUALITY TEST REPORT

Memo # AECL : 864
Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
Project Location : Ashuganj, Brahmanbaria.
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team)
Description of Sample : River Water
Sample Location : Ashuganj, Brahmanbaria (Near project area)
Sampling date : 12th & 14th October, 2021
Reporting date : 4th November, 2021

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	23.1	23.3	23.9	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	6.6	6.2	6.2	mg/l	DO meter
BOD ₅	0.2	0.2	1.5	mg/l	5-day BOD test
COD	1.4	0.8	3.2	mg/l	Open Reflux
Chromium	<0.02	<0.02	<0.02	mg/l	Atomic Absorption Spectrophotometer
Cadmium	<0.002	<0.002	<0.002	mg/l	Atomic Absorption Spectrophotometer
Pb	<0.05	<0.05	<0.05	mg/l	Atomic Absorption Spectrophotometer
Oil & Grease	<1.0	<1.0	<1.0	mg/l	APHA 5520.B

***No standard was found for River Water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT DRINKING WATER QUALITY TEST REPORT

Memo # AECL : **864**
Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
Project Location : Ashuganj, Brahmanbaria.
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
Description of Sample : Drinking Water
Sample Location : Ashuganj, Brahmanbaria
Sampling date : 12th & 14th October, 2021
Reporting date : 4th November, 2021

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.43	7.19	7.13	7.29	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	Photometric
Nitrate	<1	1	<1	<1	10	50	mg/l	Potentiometric
Phosphate	<0.07	<0.07	<0.07	<0.07	6	-	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	0.42	0.33	0.2	0.12	0.3-1.0	-	mg/l	Spectrophotometer
Mn	<0.1	<0.1	<0.1	<0.1	0.1	0.5	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Techniques
Fecal Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Techniques

* DoE Standard for drinking water.

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT GROUND WATER QUALITY TEST REPORT



Memo # AECL : **864**
Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
Project Location : Ashuganj, Brahmanbaria.

Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
Description of Sample : Ground Water
Sample Location : Ashuganj, Brahmanbaria. (Inside project area)
Sampling date : 12th & 14th October, 2021
Reporting date : 4th November, 2021

Description of analysis

Name of the Parameter	Concentration Present				Unit	Method of analysis
	(G1)	(G2)	(G3)	(G4)		
pH	6.92	6.98	7.32	7.06	-	pH Meter
TDS	292	341	341	297	Mg/l	TDS Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	mg/l	Photometric
Nitrate	<1.0	<1.0	<1.0	<1.0	mg/l	Potentiometric
Phosphate	0.06	0.07	0.07	0.07	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	mg/l	Atomic Absorption Spectrophotometer
Fe	0.11	<0.1	0.34	0.2	mg/l	Spectrophotometer
Mn	<0.1	<0.1	<0.1	<0.1	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	n/100 ml	Membrane Filter Technique

* No standard found for ground water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

(November 2021)



Adroit Environment Consultants Ltd.



A House of Complete Environmental Management Solutions



AECL LABORATORY ANALYSIS REPORT
AMBIENT AIR QUALITY TEST REPORT

Memo # AECL : 872
Project Name : Ashuganj 400MW CCPP (East)
Project Location : Ashuganj, Brahmanbaria.

Description of Sample : Ambient Air
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
Sampling date : 9th to 11th November, 2021
Reporting date : 20th November, 2021

Description of analysis

S N	Parame ters	Method	Test Duration (Hours)	Unit	24°2'3	24°2'3	24°2'3	24°2'58.	24°2'31.	Bangladesh (DoE) Standard	IPC /World Bank Standard
					8.5" N 91°1' 0.0" E (L1)	0.5" N 91°0'4 2.2" E (L2)	4.7" N 91°1'8 7" E (L3)	5" N 91°1'23. 9" E (L4)	7" N 91°00'3 0.3" E (L5)		
1	PM _{2.5}	Gravimetric	24	µg/m ₃	38.34	48.56	43.29	40.56	45.27	65	75
2	PM ₁₀	Gravimetric	24	µg/m ₃	71.10	67.38	69.45	74.19	80.21	150	150
3	SPM	Gravimetric	8	µg/m ₃	116.38	124.40	119.30	121.52	133.26	200	NF
4	SO ₂	West-Gaake	24	µg/m ₃	12.37	12.66	10.52	12.88	9.37	365	125
5	NO _x	Jacob and Hochheiser	1	µg/m ₃	17.34	23.93	15.54	19.55	16.28	NF	200
6	CO	CO/CO ₂ Meter	1	ppm	1	3	0	1	2	35	NF

(NF – not found, DoE – Department of Environment.), *1-hour standard Not Found

Note: This monitoring report was usually accomplished by - Respirable Dust Sampler (Model-Envirotech India API-450BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).

1. Fine Particulate Matter (PM_{2.5}).
2. Respirable Dust Content (PM₁₀).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_x).
5. Oxides of Sulfur (SO₂).
6. Carbene Mono-Oxide (CO).

Comment: From the aforementioned results it is discernible that, all the parameters are inside the allowable limits.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

2/12, Humayun Road (2nd Floor), Block-B, Mohammadpur, Dhaka-1207 Tel: +88-02-9116712-13
Mob: 01733376609-10, Fax: +88-02-9116714, Email: nukhan05@gmail.com, aecldhaka@gmail.com

WWW.Aecl-bd.org



AECL LABORATORY ANALYSIS REPORT AMBIENT NOISE QUALITY TEST REPORT



Memo # AECL : **872**
Project Name : Ashuganj 400MW CCPP (East)
Project Location : Ashuganj, Brahmanbaria

Description of Sample : Ambient Noise
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team)
Sampling date : 9th to 11th November, 2021
Reporting date : 20th November, 2021

Description of analysis

SN.	Site Location	Site Condition	Concentration present (LA _{eq}) dBA.			
			Day Time		Night Time	
			Minimum	Maximum	Minimum	Maximum
01	Test Result in South-West side of Project area near APSCCL Admin building, (location # 01) N- 24°02'38.5" E-091°01'0.0"	Construction Stage	51.9	59.9	38.7	46.8
02	Test Result in South-West side of Project area near PDB High School, (location # 02) N-24°02'30.5" E-091°042.2"	Construction Stage	53.3	62.3	42.0	48.8
03	Test Result in South-East side of Project area near TSK, (location # 03) N- 24°02'34.7" E-091°01'8.7"	Construction Stage	57.6	64.5	40.2	50.3
04	Test Result in North-East side of Project area near APSCCL dormitory, (location # 04) N- 24°02'58.5" E-091°01'23.9"	Construction Stage	56.4	66.3	46.9	54.8
05	Test Result in South-West side of Project area near Heji Abdul Jalil High School, (location # 05) N- 24°02'31.7" E-091°00'30.3"	Construction Stage	57.6	66.9	47.6	54.9
DoE (Bangladesh) Standard for Industrial area			75		70	
IFC/International Standard for Industrial/Commercial Zone			70		70	

Note: This noise data was usually accomplished by - CEM Sound Level Meter (Model - DT 8850)

Comment: According to the Department of Environment (ECR'1997), the standard for ambient noise level in the industrial zone is 75 and 70 decibels at day & night time respectively. The results were found within the limit as per DoE Standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT SURFACE WATER QUALITY TEST REPORT

Memo # AECL : 872
Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
Project location : Ashuganj, Brahmanbaria.
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team)
Description of Sample : River Water
Sample Location : Ashuganj, Brahmanbaria (Near project area)
Sampling date : 11th November, 2021
Reporting date : 30th November, 2021

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	21.8	20.4	21.6	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	6.5	6.0	6.1	mg/l	DO meter
BOD ₅	0.1	0.2	2.2	mg/l	5-day BOD test
COD	1.8	2.1	3.8	mg/l	Open Reflux
Chromium	<0.02	<0.02	<0.02	mg/l	Atomic Absorption Spectrophotometer
Cadmium	<0.002	<0.002	<0.002	mg/l	Atomic Absorption Spectrophotometer
Pb	<0.05	<0.05	<0.05	mg/l	Atomic Absorption Spectrophotometer
Oil & Grease	<1.0	<1.0	<1.0	mg/l	APHA 5520.B

***No standard was found for River Water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT DRINKING WATER QUALITY TEST REPORT

Memo # AECL : 872
 Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
 Project Location : Ashuganj, Brahmanbaria.
 Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
 Description of Sample : Drinking Water
 Sample Location : Ashuganj, Brahmanbaria
 Sampling date : 11th November, 2021
 Reporting date : 30th November, 2021

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.24	7.32	7.19	7.31	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	Photometric
Nitrate	<1	1	<1	<1	10	50	mg/l	Potentiometric
Phosphate	<0.07	<0.07	<0.07	<0.07	6	-	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	0.26	0.2	0.43	0.29	0.3-1.0	-	mg/l	Spectrophotometer
Mn	<0.1	<0.1	<0.1	<0.1	0.1	0.5	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique

* DoE Standard for drinking water.

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

(December 2021)



Adroit Environment Consultants Ltd.



A House of Complete Environmental Management Solutions



AECL LABORATORY ANALYSIS REPORT
AMBIENT AIR QUALITY TEST REPORT

Memo # AECL : 882
Project Name : Ashuganj 400MW CCPP (East)
Project Location : Ashuganj, Brahmanbaria.

Description of Sample : Ambient Air
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
Sampling date : 1st to 3rd December, 2021
Reporting date : 14th December, 2021

Description of analysis

S N	Parameters	Method	Test Duration (hours)	Unit	24°2'3	24°2'3	24°2'3	24°2'58.	24°2'31.	Bangladesh (DoE) Standard	IFC /World Bank Standard
					8.5" N 91°1' 0.0" E (L1)	0.5" N 91°0'4 2.2" E (L2)	4.7" N 91°1'8 .7" E (L3)	5" N 91°1'23. 9" E (L4)	7" N 91°00'3 0.3" E (L5)		
1	PM _{2.5}	Gravimetric	24	µg/m ₃	44.66	43.63	53.75	62.18	53.75	65	75
2	PM ₁₀	Gravimetric	24	µg/m ₃	81.43	73.78	81.40	93.49	81.40	150	150
3	SPM	Gravimetric	8	µg/m ₃	136.38	123.40	142.71	169.10	142.71	200	NF
4	SO ₂	West-Geake	24	µg/m ₃	9.52	8.87	12.84	15.71	12.84	365	125
5	NO _x	Jacob and Hochheiser	1	µg/m ₃	16.28	16.23	21.51	29.55	21.51	NF	200
6	CO	CO/O ₃ Meter	1	ppm	4	1	3	2	3	35	NF

(NF - not found, DoE - Department of Environment.), *1-hour standard Not Found

Note: This monitoring report was usually accomplished by - Respirable Dust Sampler (Model-Envirotech India APM-460BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).

1. Fine Particulate Matter (PM_{2.5}).
2. Respirable Dust Content (PM₁₀).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_x).
5. Oxides of Sulfur (SO₂).
6. Carbone Mono-Oxide (CO).

Comment: From the aforementioned results it is discernible that, all the parameters are inside the allowable limits.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

2/12, Humayun Road (2nd Floor), Block-B, Mohammadpur, Dhaka-1207 Tel: +88-02-9116712-13
Mob: 01733376609-10, Fax: +88-02-9116714, Email: nukhan05@gmail.com, aeclhdhaka@gmail.com

WWW.Aecl-bd.org



AECL LABORATORY ANALYSIS REPORT AMBIENT AIR QUALITY TEST REPORT

Memo # AECL : **882**
Project Name : Ashuganj 400MW CCPP (East)
Project Location : Ashuganj, Brahmanbaria.

Description of Sample : Ambient Air
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
Sampling date : 1st to 3rd December, 2021
Reporting date : 14th December, 2021

Description of analysis

S N	Parameters	Method	Test Duration (hours)	Unit	24°2'3	24°2'3	24°2'3	24°2'58.	24°2'31.	Bangladesh (DoE) Standard	IFC /World Bank Standard
					8.5" N 91°1' 0.0" E (L1)	0.5" N 91°0'4 2.2" E (L2)	4.7" N 91°1'8 .7" E (L3)	5" N 91°1'23. 9" E (L4)	7" N 91°00'3 0.3" E (L5)		
1	PM _{2.5}	Gravimetric	24	µg/m ₃	44.66	43.63	53.75	62.18	53.75	65	75
2	PM ₁₀	Gravimetric	24	µg/m ₃	81.43	73.78	81.40	93.49	81.40	150	150
3	SPM	Gravimetric	8	µg/m ₃	136.38	123.40	142.71	169.10	142.71	200	NF
4	SO ₂	West-Geake	24	µg/m ₃	9.52	8.87	12.84	15.71	12.84	365	125
5	NO _x	Jacob and Hochheiser	1	µg/m ₃	16.28	16.23	21.51	29.55	21.51	NF	200
6	CO	CO/O ₂ Meter	1	ppm	4	1	3	2	3	35	NF

(NF - not found, DoE - Department of Environment.), *1-hour standard Not Found

Note: This monitoring report was usually accomplished by - Respirable Dust Sampler (Model-Envirotech India APM-460BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).

1. Fine Particulate Matter (PM_{2.5}).
2. Respirable Dust Content (PM₁₀).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_x).
5. Oxides of Sulfur (SO₂).
6. Carbone Mono-Oxide (CO).

Comment: From the aforementioned results it is discernible that, all the parameters are inside the allowable limits.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT **SURFACE WATER QUALITY TEST REPORT**

Memo # AECL : **882**
Project Name : **Ashuganj 400MW Combined Cycle Power Plant (East)**
Project Location : **Ashuganj, Brahmanbaria.**
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team)
Description of Sample : River Water
Sample Location : Ashuganj, Brahmanbaria (Near project area)
Sampling date : 3rd December, 2021
Reporting date : 25th December, 2021

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	20.1	21.0	19.8	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	6.0	6.0	5.9	mg/l	DO meter
BODs	0.1	0.1	3.6	mg/l	5-day BOD test
COD	2.0	2.1	2.9	mg/l	Open Reflux
Chromium	<0.02	<0.02	<0.02	mg/l	Atomic Absorption Spectrophotometer
Cadmium	<0.002	<0.002	<0.002	mg/l	Atomic Absorption Spectrophotometer
Pb	<0.05	<0.05	<0.05	mg/l	Atomic Absorption Spectrophotometer
Oil & Grease	<1.0	<1.0	<1.0	mg/l	APHA 5520.B

***No standard was found for River Water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT DRINKING WATER QUALITY TEST REPORT

Memo # AECL : **882**
Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
Project Location : Ashuganj, Brahmanbaria.

Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
Description of Sample : Drinking Water
Sample Location : Ashuganj, Brahmanbaria
Sampling date : 3rd December, 2021
Reporting date : 25th December, 2021

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.39	7.19	7.21	7.34	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	Photometric
Nitrate	<1	1	<1	<1	10	50	mg/l	Potentiometric
Phosphate	<0.07	<0.07	<0.07	<0.07	6	-	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	0.18	0.16	0.21	0.15	0.3-1.0	-	mg/l	Spectrophotometer
Mn	<0.1	<0.1	<0.1	<0.1	0.1	0.5	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique

* DoE Standard for drinking water.

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

ANNEX-V: CALIBRATION CERTIFICATE



UNIVERSAL SCIENTIFIC INSTRUMENTS AND CALIBRATION

(Manufacturer of Air Pollution Monitoring Instrument, Services and Calibration)

E-2, Tala Nagri Industrial Area, Sector-2, Ramghat Road, Aligarh (U.P)- 202001

Mob: +91-8826634-265, 8076026223 Email: universalscientific0@gmail.com

CALIBRATION CERTIFICATE

Reference No.: AECL/EQP/CAL-LAB1/21/08/103	Calibration Date: 29/05/2021
Calibration Certificate No.: 2021/213	Previous Calibration Date: 23/03/2020
	Next Calibration Date: 28/05/2022

1.0 Instrument Details/Specification

Name	Origin	Model	Sl. No.
Portable Multi Gas Meter (O ₂ , H ₂ S, CO, EX)	England	-	02/21

2.0 Calibrator Used

Sl. No.	Item	Capacity/Range/Limit	Calibration Agency	Calibration Date	Supersedes Date
1	Gas Cylinder (CO)	Up to 1000 ppm	Universal Scientific Instruments and Calibration	02.03.2021	01.03.2022
2	Flow Meter	1200 ml/min	Universal Scientific Instruments and Calibration	11.02.2021	10.02.2022

3.0 Procedure

The equipment entered the calibration mode. Flowmeter was adjusted to 200-400 ml/min connected to the equipment via a gas pipe and a calibration hood. The gas concentration in the cylinder is stable 250 ppm. After releasing the pressure valve the value in the screen is rising. After one (1) minute it reached peak and stable value. Adjust the concentration value using arrow keys to 250 ppm. Click Ok to save.



UNIVERSAL SCIENTIFIC INSTRUMENTS AND CALIBRATION

(Manufacturer of Air Pollution Monitoring Instrument, Services and Calibration)

E-2, Tala Nagri Industrial Area, Sector-2, Ramghat Road, Aligarh (U.P)- 202001

Mob: +91-8826634-265, 8076026223 Email: universalscientific0@gmail.com

4.0 Calibration Data

Sl. No.	Reference Gas Concentration (ppm)	Result Obtained (ppm)	Deviation Rate (%)
1	250	250	0
2	250	250	0
3	250	250	0
Significant Standard Deviation			Not Detected

5.0 Comment

The assigned equipment/apparatus/machine/sensor under study is calibrated accordingly using standard calibration procedure described in the **manufacturer's Operation Manual**.

Notes:	Checked By	Authorized By
1 Result reported are valid at the time of and under the started condition of measurement	<i>Rinkant</i>	<i>Vesme</i>
2 Reference used traceable o NABL accredited laboratory		





UNIVERSAL SCIENTIFIC INSTRUMENTS AND CALIBRATION

(Manufacturer of Air Pollution Monitoring Instrument, Services and Calibration)

E-2, Tala Nagri Industrial Area, Sector-2, Ramghat Road, Aligarh (U.P)- 202001

Mob: +91-8826634-265, 8076026223 Email: universalscientific0@gmail.com

CALIBRATION CERTIFICATE

Reference No.: AECL/EQP/CAL-LAB1/21/08/119	Calibration Date: 30/05/2021
Calibration Certificate No.: 2021/238	Previous Calibration Date: 23/03/2020
	Next Calibration Date: 29/05/2022

1.0 Instrument Details/Specification

Name	Origin	Model	Sl. No.
Portable Air Quality Meter (T°C, RH%, PM1.0, PM2.5, PM10, HCHO & TVOC)	Life Basis, England	-	01/21

2.0 Calibrator Used

Sl. No.	Item	Capacity/Range/Limit	Calibration Agency	Calibration Date	Supersedes Date
1	Temperature Gun	Up to 200°C	Universal Scientific Instruments and Calibration	11.02.2021	10.02.2022
2	Pressure Sensor	2000 m ³ /min	Universal Scientific Instruments and Calibration	11.02.2021	10.02.2022

3.0 Procedure

After the equipment entered the calibration mode, turn on the auto calibration process. After the machine is calibrated (as per user manual), look for any display dropout. If okay then put the sensor under study via temperature & gaseous pressure sensor



UNIVERSAL SCIENTIFIC INSTRUMENTS AND CALIBRATION

(Manufacturer of Air Pollution Monitoring Instrument, Services and Calibration)

E-2, Tala Nagri Industrial Area, Sector-2, Ramghat Road, Aligarh (U.P)- 202001

Mob: +91-8826634-265, 8076026223 Email: universalscientific0@gmail.com

4.0 Calibration Data

Sl. No.	Reference Gas Concentration (°C)	Result Obtained (°C)	Deviation Rate (%)
1	15	15.04	0.26
2	25	25.0	0
3	40	40.02	0.05
Significant Standard Deviation			0.1 or Nil

Sl. No.	Reference Gas Concentration (ppm)	Input Stability Found (Yes/No)	Deviation Rate (%)
1	50	No	0
2	250	No	0
3	400	No	0
Significant Standard Deviation			N/A

5.0 Comment

The assigned equipment/apparatus/machine/sensor under study is calibrated accordingly using standard calibration procedure described in the **manufacturer's Operation Manual**.

Notes:	Checked By	Authorized By
1 Result reported are valid at the time of and under the started condition of measurement	<i>Pinkesh</i>	<i>Rohit</i>
2 Reference used traceable o NABL accredited laboratory		



P
I
C
O
L
A
B
S
L
I
M
I
T
E
D

Certificate Of Calibration

ULR No.	: CC74262P0000000086	Instrument Received Date	: 04 th November 2021
Project ID	: 10026	Date of Calibration	: 04 th November 2021
Certificate No.	: PICO/EL/21-22/69	Suggested Due Date	: 04 th November 2022
Place of Calibration	: PICO Lab	Certificate Issue Date	: 04 th November 2021

CALIBRATED FOR : **Adroit Environment Consultants Ltd.**
2/12, Block-B, Humayun Road, Mohammadpur,
Dhaka-1207, Bangladesh.

CERTIFICATE ISSUED BY : **PICO Labs Limited**
Islam Plaza (6th floor), Plot-7, Main Road-3, Section-7
Pallabi, Mirpur, Dhaka-1216, Bangladesh

INSTRUMENT DETAILS : **Name** : Sound Level Meter
ID No. : ----
Manufacturer : WENSN
Model : WS1361C
Serial Number : -----
Measuring Range : 30 to 130 dB
Resolution : 0.1 dB

CALIBRATION STATEMENT : The Instrument Listed On this Certificate has been Calibrated against traceable to NIST or Other Recognized National Metrology Institute. This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. The calibration had been performed in accordance with calibration procedure **WI/Electrical/01**. All Result Contained Within This Certificate Related Only to The Item(s) Calibrated.

ENVIRONMENT CONDITION : **Temperature** : 25±2 °C
Humidity : 55±10 %RH
PHYSICAL CONDITION : **Visual Inspection** : OK
Electrical Condition : OK



Suvra

Approved By
Suvra Deb Paul - TQM



CALIBRATION RESULT OF SOUND METER

DECIBEL- dB					
SL No.	Reference Standard Set Point	Measured D.U.C Reading	Measuring Unit	Error (\pm dB) (D.U.C- STD.)	Expanded Uncertainty (dB)
1.	94.00	91.3	dB	-2.7	± 0.5
2.	114.00	111.4		-2.6	

RESULTS OF CALIBRATION

The Expanded Uncertainty stated above as the standard uncertainty of measurement multiplied by the coverage factor $k= 2$ such that the coverage probability corresponds to approximately 95%.

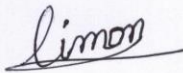
REFERENCE CALIBRATION INSTRUMENTS

SL No	Instrument Name	Make/ Model	Serial No.	Certificate No.	Cal. Date	Due Date
1	Sound Meter Calibrator	Amprobe/ SM-CAL1	21040021	CC563470000002128R	20.05.2021	20.05.2022



REMARKS:

1. D.U.C. defined above as Device Under Calibration.
2. Calibration Points has been calibrated as per customer requirement.
3. Reported Results are valid at the time of and under seated conditions of measurements.
4. The Certificate should not be reproduced except in full without prior permission from the Managing Director, PICO Calibration Lab.



Calibrated By:
Md. Limon Mia
Calibration Engineer




Checked & Approved By
Suvra Deb Paul
Technical Cum Quality Manager

*** End of Certificate ***



ANNEX-VI: DoE CLEARANCE of EIA RENEWAL (Applied for Next Renewal & under progress by DoE)




গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
পরিবেশ অধিদপ্তর
ব্রাহ্মণবাড়িয়া জেলা কার্যালয়
বাড়ি নং-১৩৬০/৮, নয়নপুর, সদর, ব্রাহ্মণবাড়িয়া।
www.doe.gov.bd

ইআইএ নবায়ন

ছাড়পত্র নং: ২০-৪৬৯০০

পরিবেশগত ব্যবস্থাপনা নিশ্চিতকরণ সাপেক্ষে সংযুক্ত শর্তে নিম্নবর্ণিত প্রতিষ্ঠান/প্রকল্পের অনুকূলে ইআইএ নবায়ন প্রদান করা হলো :

প্রতিষ্ঠান/প্রকল্পের নাম	: Ashuganj 400MW Combined Cycle Power Plant (East)
উদ্যোক্তার নাম	: Ashuganj Power Station Company Limited (APSCCL)
সনাক্তকরণ নং	: ১১১১৫২
প্রতিষ্ঠান/প্রকল্পের কার্যক্রম	: Power plant
প্রতিষ্ঠান/প্রকল্পের শ্রেণী	: Red
প্রতিষ্ঠান/প্রকল্পের ঠিকানা	: Ashuganj Power Station Company Limited (APSCCL) Sunarampur, Ashuganj Brahmanbaria-3402.
প্রদানের তারিখ	: ২৮ অক্টোবর, ২০২০
মেয়াদ উত্তীর্ণের তারিখ	: ০৭ অক্টোবর, ২০২১



ছাড়পত্রটি যাচাই করতে ভিজিট করুন: http://ecc.doe.gov.bd/certificate_verification

Page 1 of 2

এ স্বত্বপত্র সনদের সাথে গৃহকভাবে সংযুক্ত প্রদত্ত শর্তাবলী যথাযথভাবে প্রতিপালন করতে হবে, অন্যথায় স্বত্বপত্র বাতিল/ক্ষতিপূরণ আদায়সহ যে কোন অস্থানীয় ব্যবস্থা গ্রহণ করা হবে।

বিঃদ্রঃ এটি একটি সিস্টেম জেনারেশনে স্বত্বপত্র এবং এতে কোনোরূপ বান্ধবের প্রয়োজন নেই।

ইআইএ নবায়ন এর জন্য প্রযোজ্য শর্তাবলী:

- ১ . All the conditions mentioned in the original EIA issued by DOE, Head office, Dhaka, will remain same except those which were already fulfilled.
- ২ . Discharging to air and water must comply with schedule 2 and 10, rule of the Environment Conservation rules, 1997 also comply with the Noise Pollution (control) Rules, 2006.
- ৩ . The project authority shall take every possible measure to prevent air, water, soil and noise pollution.
- ৪ . The project authority shall not dump solid and liquid wastes either hazardous or non- hazardous in nature into the water body.
- ৫ . The environment management plan included in the EIA report shall strictly be implemented and kept functioning on a continuous basis.
- ৬ . All mitigation measures, as suggested in the EIA report, shall be implemented with utmost care and environment friendly practice.
- ৭ . Environmental monitoring reports shall be made available simultaneously to head quarters and Chittagong Regional office of the Dept. of Environment on a quarterly basis during the whole period of the project.
- ৮ . This renewal will remain valid for a period of 01 year and application along with renewal fees must be submitted DoE at least 30 days before the expiry.
- ৯ . Violation of any of the above mentioned conditions shall render this renewal void.

ANNEX VII: CARBON FOOTPRINT ANALYSIS


BAN: Power System Expansion and Efficiency Improvement Investment Program-Tranche 3					
Ashuganj 400 MW CCPP East Project					
<u>Methodology</u>					
SI	Description		SI	Description	
	Electricity Outputs	MW	7	New Plant Efficiency:	58.75%
1	Grid electricity:	150	8	Emission factor for gas:	56.1 kgCO ₂ /GJ
2	Existing power plant's output:	250	9	Grid emission factor for BAN:	0.0561 tCO ₂ /GJ
3	Project Output:	400	10	fuel consumption per year, GJ/year:	0.648 tCO ₂ /MWh
4	Time (hrs/yr):	8,760			3.6
5	New plant availability:	85%			
6	Old plant availability:	36%			
<u>Calculation</u>					
SI	Description				MWh/yr
1	Baseline generation from the old power plant (Existing Output*Time*New Plant Availability):				1,861,500
2	Baseline generation from Grid (Grid*Time*New Plant Availability):				1,116,900
3	Baseline generation from the old power plant:				
4	Fuel consumption-old power plant: (GJ/year)				18,792,485
5	Baseline emission—old power plant:				1,054,258 tCO ₂ /yr
6	Baseline emission—grid:				723,751 tCO ₂ /yr
7	Total baseline emission:				1,778,010 tCO₂/yr
SI	Description				
1	Project electricity generation:				2,978,400 MWh/yr
2	Project fuel consumption:				18,250,621 GJ/yr
3	Project Emission:				1,023,860 tCO₂/yr
	Emission Reduction from the Project (Tentative)				754,150 tCO₂/yr

ANNEX VIII: GRM REGISTER FORM

	ASHUGANJ POWER STATION COMPANY LIMITED	Document No. SF-OHS-23
	FORM	Revision No.: 00
		Effective Date: 14 Mar. 15
		Page 1 of 1

EXTERNAL COMPLAIN LOG

Date	Complained by (name, address, tel)	Received by	Complain in details	Day & time of incident	Root cause of the incident	Corrective Action	Decision taken By	Action taken on


01.01.2022
Md. Atiqur Rahman
 Manager (Health, Safety & Environment)
 Ashuganj Power Station Co. Ltd.
 Ashuganj, Brahmanbaria