Semi-Annual Environmental Monitoring Report

(July – December 2022)

ASHUGANJ 400 MW (EAST) COMBINED CYCLE POWER PLANT

At Ashuganj, Brahmanbaria

Ashuganj Power Station Company Limited (APSCL)

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ABBREVIATION

ADB: Asian Development Bank
AIDs: Acquired Immunodeficiency Syndrome
APSCL: Ashuganj Power Station Company Limited
BoD: Biological Oxygen Demand
CAP: Corrective Action Plan
CCB: Central Control Building
CCPP: Combined Cycle Power Plant
CNTIC: China National Technical Import & Export Corporation
CO: Carbon Mono Oxide
COD: Chemical Oxygen Demand
CW: Cooling Water
DO: Dissolved Oxygen
DoE: Department of Environment
EIA: Environmental Impact Assessment
EMP: Environmental Management Plan
EPC: Engineering Procurement & Construction
FC: Fecal Coliform
GIS: Gas Insulated Switchgear
GRC: Grievance Redress Committee
GRM: Grievance Redress Mechanism
GT: Gas Turbine
GW: Ground Water
HIV: Human Immunodeficiency Virus
HRSG: Heat Recovery Steam Generator
IEE: Initial Environmental Examination
MSDS: Material Safety Data Sheet
MW: Mega-Watt
NOx: Oxides of Nitrogen
PM: Particulate Matter
PPE: Personal Protective Equipment
RMS: Regulating and Metering Station
RP: Resettlement Plan
SEMP: Site Specific Environmental Management Plan
SOx: Oxides of Sulfur
ST: Steam Turbine
TC: Total Coliform
WHO: World Health Organization

EXECUTIVE SUMMARY

1. During the period from July to December 2022, the major tasks were commissioning and inspection of different equipment, for instance, inspection of warehouse, CEMS, hot commissioning of HRSG, stream turbine, insulation of LP & IP cylinders, inspection of safety valves. In addition to that, commissioning work of the HRSG in cold state, CW system, fire alarm system, air compressor system, DCS control (grid auxiliary transformer electrify), generator end shield opening for insulation treatment, grid auxiliary transformer, plant electricity system, GUST electrify and 400kV GIS system, hot commissioning activities (such as ST hot commissioning/Boiling tuning etc.) have been completed. Performance test was done successfully both in simple and combined cycle mode at different load. Finally the plant is now commercially operated from 26 November 2022.

2. 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.

3. 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.

4. 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.

5. 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.

6. 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

7. 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

8. 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.

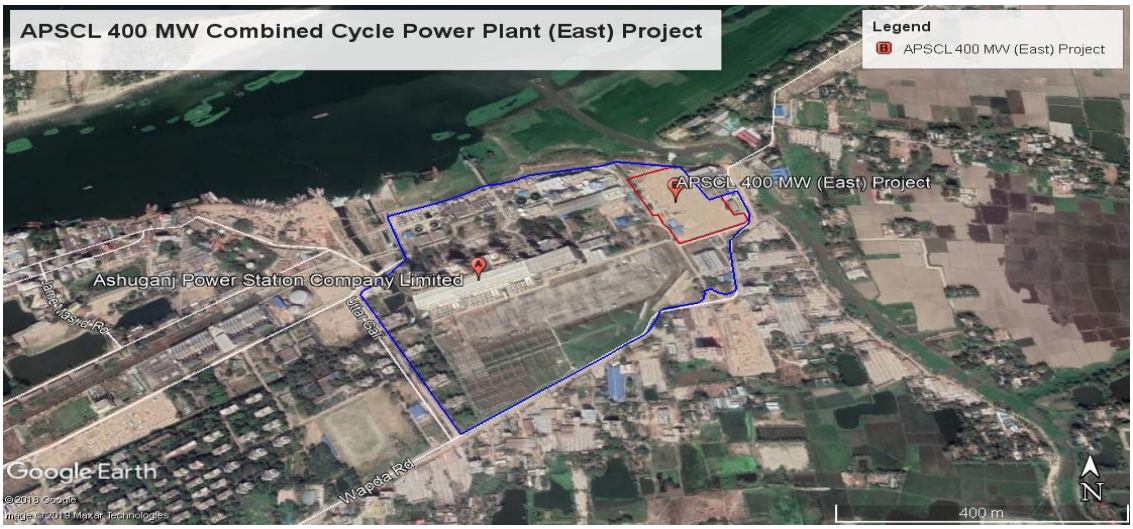

Figure 1: Location Map of APSCL 400 MW CCPP (East) project

1.2 Context of the monitoring report

9. The present environmental monitoring report period is July to December 2022 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

10. APSCL and CNTIC are working so hard to reach the target within the timeframe. 100% of work has been done where 4% 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.
11. 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.
12. On the contrary, the construction work of auxiliary system erection, GT generator installation, ST installation and electrical system are currently under progress. Commissioning work of the HRSG in cold state, CW system, fire alarm system, air compressor system, DCS control (grid auxiliary transformer electrify), generator end shield opening for insulation treatment, grid auxiliary transformer, plant electricity system, GUST electrify and 400kV GIS system have been completed. Whereas commissioning work of the gas booster regulating station & RMS, GT & ST equipment in cold state, H_2 module system are currently under progress.
13. 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 2022 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 2022	Progress from July-December 2022	Cumulative Progress July 2018- December 2022
1	Design	100%	-	100%
2	Procurement	100%	-	100%
3	Demolition work of old plant	100%	-	100%
4	Construction	99%	1%	100%
5	Commissioning	81%	19%	100%

Figure 2: Latest Picture of the Project Site

1.4 Progress status on implementation of environment management activity

14. Progress status on implementation of environmental management activity during construction phase of the project (analytical and visual) is shown in Table 2 and 3.

Table 2: 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, SOx, NOx, CO, CO2.	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, Fecal coliform, fecal streptococci, vibrio cholera	Once in 3 months	√			

SI No.	Issue	Key aspects	Monitoring Frequency	[1]Compliance status			Remarks
				C	PC	NC	
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, Fecal coliform, fecal streptococci, vibrio cholera	Monthly	√			

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

Table 3: 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	√			

SI No.	Issue	Key aspects	Monitoring Frequency	[1]Compliance status			Remarks/ Mitigation measures
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	√			Should be kept it clean regularly.

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

1.5 Environmental management implementation work schedule

15. Environmental management implementation work schedule for next six months working plan (January 2023 to June 2023) is shown in Table 4.

Table 4: Environmental management implementation work schedule for next six months working plan (January 2023 to June 2023)

SI No.	Works Description	Date					
1	Ambient Air Quality (2 Locations) & Noise Level (Day & Night)- 2 Locations	2nd January	11th February	2rd March	8th April	1st May	3rd June
2	Ambient Air Quality (2 Locations), Noise Level (Day & Night)-3 Locations	3rd January	12th February	4th March	9th April	2nd May	4th June
3	Ambient Air Quality (1 Locations), Sampling of River Water (3 Locations) and Drinking Water (4 Locations) and on-site test. Visual Monitoring.	4th January	13th February	5th March	10th April	3rd May	5th June

1.6 Corrective Action Plan (CAP)

16. 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 and Figure 3.

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

SI No.	Issue	Mitigation measures	Time
1	Noise from steam blowing	All nearby communities should be informed the time of steam blowing and provide ear plug to the direct exposed people. (15/07/2022)	Immediately
2	Insulated material were kept open	All insulating materials must be kept covered. (28/07/2022)	Immediately

Figure 3: Implementation of CAP

2.0 ENVIRONMENTAL RESPONSIBILITIES AND INSTITUTIONAL SETUP

17. 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
18. 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.
19. 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.
20. 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.

Table 6: Project Environmental Key Personnel, Contact Names and Telephone Numbers

Sl. No.	Project Key personnel	Name of Key personnel	Telephone No.
01	Manager (HS&E), 400 MW (East) CCPP, APSCL	Md. Atiqur Rahman	01717462670
02	Executive Engineer (Electrical.)	Md. Imrose Islam	01711100873
03	Executive Engineer (Civil.)	Mohammad Asadujjaman	01712238642
04	Assistant Manager (HS&E)	Md. Dilshad Ibne Baqui	01730026795
05	Environmental Specialist	Mohammad Arifur Rahman	01711128593

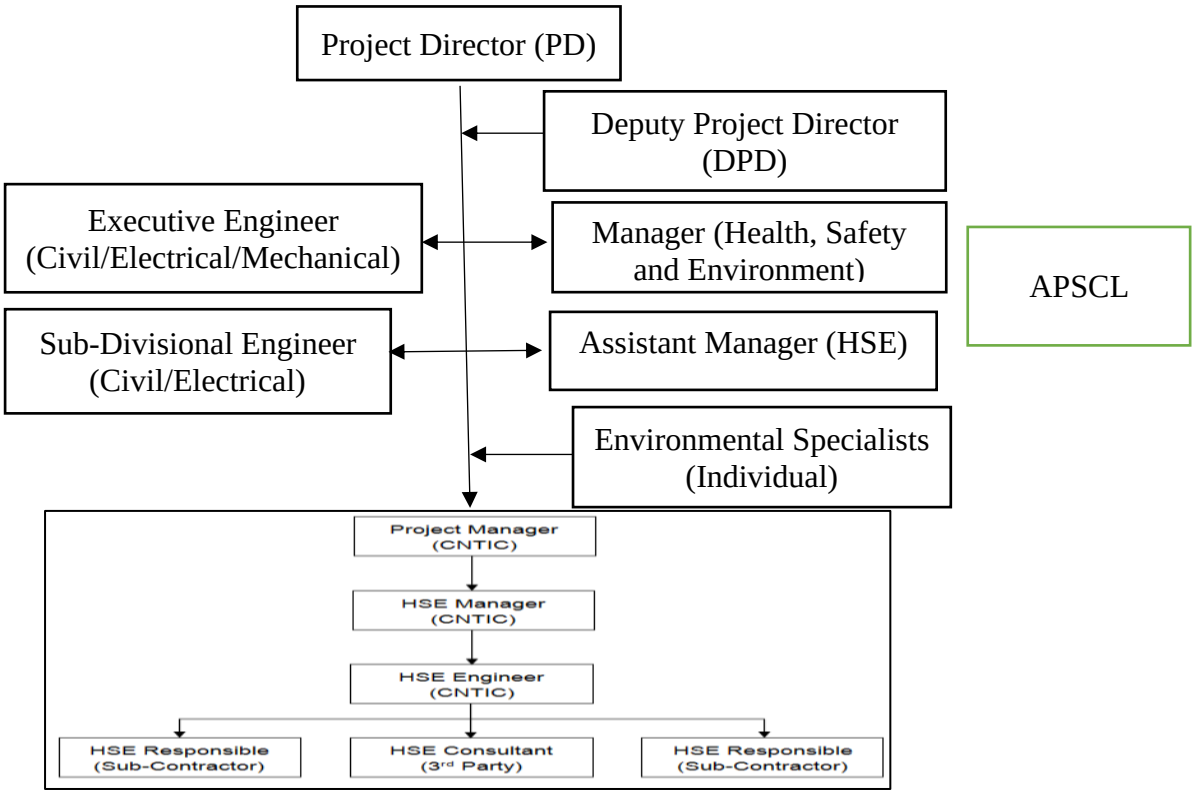

Figure 4: SEMP Organizational Structure

3.0 SAFEGUARD COMPLIANCE PERFORMANCE OF THE PROJECT

3.1 Compliance with the Environmental Provisions of National Legal Instruments

21. 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	➢ 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. Annex V.
Policies, Laws and Regulations	**Responsible Agency/Ministry/ Authority**	**Potential Applicability**	**Compliance Status**

The Environment Conservation Act, 1995	Ministry of Environment and Forest; Department of Environment	➢ 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. ECC was approved on 30th June 2022.
Environment Conservation Rules, 1997	Ministry of Environment and Forest; Department of Environment	➢ 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 ❖ Prepare Initial Environmental Examination report. ❖ Report on the Environmental Management Plan (EMP). ❖ Prepare Environmental Impact Assessment report. ❖ Obtain No objection certificate of the local authority.	**Complied with:** EIA report was prepared and approved by DoE. ECC was approved on 30th June 2022. EMP was prepared. Obtain No objection certificate 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	**Complied with.**

		climate change impacts on different sectors.	
Policies, Laws and Regulations	**Responsible Agency/Ministry/ Authority**	**Potential Applicability**	**Compliance Status**
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

22. 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**
Impacts are identified and assessed early in the project cycle	Complied
Plans to avoid, minimize, mitigate, or compensate for the potential adverse impacts are developed and implemented.	Complied
Affected people are informed and consulted during project preparation and implementation	Complied

3.3 Compliance of environmental covenants from the ADB loan agreement

23. 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 with (a) All applicable laws and regulations of the Borrower relating to the environment, health, and safety; (b) The environmental safeguards; (c)The EARF; and (d) All measures and requirement set forth in the respective EIA, IEE and EMP, and any corrective or preventive actions set forth in a safeguards monitoring report	LA, Schedule 5, Para 2	a) All applicable laws and regulations of the Borrower relating to the environment, health, and safety were followed strictly in the project. 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. c) The EARF is followed as per requirements. d) All measures and requirement 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.
Covenants	**Reference**	**Compliance status**
Land Acquisition and Involuntary Resettlement		
The borrower shall ensure, or cause APSCL to ensure, that all land and all rights-of-way required for the project, and all project facilities are made available to the works contractor in accordance with the schedule agrees under the related works contract and all land acquisition and resettlement activities are implemented in	LA, Schedule 5, Para 3	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.

compliance with (a)all applicable laws and regulations of the borrower relating to land acquisition and involuntary resettlement; (b)the involuntary resettlement safeguards; (c)the RF; and (d) All measures and requirement set forth in the respective RP, and any corrective or preventive actions set forth in a safeguards monitoring report.		
Safeguards – Related provisions in bidding documents and works contracts		
The borrower shall ensure, or cause each projects executing agency to ensure, that all bidding documents and contracts for works contain provisions that require the contractor to: (a) Comply with the measures and requirements relevant to the contractor set forth in the EIA, IEE, the EMP, the RP and any small ethnic community peoples plan(to the extent they concern impacts on affected people during construction), and any corrective or preventive actions set out in a safeguards monitoring report; (b) Make available a budget for all such environmental and social measures; (c) Provide the borrower with a written notice of any unanticipated environmental, resettlement or small ethnic community people risks or impacts that arise during construction, implementation or operation of the project that were not considered in the EIA,	LA, Schedule 5, Para 7	(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.

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 agricultural land to at least their pre-project condition upon the completion of construction.		
Safeguards- Monitoring and Reporting		
Covenants	**Reference**	**Compliance status**
The borrower shall do the following or shall cause APSCL to do the following: (a) Submit semiannual safeguards monitoring reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission; (b) If any unanticipated environmental and or social risks and impacts arise during construction, implementation or operation of the project that were not considered in the EIA, the IEE, the EMP or the RP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan; (c) No later than the mobilization of the turnkey contractor for APSCL,s power plant, engage qualified and experienced external experts or qualified no-governmental organizations	LA, Schedule 5, Para 7	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.

under a selection process and terms of reference acceptable to ADB, to verify information produced through the project monitoring process, and facilitated the carrying out of any verification by such external experts; and (d) Report any actual or potential breach of compliance with the measures and requirements set forth in the EMP or the RP promptly after becoming aware of the breach.		
Labor standards		
Covenants	**Reference**	**Compliance status**
The borrower shall ensure that all works contract documents to be prepared under the project incorporate provisions and budget to the effect that contractors (a) Comply with all applicable labor laws and related international treaty obligations of the borrower and do not employ child labor as defined under Bangladesh law; (b) Provide safe working conditions for male and female workers; (c) Carry out HIV/ AIDS and human trafficking prevention and awareness campaigns in the campsites and corridors of influence; (d) Engage women worker as wage laborers depending on their skill; and (e) Provide equal wages for equal work between men and women	LA, Schedule 5, Para 10	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.

24. In addition to that, most of the issues identified during the last mission review on 7-8 June 2022 have been resolved; however, action plan has been taken for correction of some unsolved issues as follows.

Table 10: Implementation status of CAP recommended by last ADB review mission

Sl. No.	Recommended Corrective Action Measures	Implementation Status
1.	Speed-up the process of Cumulative Impact Assessment (CIA) for the Ashugnaj Power Hub and share with ADB	Will be done in future when environmental study for new projects will be conducted.
2.	Ensure installation, commissioning and operation of 3 remaining Air Quality Monitoring System (AQMS) as per design	EPC is communicated already and kept in punch list. Will give an update in the next reporting.
3.	Ensure synchronization of Continuous Emission Monitoring System (CEMS) placed on the main and by-pass stake with Central Control Room (CCR) which should is to be verified by an authorized 3rd party vendor during APSCL's regular environmental quarterly monitoring	During the performance test, NOx sensor of in build CEMS was not working properly and therefore portable analyzer that was acceptable. CNTIC confirmed the the issue will be rectified by 30 March 2023.
4.	Develop a standard operational procedure (SOP) for pump operation at the two water intake points to reduce pressure on the Meghna river	The amount of discharged water would be nearly the same of withdrawal. Therefore, there will be no pressure on the river.
5.	Install Health and Safety markings, signboards, warnings etc. both in Bengali and English languages before handover of the plant from the contractor,	In progress
6.	Install Emergency Eye System for Chlorine disinfection section	Already installed
7.	Ensure regular monitoring of wastewater quality through installed online monitoring system before discharging to the outfall.	Done as per Design

4.0 ENVIRONMENTAL STATUS

25. 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 2022). 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.

26. Until date, 12 environmental safeguards monitoring visits have been conducted at different times during the current cycle (July to December 2022) 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.

Table 11: **List of monitoring visit**

	Mission/Task	**Date**	**Location of Site Visits**	**Conducted by**
1.	HSE Observation	03.07.2022	Whole project area	Mr.Parvez, Mr. Zhang, Mr. Li & Mr.He
2.	HSE Observation	23.07.2022	Whole project area	Mr.Parvez, Mr. Zhang, Mr. Li & Mr.He
3.	HSE Observation	02.08.2022	Whole project area	Mr.Parvez, Mr. Zhang, Mr. Li & Mr.He
4.	HSE Observation	21.08.2022	Whole project area	Mr.Parvez, Mr. Zhang, Mr. Li & Mr.He
5.	HSE Observation	04.09.2022	Whole project area	Mr.Parvez, Mr. Zhang, Mr. Li & Mr.He
6.	HSE Observation	18.09.2022	Whole project area	Mr.Parvez, Mr. Zhang, Mr. Li & Mr.He
7.	HSE Observation	05.10.2022	Whole project area	Mr.Parvez, Mr. Zhang, Mr. Li & Mr.He
8.	HSE Observation	20.10.2022	Whole project area	Mr.Parvez, Mr. Zhang, Mr. Li & Mr.He
9.	HSE Observation	02.11.2022	Whole project area	Mr.Parvez, Mr. Zhang, Mr. Li & Mr.He
10.	HSE Observation	19.11.2022	Whole project area	Mr.Parvez, Mr. Zhang, Mr. Li & Mr.He
11.	HSE Observation	03.12.2022	Whole project area	Mr.Parvez, Mr. Zhang, Mr. Li & Mr.He

	Mission/Task	Date	Location of Site Visits	Conducted by
12.	HSE Observation	15.12.2022	Whole project area	Mr.Parvez, Mr. Zhang, Mr. Li & Mr.He

4.1 Analytical Monitoring and Observations

Laboratory Test results are attached in Annex IV.

4.1.1 Air Quality Monitoring

27. 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 12.

	
Air Quality Monitoring Location in front of Admin Building, APSCL (L1)	**Air Quality Monitoring Location at PDB School Area (L2)**

Air Quality Monitoring Location at TSK Shed (L3)

Air Quality Monitoring Location at near APSCL dormitory (L4)

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

Figure 5: Air quality monitoring

Table 12: Test Result of Ambient Air Quality

JULY 2022								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	Baseline for L1 (July 2014) **	L1	L2	L3	L4	L5
PM 2.5	65 µg/m^3	75 µg/m3	34	52.48	46.12	50.26	42.14	45.34
PM 10	150 µg/m^3	150 µg/m3	62	71.22	74.35	65.91	74.68	62.25
SPM	200 µg/m^3	NF	179	128.56	122.74	118.63	124.88	102.38
SO_2	365 µg/m^3	125 µg/m^3	19	15.47	12.86	9.54	9.27	11.43
NOx	NF	200 µg/m^3	24	20.49	17.32	13.42	14.73	15.90
CO	35 ppm	NF	1.4	2	1	2	1	2
AUGUST 2022								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	Baseline for L1 (Aug 2014) **	L1	L2	L3	L4	L5
PM 2.5	65 µg/m^3	75 µg/m3	49	51.63	48.23	49.88	43.56	43.17
PM 10	150 µg/m^3	150 µg/m3	134	69.87	70.16	67.07	73.90	64.24
SPM	200 µg/m^3	NF	290	130.72	125.18	115.81	119.56	105.40
SO_2	365 µg/m^3	125 µg/m^3	27	16.17	11.23	8.81	10.18	12.36
NOx	NF	200 µg/m^3	39	18.57	16.66	15.25	11.01	14.00
CO	35 ppm	NF	3.6	2.5	1	1	2	2

SEPTEMBER 2022								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	Baseline for L1 (Sep 2014) **	L1	L2	L3	L4	L5
PM 2.5	65 µg/m^3	75 µg/m3	52	53	60.2	50.5	51.1	58.9
PM 10	150 µg/m^3	150 µg/m3	126	103.9	99.6	97.8	89.2	93.7
SPM	200 µg/m^3	NF	247	160.9	164.8	158.3	148.3	157.7
SO_2	365 µg/m^3	125 µg/m^3	25	13.42	11.14	12.25	12.08	9.53
NOx	NF	200 µg/m^3	31	32.26	25.18	27.31	18.42	12.90
CO	35 ppm	NF	3.2	2	1	2	0	2
OCTOBER 2022								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	Baseline for L1 (Oct 2014)**	L1	L2	L3	L4	L5
PM 2.5	65 µg/m^3	75 µg/m3	44	60.46	65.2	57.1	66.7	63.4
PM 10	150 µg/m^3	150 µg/m3	119	113.3	105.8	101.4	111.5	108.2
SPM	200 µg/m^3	NF	266	172.9	169.3	165.8	168.4	159.1
SO_2	365 µg/m^3	125 µg/m^3	27	12.37	14.19	12.88	18.05	13.56
NOx	NF	200 µg/m^3	36	30.54	32.40	28.44	27.48	22.96
CO	35 ppm	NF	2.9	1	2	1	2	1
NOVEMBER 2022								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	Baseline for L1 (Nov 2014) **	L1	L2	L3	L4	L5
PM 2.5	65 µg/m^3	75 µg/m3	61	64.41	61.78	68.28	65.42	69.12
PM 10	150 µg/m^3	150 µg/m3	139	123.8	111.5	122.4	115.6	128.4
SPM	200 µg/m^3	NF	310	162.7	169.5	166.3	160.6	169.8
SO_2	365 µg/m^3	125 µg/m^3	31	17.42	14.98	21.18	18.54	23.80
NOx	NF	200 µg/m^3	39	32.67	35.72	37.25	31.62	38.52
CO	35 ppm	NF	3.1	2	1	2	1	2
DECEMBER 2022								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	Baseline for L1 (Dec 2014)**	L1	L2	L3	L4	L5
PM 2.5	65 µg/m^3	75 µg/m3	63	64.88	63.22	64.12	65.00	64.92
PM 10	150 µg/m^3	150 µg/m3	141	132.5	119.2	124.8	126.3	135.8
SPM	200 µg/m^3	NF	307	170.4	176.2	168.9	168.4	174.2
SO_2	365 µg/m^3	125 µg/m^3	29	18.11	15.76	20.34	20.66	25.37
NOx	NF	200 µg/m^3	36	30.20	37.91	38.11	30.29	40.10
CO	9 ppm	NF	2.9	1	1	1	2	2

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

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28. **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 except for the L3, L4 & L5 in November 2022 where the concentration exceeded the limit. All of these locations are located nearby the road except the L3 which is close to the sand filled area of APSCL near river. Rapid vehicle movement and/or sudden wind blow can influence the concentration of PM 2.5 to go beyond the limit.

29. **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.

30. **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 SO_2 ranges from 8.81 to 18.54 μg/m3 which are within the standard for air quality.

31. **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 (NO_2). 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 11.01 to 38.52 μg/m3 which is within the standard.

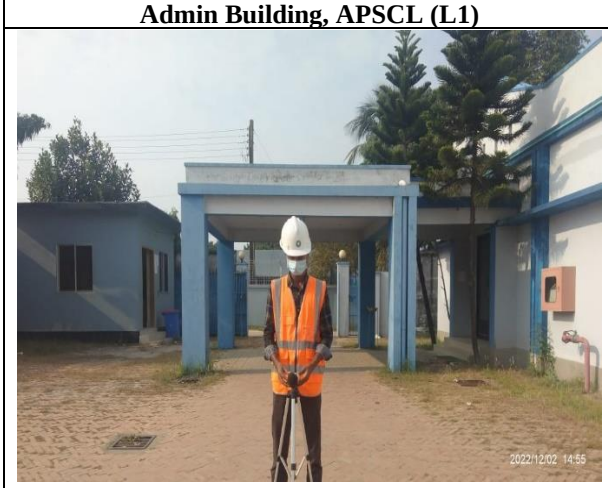
32. **CO:** High levels of carbon monoxide are poisonous to humans and, unfortunately, it cannot be detected by humans as it has no taste or smell and cannot be seen. The main sources of additional carbon monoxide are motor vehicle exhaust and some industrial activities, such as making steel. Cigarette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

33. 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

34. 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.

35. The measured noise level in the construction site is summarized in Table 13. Noise level monitoring (Day time) are shown in Figure 6 and Figure 7.

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Noise Quality Monitoring Location in front of Admin Building, APSCL (L1)</td><td>Noise Quality Monitoring Location at PDB School Area (L2)</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Noise Quality Monitoring Location at TSK Dorm Site (L3)</td><td>Noise Quality Monitoring Location at near APSCL dormitory (L4)</td></tr>
</table>

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

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

Noise Quality Monitoring Location in front of Admin Building, APSCL (L1)

Noise Quality Monitoring Location at PDB School Area (L2)

Noise Quality Monitoring Location at TSK dorm Site (L3)

Noise Quality Monitoring Location at near APSCL dormitory (L4)

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

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

36. 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 13: Test Result of Noise Quality

JULY 2022								
(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	50.2	45.4	43.1	46.8	42.4	69.08
Day(Max)	75	70	68.3	69.7	66.5	68.2	64.3	76.4
Night (Min)	70	70	43.4	44.2	42	40.7	42.8	66.6
Night(Max)	70	70	59.7	56.4	52.5	50.1	51.7	69.93
AUGUST 2022								
(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	53.4	43.3	40.2	48.2	41.1	69.08
Day(Max)	75	70	67.	66.8	63.6	71.1	61.5	76.4
Night (Min)	70	70	40.7	42.1	39.1	41.1	44.8	66.6
Night(Max)	70	70	61.2	57.1	50.9	53.2	50.1	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	51.2	51.2	50.2	51.1	50.3	69.08
Day(Max)	75	70	64.3	68.3	61.9	59.6	57.2	76.4
Night (Min)	70	70	41.8	41.2	42.5	40.9	41.1	66.6
Night(Max)	70	70	52.6	53.3	50.8	52.9	49.8	69.93

OCTOBER 2022								
(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	49.8	46.4	51.8	53.6	49.3	69.08
Day(Max)	75	70	62.8	60.6	63.4	62.3	56.1	76.4
Night (Min)	70	70	40.2	42.7	40.5	39.9	42.5	66.6
Night(Max)	70	70	51.3	52.1	52.7	55.2	51.2	69.93
NOVEMBER 2022								
(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	51.2	48.4	49.3	52.2	46.5	69.08
Day(Max)	75	70	66.2	62.3	65.8	66.9	60.7	76.4
Night (Min)	70	70	42.8	40.1	42.2	38.6	37.2	66.6
Night(Max)	70	70	52.5	50.7	53.9	52.3	49.6	69.93
DECEMBER 2022								
(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	52.6	55.5	52.6	52.7	52.1	69.08
Day(Max)	75	70	68.3	62	57.1	65.6	64.5	76.4
Night (Min)	70	70	36.2	36.1	36.8	35.3	35.5	66.6
Night(Max)	70	70	60.6	59.5	59.1	56.8	51.3	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.

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4.1.3 Water Quality Analysis

37. Health, Safety & Environment Division of APSCL has provided pure drinking water at several locations in APSCL plant area that also covers the 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 APSCL. 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

38. The Drinking Water samples collected from different points as prescribed have been analyzed and shown in Table 14. Drinking water sampling is shown in Figure 8.

APSCL Canteen (D1)

South-west side of Project area near admin building purifier (D2)

North-East side of Project area at PDB School (D3)

North-East side of project area at dormitory area (Inside B Type Area) (D4)

Figure 8: Drinking Water Sampling

Table 14: Drinking Water Quality Test Result

JULY 2022							
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	7.36	7.15	7.28	7.04
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	0.16	0.21	0.28	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
Fecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0

AUGUST 2022							
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	7.22	7.10	7.16	7.23
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	0.14	0.15	0.25
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
Fecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0
SEPTEMBER 2022							
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	7.42	7.16	7.28	7.36
Ammonia	0.5 mg/l	-	---	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	1.2	1	1.3	1
Phosphate	6 mg/l	-	---	0.16	0.12	0.18	0.12
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	0.36	0.21	0.18	0.28
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
Fecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0
OCTOBER 2022							
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	7.64	7.36	7.22	7.44
Ammonia	0.5 mg/l	-	---	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	1.1	1.3	1.2	1
Phosphate	6 mg/l	-	---	0.21	0.17	0.18	0.15
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	0.25	0.17	0.33
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
Fecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0

NOVEMBER 2022							
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	7.62	7.36	7.88	7.48
Ammonia	0.5 mg/l	-	---	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	1.5	1.2	1.6	1.3
Phosphate	6 mg/l	-	---	0.24	0.15	0.38	0.26
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	0.38	0.35	0.46	0.32
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
Fecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0
DECEMBER 2022							
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	8.01	7.77	7.53	7.71
Ammonia	0.5 mg/l	-	---	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	1.8	1.7	1.3	1.5
Phosphate	6 mg/l	-	---	0.41	0.30	0.21	0.27
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	0.48	0.42	0.39	0.37
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
Fecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0

*ECR'1997

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39. **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 7.04 to 8.01
40. **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.

41. **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 0.12 and 0.48 mg/l.

42. **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.

43. **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.

44. **Fecal 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. Fecal 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.

45. From the analysis, it was found that all parameters of drinking water are 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

46. The river water samples collected from different points as prescribed have been analyzed and shown in Table 15. River water sampling is shown in Figure 9.

River water sampling from upstream side

River water sampling from downstream side

River water sampling from outfall (Outfall)

Figure 9: River Water Sampling

Table 15: River Water Quality Test Result

JULY 2022					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38ºC	-	23.2	23.6	24.1
Dissolved Oxygen (DO)	7.3 mg/l	-	6.2	6.0	6.1
BOD5	7 mg/l	-	0.3	0.5	3.1
COD	32 mg/l	-	0.6	0.9	2.3
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 2022					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38ºC	-	25.6	26.1	23.8
Dissolved Oxygen (DO)	7.3 mg/l	-	6.9	5.8	6.4

BOD5	7 mg/l	-	0.4	0.4	3.9
COD	32 mg/l	-	0.5	0.7	2.8
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
SEPTEMBER 2022					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38ºC	-	28.3	25.7	22.5
Dissolved Oxygen (DO)	7.3 mg/l	-	6.8	6	6.4
BOD5	7 mg/l	-	0.6	0.5	4.0
COD	32 mg/l	-	0.7	0.9	3.1
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 2022					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38ºC	-	32.8	22.6	26.9
Dissolved Oxygen (DO)	7.3 mg/l	-	6.5	6.2	6.4
BOD5	7 mg/l	-	0.8	0.5	3.6
COD	32 mg/l	-	0.9	1.2	3.6
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 2022					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38ºC	-	30.2	19.3	24.9
Dissolved Oxygen (DO)	7.3 mg/l	-	6.7	6.5	6.5
BOD5	7 mg/l	-	0.7	0.5	3.2
COD	32 mg/l	-	1.0	1.4	2.8
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 2022					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38ºC	-	23.1	18.4	20.2
Dissolved Oxygen (DO)	7.3 mg/l	-	7.1	7.0	6.7

BOD5	7 mg/l	-	0.8	0.45	3.8
COD	32 mg/l	-	1.6	1.5	3.1
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

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

47. **Temperature:** Test result of each of months showing that, plant is discharging cold water compared to the water it is withdrawing from intake at the river
48. **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.
49. **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.
50. **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 0.5 to 3.6 mg/l.
51. 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

52. The Ground water samples collected from different points as prescribed have been analyzed and shown in Table 16. Ground water sampling is shown in Figure 10.

North-West side of the project area at canteen (GW1)

North-west side of Project area at B-Type colony (GW2)

South-East side of Project area at CNTIC Office Area (GW3)

North-East side of Project area at mosque (GW4)

Figure 10: Ground water sampling

Table 16: Ground Water Quality

JULY 2022						
PARAMETER	Baseline Data from EIA (G1) 30.4.2015	DoE/IFCStandard	G1	G2	G3	G4
pH	6.9	-	6.92	7.28	6.95	7.23
TDS	-	-	236	224	248	254
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	-	0.07	0.05	0.05	0.05
As	0.003 mg/l	-	<0.003	<0.003	<0.003	<0.003
Fe	0.4 mg/l	-	0.28	0.37	0.22	0.27
Mn	-	-	<0.1	<0.1	<0.1	<0.1
Total coliform	0/100 ml	-	0	0	0	0
Fecal Coliform	0/100 ml	-	0	0	0	0
OCTOBER 2022						
PARAMETER	Baseline Data from EIA (G1) 30.4.2015	DoE/IFCStandard	G1	G2	G3	G4
pH	6.9	-	7.14	7.22	7.06	7.38
TDS	-	-	210	242	232	254
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	-	0.07	0.05	0.08	0.06
As	0.003 mg/l	-	<0.003	<0.003	<0.003	<0.003
Fe	0.4 mg/l	-	0.35	0.31	0.28	0.39
Mn	-	-	<0.1	<0.1	<0.1	<0.1
Total coliform	0/100 ml	-	0	0	0	0
Fecal Coliform	0/100 ml	-	0	0	0	0

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

53. **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 7.38.

54. **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.

55. **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 0.22 and 0.39 mg/l.
56. **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.
57. **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.
58. **Fecal 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. Fecal 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

59. The Project is at the last stage of construction phase and therefore, volume of traffic decreased significantly in this reporting time. The daily traffic details on day to day basis are being monitored (Table 17) 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 17: Total number of vehicles based on their categories

Name of vehicle	Number of Vehicles
Truck	17
Tailor (load>20T)	5
Microbus	23
Cars	28
Total	**73**

4.2.2 Site Security

60. CNTIC-CCOEC Consortium already constructed of site boundary fencing (Figure 10) 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

61. 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 18.

Table 18: 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

62. 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. Summary of incident/accident reported at project site is shown in Table 19.

Table 19: Summary of incident/accident reported at project site (From July to December 2022)

Sl. No.	Date & Time	Nature of Incident/ Accident	Description of incident	Corrective Action
July				
1.	10.10.2022	Back Side Pain	• The employee has suffered pain at his back due to sitting on working long time in a same place. • He does not take any sitting tool and working sits on his feet.	• HSE officer advises him not to work sitting a long time in a place and also says him to walk a few minutes after a certain time. • HSE officer also advices him to use a sitting tool always during working time.

4.2.5 Solid Waste

63. Solid wastes were generated from construction works (construction waste) and workers activities (kitchen waste, paper waste) at the project site during this construction and operational phases. The main solid waste is construction waste i.e. plastic pipe, brick, rubbish, scrab, cable and broken bricks. Waste inventory was properly maintained and Table 20 describes the amount of waste generated according to their character during the reporting time. Generated solid and domestic wastes are disposed at the designated storage site (Figure 13) of APSCL in front of Unit-5 power plant. From time to time the scraps and other materials are sold through tendering process.

Table 20: Waste Inventory Log of CNTIC-CCOEC Consortium (From July to December 2022)

SI	Wastage Name	Wastage Classification	Wastage Type	Source of wastage	Wastage storage area	Storage quantity (kg)	Delivery quantity (kg)	Agreement	Remarks
1	Cable	Hazardous	Solid	Construction Site	On site	0	0	Ok	Ok
2	Scrub	Non-Hazardous	Solid	Construction Site	On site	180.5	180.5	Ok	Ok
3	Brick	Non-Hazardous	Solid	Construction Site	On site	0	0	Ok	Ok
4	Rubbish	Hazardous	Solid	Construction Site	On site	19.4	19.4	Ok	Ok
5	Plastic Pipe	Non-Hazardous	Solid	Construction Site	On site	2.1	2.1	Ok	Ok
6	Aggregate	Non-Hazardous	Solid	Construction Site	On site	13.3	13.3	Ok	Ok

4.2.5.1 Solid Waste Management Plan

64. ***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 during the construction and operational phases.
65. ***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 using designated waste bins.
66. **Construction waste**: Electrical wiring, rebar, wood, plaster, and scrap metal, cement, and bricks.
67. **Organic waste**: Kitchen waste, vegetables, flowers, leaves, fruits.
68. **Toxic waste:** Old medicines, paints, chemicals, bulbs, spray cans, fertilizer and pesticide containers, batteries, shoe polish.
69. **Recyclable waste:** Paper, glass, metals, plastics.
70. ***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.
71. ***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.

Figure 13: Solid Waste (Left: Others & Right: Organic) Storage

4.2.6 Worker's Health and COVID Response

72. 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 check 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). 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 warning sign

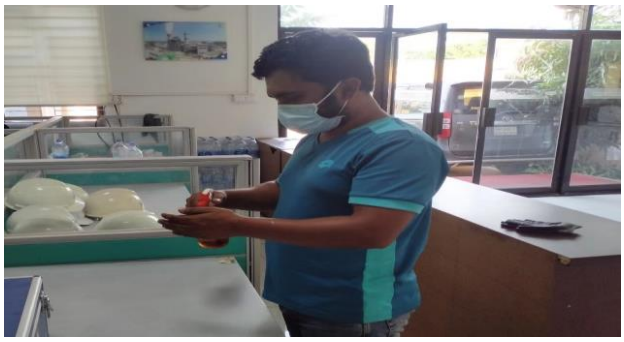


Figure 16: On-site Wash, Sanitation and Hygiene facilities.

4.2.7 Grievance Redress Mechanism

73. 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 Consortiumhas 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 compline was raised to resolve. APSCL as a project proponent also set a grievance redress committee (GRC) has been formed with following personals (Table 21) to rectify issue from different stakeholders if raised. GRM register form is attached in Annex VII.

74. 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/-.

75. 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 21: Members of the Committee of Grievance Redress (GRC)

Sl 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

76. Training is essential to maintain the employee health and safety. Both theoretical and practical training 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 arranges 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.

Figure 18: Toolbox meeting & training of workers

77. To improve the environmental, health & safety performance, monthly safety meeting was conducted each month. Last safety meeting was conducted on 08/11/2022. About 12 issues were discussed of HSE to resolve within a set deadline. Responsibilities were also delegated to different persons from both CNTIC for proper implementation of work. Training and capacity building activities shown in Table 22.

Table 22: **Training and capacity building activities**

Date	Name of the Training	Trainer Name & Designation	No. of Participants	Discussed Topics
20.07.2022	Workers Health & safety	Md. Parvez Hossain (HSE Supervisor)	8	➢ Types of PPE ➢ Legislation relating to PPE ➢ Importance of wearing PPE ➢ Hand safety (pinch, point) ➢ Specific job related safeties ➢ Previous accident and incident reports to prevent recurrence
20.08.2022	Workers Health & safety	Md. Parvez Hossain (HSE Supervisor)	14	➢ Types of PPE ➢ Legislation relating to PPE ➢ Importance of wearing PPE ➢ Hand safety (pinch, point) ➢ Specific job related safeties ➢ Previous accident and incident reports to prevent recurrence
21.09.2022	Workers Health & safety	Md. Parvez Hossain (HSE Supervisor)	12	➢ Types of PPE ➢ Legislation relating to PPE ➢ Importance of wearing PPE ➢ Hand safety (pinch, point) ➢ Specific job related safeties ➢ Previous accident and incident reports to prevent recurrence
17.10.2022	Workers Health & safety	Md. Parvez Hossain (HSE Supervisor)	10	➢ Types of PPE ➢ Legislation relating to PPE ➢ Importance of wearing PPE ➢ Hand safety (pinch, point) ➢ Specific job related safeties ➢ Previous accident and incident reports to prevent recurrence
18.11.2022	Workers Health & safety	Md. Parvez Hossain (HSE Supervisor)	6	➢ Types of PPE ➢ Legislation relating to PPE ➢ Importance of wearing PPE ➢ Hand safety (pinch, point) ➢ Specific job related safeties ➢ Previous accident and incident reports to prevent recurrence

Date	Name of the Training	Trainer Name & Designation	No. of Participants	Discussed Topics
20.12.2022	Workers Health & safety	Md. Parvez Hossain (HSE Supervisor)	8	➢ Types of PPE ➢ Legislation relating to PPE ➢ Importance of wearing PPE ➢ Hand safety (pinch, point) ➢ Specific job related safeties Previous accident and incident reports to prevent recurrence

4.2.9 Sanitation & Drinking Water Facility

78. 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

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

Figure 20: Photograph of Site Drainage

4.2.11 Dust Control and plantation

80. Dust poses negative impact of air quality as well as health especially in dry season. To control the dust the project area was swept regularly and sprayed water if necessary (Figure 21) and stock materials were kept covered.

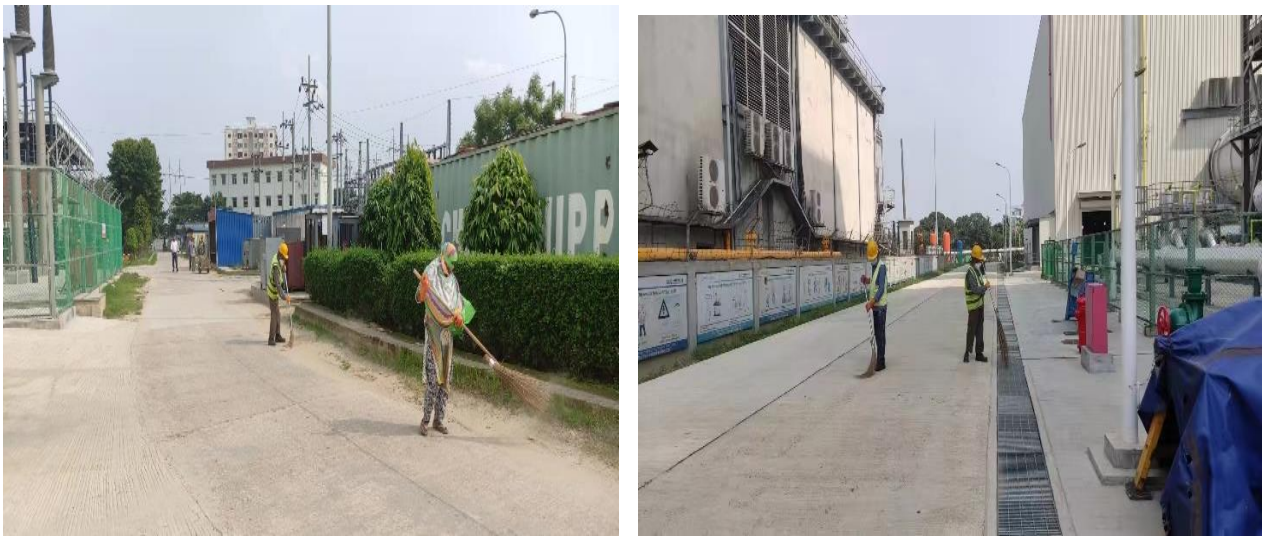


Figure 21: Dust control practices

81. However the bared soil is covered with carpet grass and different species of plants are implanted (Figure 22) at different locations of the project site.

Table 23: Details of tree planation program done in project site

Tree plantation plan (TPP) prepared (Yes/No)	No. of trees planned to cut	Trees planned to replant as per TPP	Trees removed (if any)	Types of species planted	Trees planted (as of December 22)	Plantation completion status	Survival status	Remarks
Yes	0	0	0	Mango	55 Nos	100%	100%	Regular nursing of the plants is going on under HS&E division.
				Jackfruit	15 Nos			
				Neem	15 Nos			
				Kamini Flower	150 Nos			
				Krishnachura Flower	25 Nos			
				Palash Flower	3 Nos			
				Cherry	18 Nos			
				Panthopadop	2 Nos			
				Orchid	120 Nos			
				Baganbilash	35 Nos			
				Malotilota	8 Nos			
				PaulowniaTomentosa	4 Nos			
				Candle Boxwood for edging	9000 Nos			
				Carpet Grass	On 5000 Sq. ft Land Area.			

Figure 22: Tree Plantation

4.2.12 Oily Waste Generation & Disposal System

82. 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 HEALTH SAFETY AND ENVIRONMENTAL PERFORMANCE

83. APSCL is always aware to implement EMP for the gradual improvement of its Health Safety and environmental performance complying with the local and other compliance obligations. For illustrating the HSE performance concentration of $PM_{2.5}$, Maximum Noise intensity (Day time) and percentage of first cases with respect to the total man-hour worked are considered. Note that the concentration of dust varies with the season therefore only the same time period is considered to evaluate this.

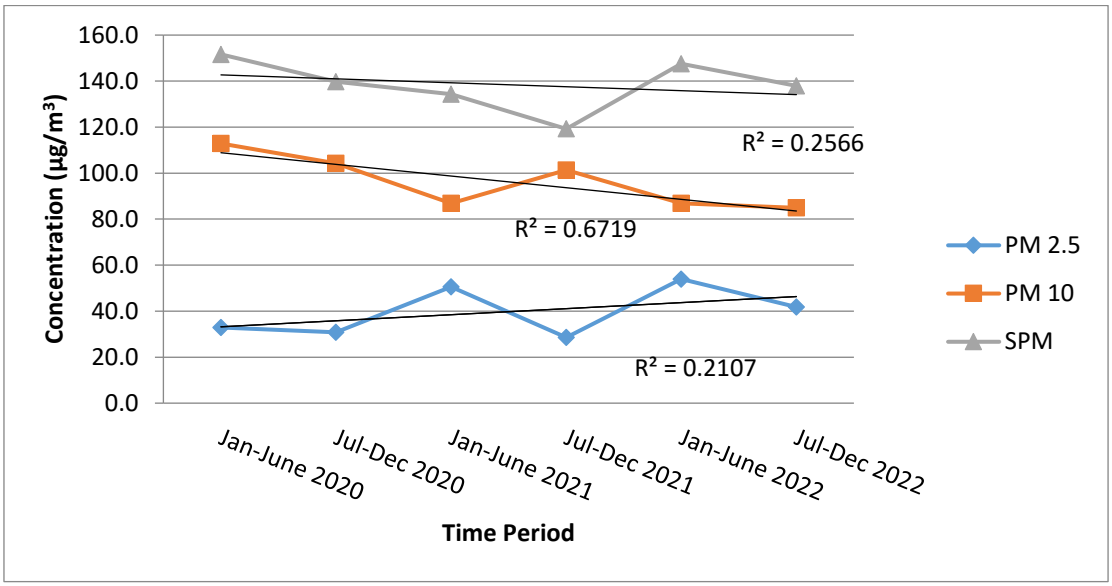


Figure 23: Trend of Particulate Matter (PM) Concentration

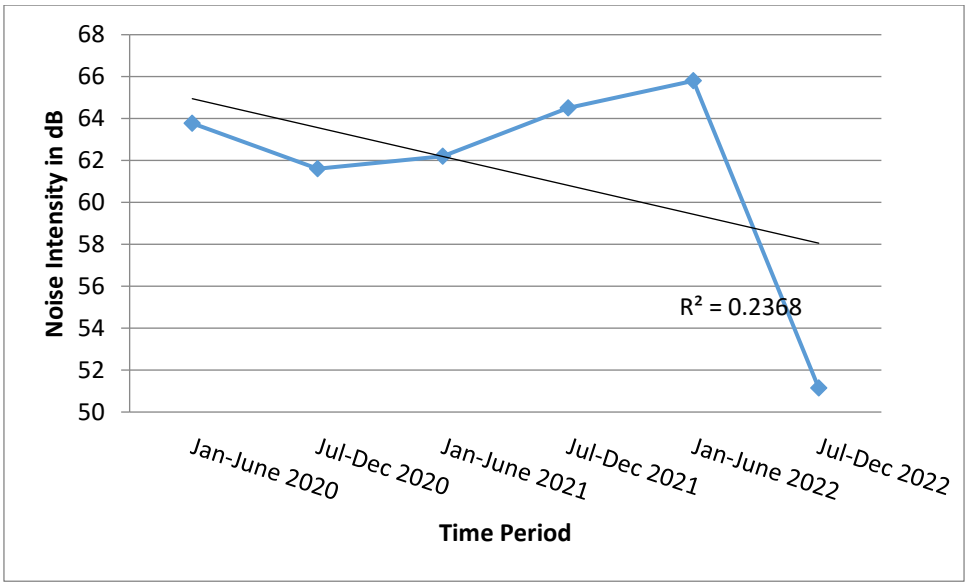


Figure 24: Trend in Noise intensity

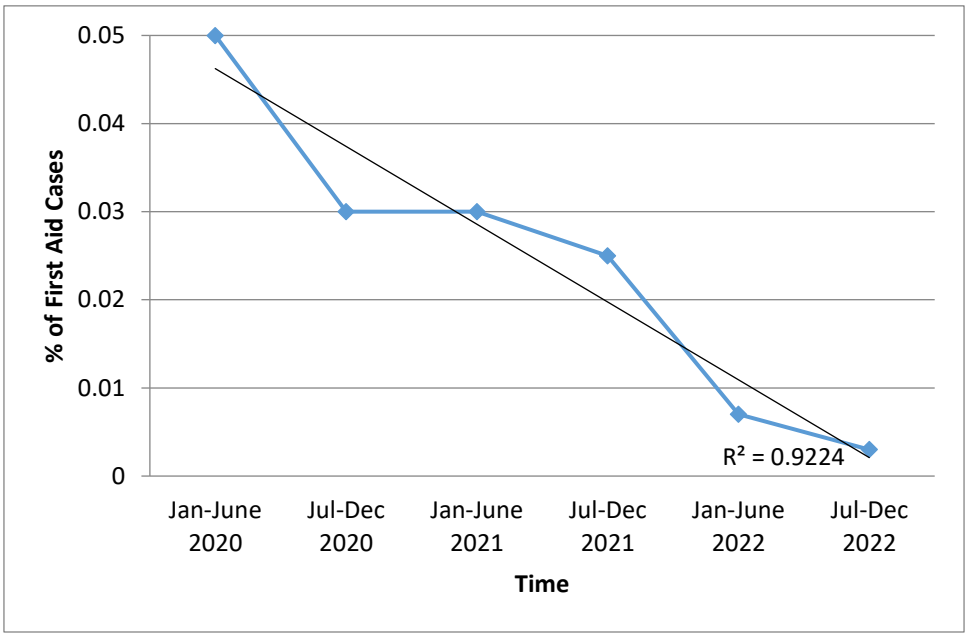


Figure 25: Trend in % of First Aid Cases

84. Linear regression was done to determine the relation among the variables. The figures show that there is a decreasing trend in PM10, SPM concentration (not significant), noise intensity that was more intense in the reporting time and whereas, significant decreasing trend exist in percentage of first aid cases. On the other hand, heterogeneity in the concentration of PM2.5 was found in each semiannual time period. Note that the location considered for this comparison is in the plant premise and the road is always busy with slow and fast moving vehicle all the time. However, construction of new admin building and access road is going on. May be the concentration of PM 2.5 is influenced by these activities and the weather condition. Noise intensity may be intensified by the running auxiliaries associated with the plant for commissioning.

5.0 CONCLUSION AND RECOMMENDATION

85. The environmental monitoring report is consist of 14th Semiannually environmental monitoring reporting based on monthly measured ambient air, noise, drinking water, ground and river water quality parameters. 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.

86. 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. SPM, $PM_{2.5}$, PM_{10} level during the construction period of the power plant is controlled by taking proper mitigation measures and spraying of water.

87. 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.

88. 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.

89. 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.

90. HS&E Division of APSCL has already completed plantation works during this period at all applicable sites of this project and nursing works of these is continuing.

91. 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: PROGRESS STATUS

Central Control Building (CCB)

Turbine Hall

Water Treatment plant

Plant road

HRSG

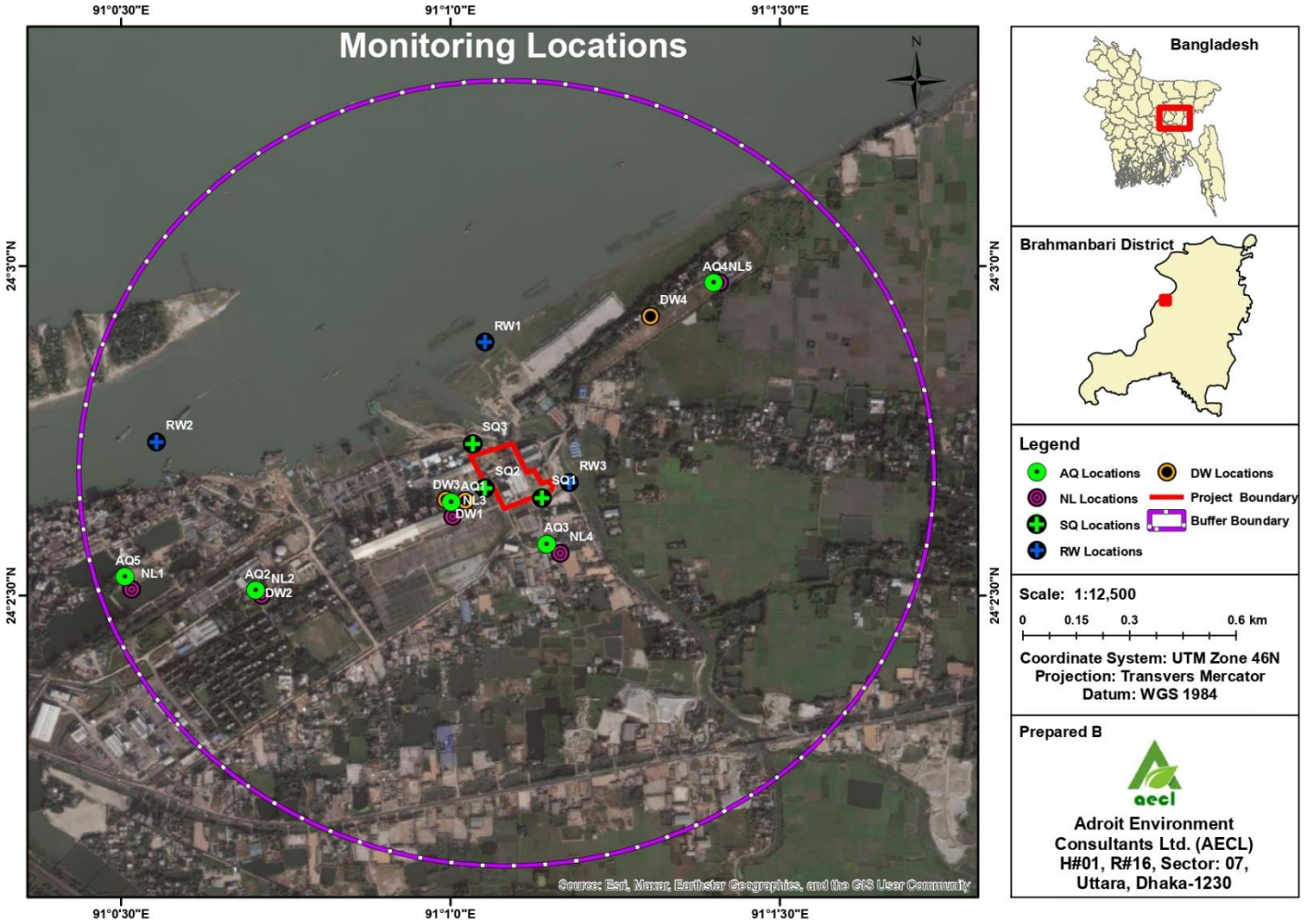
Power control center

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 2022)

Adroit Environment Consultants Ltd.
A House of Complete Environmental Management Solutions

AECL LABORATORY ANALYSIS REPORT
AMBIENT AIR QUALITY TEST REPORT

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 : **2nd to 4th July, 2022**
Reporting date : 26th July, 2022

Description of analysis

SN	Parameters	Method	Test Duration (hours)	Unit	24°2'38.5" N 91°1'0.0" E (L1)	24°2'30.5" N 91°0'42.2" E (L2)	24°2'34.7" N 91°1'8.7" E (L3)	24°2'58.5" N 91°1'23.9" E (L4)	24°2'31.7" N 91°00'30.3" E (L5)	Bangladesh (DoE) Standard	IFC /World Bank Standard
1	$PM_{2.5}$	Gravimetric	24	µg/m3	*52.48*	*46.12*	*50.26*	*42.14*	*45.34*	65	75
2	PM_{10}	Gravimetric	24	µg/m3	*71.22*	*74.35*	*65.91*	*74.68*	*62.25*	150	150
3	SPM	Gravimetric	8	µg/m3	*128.56*	*122.74*	*118.63*	*124.88*	*102.38*	200	NF
4	SO_2	West-Geake	24	µg/m3	*15.47*	*12.86*	*9.54*	*9.27*	*11.43*	365	125
5	NO_x	Jacob and Hochheiser	1	µg/m3	*20.49*	*17.32*	*13.42*	*14.73*	*15.90*	NF	200
6	CO	CO/O_3 Meter	1	ppm	*2*	*1*	*2*	*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-460BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).*

1. Fine Particulate Matter ($PM_{2.5}$).
2. Respirable Dust Content (PM_{10}).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_X).
5. Oxides of Sulfur (SO_2).
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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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

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 : **2nd to 4th July, 2022**
Reporting date : **26th July, 2022**

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	50.2	68.3	43.4	59.7
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	45.4	69.7	44.2	56.4
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	43.1	66.5	42	52.5
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	46.8	68.2	40.7	50.1
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	42.4	64.3	42.8	51.7
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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
SURFACE WATER QUALITY TEST REPORT

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 : 4th July, 2022
Reporting date : 26th July, 2022

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	23.2	23.6	24.1	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	6.2	6.0	6.1	mg/l	DO meter
BOD_5	0.3	0.5	3.1	mg/l	5-day BOD test
COD	0.6	0.9	2.3	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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
DRINKING WATER QUALITY TEST REPORT

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 July, 2022
Reporting date : 26th July, 2022

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	7.04	7.36	7.15	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	0.28	0.12	0.16	0.21	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

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
GROUND WATER QUALITY TEST REPORT

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 : 3rd July, 2022
Reporting date : 26th July, 2022

Description of analysis

Name of the Parameter	Concentration Present				Unit	Method of analysis
	(G1)	(G2)	(G3)	(G4)		
pH	6.92	7.28	6.95	7.23	-	pH Meter
TDS	236	224	248	254	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	0.07	0.05	0.05	0.05	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	mg/l	Atomic Absorption Spectrophotometer
Fe	0.28	0.37	0.22	0.27	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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 Tel: +88-02-9116712-13
Mob: 01733376609-10, Fax: +88-02-9116714, Email: nukhan05@gmail.com, aecldhaka@gmail.com
www.aecl-bd.org

(August 2022)

Adroit Environment Consultants Ltd.
A House of Complete Environmental Management Solutions

AECL LABORATORY ANALYSIS REPORT
AMBIENT AIR QUALITY TEST REPORT

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 : **10th to 12th August, 2022**
Reporting date : 29th August, 2022

Description of analysis

SN	Parameters	Method	Test Duration (hours)	Unit	24°2'38.5" N 91°1'0.0" E (L1)	24°2'30.5" N 91°0'42.2" E (L2)	24°2'34.7" N 91°1'8.7" E (L3)	24°2'58.5" N 91°1'23.9" E (L4)	24°2'31.7" N 91°00'30.3" E (L5)	Bangladesh (DoE) Standard	IFC /World Bank Standard
1	$PM_{2.5}$	Gravimetric	24	µg/m3	*51.63*	*48.23*	*49.88*	*43.56*	*43.17*	65	75
2	PM_{10}	Gravimetric	24	µg/m3	*69.87*	*70.16*	*67.07*	*73.90*	*64.24*	150	150
3	SPM	Gravimetric	8	µg/m3	*130.72*	*125.18*	*115.81*	*119.56*	*105.40*	200	NF
4	SO_2	West-Geake	24	µg/m3	*16.17*	*11.23*	*8.81*	*10.18*	*12.36*	365	125
5	NO_x	Jacob and Hochheiser	1	µg/m3	*18.57*	*16.66*	*15.25*	*11.01*	*14.00*	NF	200
6	CO	CO/O_3 Meter	1	ppm	*2.5*	*1*	*1*	*2*	*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-460BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).*

1. Fine Particulate Matter ($PM_{2.5}$).
2. Respirable Dust Content (PM_{10}).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_X).
5. Oxides of Sulfur (SO_2).
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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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

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 : **10th to 12th August, 2022**
Reporting date : 29th August, 2022

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	53.4	67.6	40.7	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	43.3	66.8	42.1	57.1
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	40.2	63.6	39.1	50.9
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	48.2	71.1	41.1	53.2
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	41.1	61.5	44.8	50.1
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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
SURFACE WATER QUALITY TEST REPORT

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 August, 2022**
Reporting date : 29th August, 2022

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	25.6	26.1	23.8	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	6.9	5.8	6.4	mg/l	DO meter
BOD_5	0.4	0.4	3.9	mg/l	5-day BOD test
COD	0.5	0.7	2.8	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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
DRINKING WATER QUALITY TEST REPORT

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 -12th August, 2022**
Reporting date : 29th August, 2022

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.22	7.10	7.16	7.23	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	0.26	0.14	0.15	0.25	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

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 Tel: +88-02-9116712-13
Mob: 01733376609-10, Fax: +88-02-9116714, Email: nukhan05@gmail.com, aecldhaka@gmail.com
www.aecl-bd.org

(September 2022)

AECL LABORATORY ANALYSIS REPORT
AMBIENT AIR QUALITY TEST REPORT

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 : **3rd to 5th September, 2022**
Reporting date : 26th September, 2022

Description of analysis

SN	Parameters	Method	Test Duration (hours)	Unit	24°2'38.5" N 91°1'0.0" E (L1)	24°2'30.5" N 91°0'42.2" E (L2)	24°2'34.7" N 91°1'8.7" E (L3)	24°2'58.5" N 91°1'23.9" E (L4)	24°2'31.7" N 91°00'30.3" E (L5)	Bangladesh (DoE) Standard	IFC /World Bank Standard
1	$PM_{2.5}$	Gravimetric	24	µg/m3	*53*	*60.2*	*50.5*	*51.1*	*58.9*	65	75
2	PM_{10}	Gravimetric	24	µg/m3	*103.9*	*99.6*	*97.8*	*89.2*	*93.7*	150	150
3	SPM	Gravimetric	8	µg/m3	*160.9*	*164.8*	*158.3*	*148.3*	*157.7*	200	NF
4	SO_2	West-Geake	24	µg/m3	13.42	11.14	12.25	12.08	*9.53*	365	125
5	NO_x	Jacob and Hochheiser	1	µg/m3	32.26	25.18	27.31	18.42	*12.90*	NF	200
6	CO	CO/O_3 Meter	1	ppm	2	1	2	0	*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-460BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).*

1. Fine Particulate Matter ($PM_{2.5}$).
2. Respirable Dust Content (PM_{10}).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_X).
5. Oxides of Sulfur (SO_2).
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
AMBIENT NOISE QUALITY TEST REPORT

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 : **3rd to 5th September, 2022**
Reporting date : 26th September, 2022

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	51.2	64.3	41.8	52.6
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	51.2	58.3	41.2	53.3
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	50.2	61.9	42.5	50.8
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	51.1	59.6	40.9	52.9
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	50.3	57.2	41.1	49.8
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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
SURFACE WATER QUALITY TEST REPORT

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 : **4th -5th September, 2022**
Reporting date : 26th September, 2022

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	28.3	25.7	22.5	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	6.8	6	6.4	mg/l	DO meter
BOD_5	0.6	0.5	4.0	mg/l	5-day BOD test
COD	0.7	0.9	3.1	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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
DRINKING WATER QUALITY TEST REPORT

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 September, 2022**
Reporting date : 26th September, 2022

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.42	7.16	7.28	7.36	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Photometric
Nitrate	1.2	1	1.3	1	10	50	mg/l	Potentiometric
Phosphate	0.16	0.12	0.18	0.12	6	-	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	0.36	0.21	0.18	0.28	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

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 Tel: +88-02-9116712-13
Mob: 01733376609-10, Fax: +88-02-9116714, Email: nukhan05@gmail.com, aecldhaka@gmail.com
www.aecl-bd.org

(October 2022)

AECL LABORATORY ANALYSIS REPORT
AMBIENT AIR QUALITY TEST REPORT

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 : **8th to 10th October, 2022**
Reporting date : 29th October, 2022

Description of analysis

SN	Parameters	Method	Test Duration (hours)	Unit	24°2'38.5" N 91°1'0.0" E (L1)	24°2'30.5" N 91°0'42.2" E (L2)	24°2'34.7" N 91°1'8.7" E (L3)	24°2'58.5" N 91°1'23.9" E (L4)	24°2'31.7" N 91°00'30.3" E (L5)	Bangladesh (DoE) Standard	IFC /World Bank Standard
1	$PM_{2.5}$	Gravimetric	24	µg/m3	*60.46*	*65.2*	*57.1*	*66.7*	*63.4*	65	75
2	PM_{10}	Gravimetric	24	µg/m3	*113.3*	*105.8*	*101.4*	*111.5*	*108.2*	150	150
3	SPM	Gravimetric	8	µg/m3	*172.9*	*169.3*	*165.8*	*168.4*	*159.1*	200	NF
4	SO_2	West-Geake	24	µg/m3	12.37	14.19	12.88	18.05	*13.56*	365	125
5	NO_x	Jacob and Hochheiser	1	µg/m3	30.54	32.40	28.44	27.48	*22.96*	NF	200
6	CO	CO/O_3 Meter	1	ppm	1	2	1	2	*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 APM-460BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).*

1. Fine Particulate Matter ($PM_{2.5}$).
2. Respirable Dust Content (PM_{10}).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_X).
5. Oxides of Sulfur (SO_2).
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
AMBIENT NOISE QUALITY TEST REPORT

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 : **8th to 10th October, 2022**
Reporting date : 29th October, 2022

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	49.8	62.8	40.2	51.3
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	46.4	60.6	42.7	52.1
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	51.8	63.4	40.5	52.7
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	53.6	62.3	39.9	55.2
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	56.1	42.5	51.2
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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
DRINKING WATER QUALITY TEST REPORT

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 : **8th October, 2022**
Reporting date : 29th October, 2022

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.64	7.36	7.22	7.44	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	1.3	1.2	1	10	50	mg/l	Potentiometric
Phosphate	0.21	0.17	0.18	0.15	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	0.25	0.17	0.33	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

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
SURFACE WATER QUALITY TEST REPORT

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 : **10th October, 2022**
Reporting date : 29th October, 2022

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	32.8	22.6	26.9	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	6.5	6.2	6.4	mg/l	DO meter
BOD_5	0.8	0.5	3.6	mg/l	5-day BOD test
COD	0.9	1.2	3.6	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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
GROUND WATER QUALITY TEST REPORT

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 : **9th October, 2022**
Reporting date : 29th October, 2022

Description of analysis

Name of the Parameter	Concentration Present				Unit	Method of analysis
	(G1)	(G2)	(G3)	(G4)		
pH	7.14	7.22	7.06	7.38	-	pH Meter
TDS	210	242	232	254	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	0.07	0.05	0.08	0.06	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	mg/l	Atomic Absorption Spectrophotometer
Fe	0.35	0.31	0.28	0.39	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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 Tel: +88-02-9116712-13
Mob: 01733376609-10, Fax: +88-02-9116714, Email: nukhan05@gmail.com, aecldhaka@gmail.com
www.aecl-bd.org

(November 2022)

Adroit Environment Consultants Ltd.
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AECL LABORATORY ANALYSIS REPORT
AMBIENT AIR QUALITY TEST REPORT

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 November, 2022**
Reporting date : 27th November, 2022

Description of analysis

SN	Parameters	Method	Test Duration (hours)	Unit	24°2'38.5" N 91°1'0.0" E (L1)	24°2'30.5" N 91°0'42.2" E (L2)	24°2'34.7" N 91°1'8.7" E (L3)	24°2'58.5" N 91°1'23.9" E (L4)	24°2'31.7" N 91°00'30.3" E (L5)	Bangladesh (DoE) Standard	IFC /World Bank Standard
1	$PM_{2.5}$	Gravimetric	24	µg/m3	*64.41*	*61.78*	*68.28*	*65.42*	*69.12*	65	75
2	PM_{10}	Gravimetric	24	µg/m3	*123.8*	*111.5*	*122.4*	*115.6*	*128.4*	150	150
3	SPM	Gravimetric	8	µg/m3	*162.7*	*169.5*	*166.3*	*160.6*	*169.8*	200	NF
4	SO_2	West-Geake	24	µg/m3	17.42	14.98	21.18	18.54	*23.80*	365	125
5	NO_x	Jacob and Hochheiser	1	µg/m3	32.67	35.72	37.25	31.62	*38.52*	NF	200
6	CO	CO/O_3 Meter	1	ppm	2	1	2	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-460BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).*

1. Fine Particulate Matter ($PM_{2.5}$).
2. Respirable Dust Content (PM_{10}).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_X).
5. Oxides of Sulfur (SO_2).
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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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

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 3rd November, 2022**
Reporting date : 27th November, 2022

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	51.2	66.2	42.8	52.5
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	48.4	62.3	40.1	50.7
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	49.3	65.8	42.2	53.9
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	52.2	66.9	38.6	52.3
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	46.5	60.7	37.2	49.6
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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
SURFACE WATER QUALITY TEST REPORT

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 November, 2022**
Reporting date : 27th November, 2022

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	30.2	19.3	24.9	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	6.7	6.5	6.5	mg/l	DO meter
BOD_5	0.7	0.5	3.2	mg/l	5-day BOD test
COD	1.0	1.4	2.8	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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
DRINKING WATER QUALITY TEST REPORT

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 : **2nd November, 2022**
Reporting date : 27th November, 2022

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.88	7.62	7.36	7.48	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Photometric
Nitrate	1.6	1.5	1.2	1.3	10	50	mg/l	Potentiometric
Phosphate	0.38	0.24	0.15	0.26	6	-	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	0.46	0.38	0.35	0.32	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

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 Tel: +88-02-9116712-13
Mob: 01733376609-10, Fax: +88-02-9116714, Email: nukhan05@gmail.com, aecldhaka@gmail.com
www.aecl-bd.org

(December 2022)

Adroit Environment Consultants Ltd.

A House of Complete Environmental Management Solutions

AECL LABORATORY ANALYSIS REPORT
AMBIENT AIR QUALITY TEST REPORT

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, 2022**
Reporting date : 19th December, 2022

Description of analysis

SN	*Parameters*	Method	Test Duration (hours)	Unit	24°2'38.5" N 91°1'0.0" E (L1)	24°2'30.5" N 91°0'42.2" E (L2)	24°2'34.7" N 91°1'8.7" E (L3)	24°2'58.5" N 91°1'23.9" E (L4)	24°2'31.7" N 91°00'30.3" E (L5)	Bangladesh (DoE) Standard	IFC /World Bank Standard
1	**$PM_{2.5}$**	Gravimetric	24	µg/m$_3$	*64.88*	*63.22*	*64.12*	*65.00*	*64.92*	65	75
2	**PM_{10}**	Gravimetric	24	µg/m$_3$	*132.5*	*119.2*	*124.8*	*126.3*	*135.8*	150	150
3	**SPM**	Gravimetric	8	µg/m$_3$	*170.4*	*176.2*	*168.9*	*168.4*	*174.2*	200	NF
4	**SO_2**	West-Geake	24	µg/m$_3$	18.11	15.76	20.34	20.66	*25.37*	365	125
5	**NO_x**	Jacob and Hochheiser	1	µg/m$_3$	30.20	37.91	38.11	30.29	*40.10*	NF	200
6	**CO**	CO/O_3 Meter	1	ppm	1	1	1	2	*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-460BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).*

1. Fine Particulate Matter ($PM_{2.5}$).
2. Respirable Dust Content (PM_{10}).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_X).
5. Oxides of Sulfur (SO_2).
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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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

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 3rd December, 2022**
Reporting date : 19th December, 2022

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	54.4	69.5	45.1	53.2
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	52.1	64.8	38.3	53.8
03	Test Result in South-East side of Project area near TSK, (location # 03) N- 24˚02'34.7" E-91˚01'8.7"	Construction Stage	52.1	66.5	44.1	51.3
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	70.1	36.8	55.2
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	47.1	64.3	36.9	52.8
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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
DRINKING WATER QUALITY TEST REPORT

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, 2022**
Reporting date : 19th December, 2022

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	8.01	7.77	7.53	7.71	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Photometric
Nitrate	1.8	1.7	1.3	1.5	10	50	mg/l	Potentiometric
Phosphate	0.41	0.30	0.21	0.27	6	-	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	0.48	0.42	0.39	0.37	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

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 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
SURFACE WATER QUALITY TEST REPORT

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, 2022**
Reporting date : 19th December, 2022

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	23.1	18.4	20.2	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	7.1	7.0	6.7	mg/l	DO meter
BOD_5	0.8	0.45	3.8	mg/l	5-day BOD test
COD	1.6	1.5	3.1	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

House 01, Road 16, Sector 07, Uttara, Dhaka-1230 Tel: +88-02-9116712-13
Mob: 01733376609-10, Fax: +88-02-9116714, Email: nukhan05@gmail.com, aecldhaka@gmail.com
www.aecl-bd.org

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

Calibration Certificate No.:- USIC/DD/GS/114	**Calibration Date:-** 02.11.2021	**Page** 1 of 2
Suggested Date of Next Calibration:- 01.11.2022		
Customer Name:- **M/S Adroit Environment Consultants Limited**		
Address:- House 01, Road 16, Sector 07, Dhaka-1230, Bangladesh		
Reference:- S.R.F. No.:- 2021/604 **Date:-** 10.11.2021		

01. Instrument

Name	Origin	Model	Sl. No.
Fine Particulate Sampler	India	AAS 127 Mini	15-D-376

02. Environmental Condition

Criteria	Result	Unit
Ambient Temperature	28	°C
Relative Humidity	53	%
Atmospheric Pressure	667.2	mmHg

03. Calibrator Used

Sl. No.	Standard Equipment Name	Limit	Ref. No.	Calibration Agency
1	Dry Gas Meter	0-40 LPM	FST/113F/53	LES, CCL, Greater Noida
	Certificate No.	**Calibration Date**		**Valid Up to**
	CC222242066830655L	02.07.2021		01.07.2022
2	Stop Watch	60 mins	UUT/113G/03	LES, CCL, Greater Noida
	Certificate No.	**Calibration Date**		**Valid Up to**
	CC2222119460005 9SL	02.08.2021		01.08.2022

04. Calibration Result (Rotameter)

Sl. No.	Flow (lpm)	Reference Flow Rate					Average Flow	Factor	% Error	Type A Uncertainty
		1	2	3	4	5				
1	2	2.003	2.006	2.004	2.001	2.004	2.0036	0.5	0.18	0.0001
2	5	5.02	5.0	5.0	5.002	5.03	5.0104	1	0.208	0.0001
3	8	7.99	8.0	8.006	8.0	8.0	7.9992	0.1	0.01	0.00001
4	12	12.008	11.997	12.003	12.04	11.99	12.0076	0.2	0.063	0.00001
5	16	15.998	15.999	15.994	16.001	16.001	15.9986	0.1	0.009	0.00001

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

Calibration Certificate No.: - USIC/DD/GS/114	**Calibration Date: -** 02.11.2021	**Page** 1 of 2
Suggested Date of Next Calibration: - 01.11.2022		
Customer Name: - M/s Adroit Environment Consultants Limited		
Address: - House 01, Road 16, Sector 07, Dhaka-1230, Bangladesh		
Reference: - S.R.F. No.: - 2021/604 **Date: -** 10.11.2021		

05. Calibration Result (Auto Time Totalizer)

Sl. No.	Time (min)	Reference Time (min) 1	2	3	4	5	Average	Factor	% Error	Type A Uncertainty
1	60	60.02	59.99	59.99	60.01	60.02	59.834	1	0.01	0.00001
2	480	480.02	479.1	479.9	480.01	480.03	479.24	1	0.04	0.00002
3	1440	1439.3	1438.2	1436.9	1438.8	1439.2	1438.26	1	0.1	0.0001

Notes:	Checked By	Authorized By
1 Result reported are valid at the time of and under the started condition of measurement 2 Reference used traceable o NABL accredited laboratory	Rinkesh Kumar	Rekha Verma

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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

Calibration Certificate No.: - USIC/DD/GS/117	**Calibration Date: -** 02.11.2021	**Page** 1 of 2
Suggested Date of Next Calibration: - 01.11.2022		
Customer Name: - M/S Adroit Environment Consultants Limited		
Address: - House 01, Road 16, Sector 07, Dhaka-1230, Bangladesh		
Reference: - S.R.F. No.: - 2021/603 **Date: -** 10.11.2021		

01. Instrument

Name	Origin	Model	Sl. No.
Fine Particulate Sampler	India	AAS 127 Mini	13-G-224

02. Environmental Condition

Criteria	Result	Unit
Ambient Temperature	28	°C
Relative Humidity	53	%
Atmospheric Pressure	667.2	mmHg

03. Calibrator Used

Sl. No.	Standard Equipment Name	Limit	Ref. No.	Calibration Agency
1	Dry Gas Meter	0-40 LPM	FST/113F/53	LES, CCL, Greater Noida
	Certificate No.	**Calibration Date**		**Valid Up to**
	CC222242066830655L	02.07.2021		01.07.2022
2	Stop Watch	60 mins	UUT/113G/03	LES, CCL, Greater Noida
	Certificate No.	**Calibration Date**		**Valid Up to**
	CC222211946000595L	02.08.2021		01.08.2022

04. Calibration Result (Rotameter)

Sl. No.	Flow (lpm)	Reference Flow Rate					Average Flow	Factor	% Error	Type A Uncertainty
		1	2	3	4	5				
1	2	2.001	2.008	2.003	2.004	1.999	2.0036	0.5	0.155	0.0009
2	5	5.0	5.001	5.0	5.0	5.0	5.0104	1	0.04	0.001
3	8	8.01	8.0	8.0	8.0	8.0	8.002	0.1	0.025	0.00001
4	12	12.001	12.003	12.001	12.004	12.001	12.002	0.2	0.016	0.00001
5	16	15.999	16.0	16.002	16.003	16.001	16.001	0.1	0.006	0.00001

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Calibration Certificate No.:- USIC/DD/GS/117	**Calibration Date:-** 02.11.2021	**Page** 1 of 2
Suggested Date of Next Calibration:- 01.11.2022		
Customer Name:- M/s Adroit Environment Consultants Limited		
Address:- House 01, Road 16, Sector 07, Dhaka-1230, Bangladesh		
Reference:- S.R.F. No.:- 2021/604 **Date:-** 10.11.2021		

05. Calibration Result (Auto Time Totalizer)

Sl. No.	Time (min)	Reference Time (min)					Average	Factor	% Error	Type A Uncertainty
		1	2	3	4	5				
1	60	60.002	60.001	59.994	60.002	59.989	59.997	1	0.004	0.00001
2	480	479.03	479.04	479.80	480.88	480.91	479.932	1	0.014	0.00002
3	1440	1439.1	1439.4	1441.2	1439.2	1437.6	1439.3	1	0.04	0.0001

Notes:
1 Result reported are valid at the time of and under the started condition of measurement
2 Reference used traceable o NABL accredited laboratory

Checked By | Authorized By

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

CALIBRATION CERTIFICATE

Calibration Certificate No.: - USIC/DD/GS/113	**Calibration Date: -** 02.11.2021	**Page 1 of 2**
Suggested Date of Next Calibration: - 01.11.2022		
Customer Name: - **M/S Adroit Environment Consultants Limited**		
Address: - **House 01, Road 16, Sector 07, Dhaka-1230, Bangladesh**		
Reference: - S.R.F. No.: - 2021/604 **Date: -** 10.11.2021		

01. Instrument

Name	Origin	Model	Sl. No.
Respirable Dust Sampler	India	APM 460 BL	1773-DTH-2010

02. Environmental Condition

Criteria	Result	Unit
Ambient Temperature	28	°C
Relative Humidity	53	%
Atmospheric Pressure	667.2	mmHg

03. Calibrator Used

Sl. No.	Standard Equipment Name	Limit	Ref. No.	Calibration Agency
1	Top Loading Calibrator	0.6-1.4 m^3/min	FST/113G/11	LES, CCL, Greater Noida
	Certificate No.	**Calibration Date**		**Valid Up to**
	CC222241896000335L	02.07.2021		01.07.2022
2	Stop Watch	60 mins	UUT/113G/03	LES, CCL, Greater Noida
	Certificate No.	**Calibration Date**		**Valid Up to**
	CC2222119460059SL	02.08.2021		01.08.2022

04. Calibration Result (Flow Manometer)

Sl. No.	Flow (m^3/min)	Reference Flow Rate					Average Flow	Factor	% Error	Type A Uncertainty
		1	2	3	4	5				
1	0.3	0.301	0.304	0.298	0.301	0.301	0.301	1	0.3	0.0001
2	0.5	0.505	0.500	0.502	0.501	0.501	0.5018	0.6	0.36	0.0001
3	1.0	1.001	1.001	1.003	1.001	1.001	1.0014	0.1	0.14	0.00001
4	1.2	1.199	1.199	1.202	1.199	1.201	1.2	1	0	0
5	1.5	1.498	1.499	1.496	1.494	1.497	1.497	1	0.2	0.0001

UNIVERSAL SCIENTIFIC INSTRUMENTS AND CALIBRATION

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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 No.: - USIC/DD/GS/113	**Calibration Date: -** 02.11.2021	**Page** 1 of 2
Suggested Date of Next Calibration: - 01.11.2022		
Customer Name: - M/s Adroit Environment Consultants Limited		
Address: - House 01, Road 16, Sector 07, Dhaka-1230, Bangladesh		
Reference: - S.R.F. No.: - 2021/604 **Date: -** 10.11.2021		

05. Calibration Result (Auto Time Totalizer)

Sl. No.	Time (min)	Reference Time (min) 1	2	3	4	5	Average	Factor	% Error	Type A Uncertainty
1	60	60.04	60	59.09	60.02	60.02	59.834	1	0.27	0.0007
2	480	479.1	479.2	478.8	479.4	479.7	479.24	1	0.16	0.0007
3	1440	1439.1	1437.6	1438.5	1438.5	1437.6	1438.26	1	0.12	0.001

Notes:	Checked By	Authorized By
1 Result reported are valid at the time of and under the started condition of measurement 2 Reference used traceable o NABL accredited laboratory	Rinkesh Kakkar	Rahul Verma

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

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CALIBRATION CERTIFICATE

Calibration Certificate No.: - USIC/DD/GS/116	**Calibration Date: -** 02.11.2021	**Page** 1 of 2
Suggested Date of Next Calibration: - 01.11.2022		
Customer Name: - M/S Adroit Environment Consultants Limited		
Address: - House 01, Road 16, Sector 07, Dhaka-1230, Bangladesh		
Reference: - S.R.F. No.: - 2021/603 **Date: -** 10.11.2021		

01. Instrument

Name	Origin	Model	Sl. No.
Respirable Dust Sampler	India	APM 460 BL	13-G-103

02. Environmental Condition

Criteria	Result	Unit
Ambient Temperature	28	°C
Relative Humidity	53	%
Atmospheric Pressure	667.2	mmHg

03. Calibrator Used

Sl. No.	Standard Equipment Name	Limit	Ref. No.	Calibration Agency
1	Top Loading Calibrator	0.6-1.4 m^3/min	FST/113G/11	LES, CCL, Greater Noida
	Certificate No.	**Calibration Date**		**Valid Up to**
	CC222241896000033SL	02.07.2021		01.07.2022
2	Stop Watch	60 mins	UUT/113G/03	LES, CCL, Greater Noida
	Certificate No.	**Calibration Date**		**Valid Up to**
	CC222211946000059SL	02.08.2021		01.08.2022

04. Calibration Result (Flow Manometer)

Sl. No.	Flow (m^3/min)	Reference Flow Rate 1	2	3	4	5	Average Flow	Factor	% Error	Type A Uncertainty
1	0.3	0.3	0.304	0.299	0.297	0.301	0.06	1	0.3	0.0001
2	0.5	0.505	0.5	0.5	0.501	0.501	0.28	1	0.36	0.0001
3	1.0	1.003	1.001	1.0	1.001	1.001	0.12	0.5	0.14	0.00001
4	1.2	1.186	1.199	1.203	1.201	1.206	0.08	1	0	0
5	1.5	1.498	1.499	1.501	1.495	1.499	0.1	1	0.2	0.0001

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 No.: - USIC/DD/GS/116	**Calibration Date: -** 02.11.2021	**Page** 1 of 2
Suggested Date of Next Calibration: - 01.11.2022		
Customer Name: - M/s Adroit Environment Consultants Limited		
Address: - House 01, Road 16, Sector 07, Dhaka-1230, Bangladesh		
Reference: - S.R.F. No.: - 2021/604 **Date: -** 10.11.2021		

05. Calibration Result (Auto Time Totalizer)

Sl. No.	Time (min)	Reference Time (min)					Average	Factor	% Error	Type A Uncertainty
		1	2	3	4	5				
1	60	60.01	60.01	59.97	59.99	59.86	59.97	1	0.05	0.0003
2	480	479.91	479.92	480.08	479.98	479.85	479.95	1	0.01	0.0002
3	1440	1439.2	1439.6	1441.07	1437.4	1438.5	1439.15	1	0.06	0.0003

Notes:	Checked By	Authorized By
1 Result reported are valid at the time of and under the started condition of measurement 2 Reference used traceable o NABL accredited laboratory	Rinkesh	Rakesh Verma

PICO LABS LIMITED

PICO™
Accredited Lab.

Certificate Of Calibration

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

Calibrated PICO™
Date Cal : 04/11/2021
Date Due : 04/11/2022
Name: Sound Level Meter
Model: WS1361C
S/N: ------
www.pico.com.bd info@pico.com.bd

Approved By
Suvra Deb Paul – TQM

ISO 9001 BUREAU VERITAS Certification

Islam Plaza, Section-7, Pallabi, Mirpur, Dhaka-1216
www.pico.com.bd info@pico.com.bd
+8801977426640 +8801977426661

PICO LABS LIMITED

CALIBRATION RESULT OF SOUND METER

DECIBEL- dB					
SL No.	Reference Standard Set Point	Measured D.U.C Reading	Measuring Unit	Error (±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

Islam Plaza, Section-7, Pallabi, Mirpur, Dhaka-1216
www.pico.com.bd
info@pico.com.bd
+8801977426640
+8801977426661

PICO LABS LIMITED

PICO™
Accredited Lab.

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.

limon

Calibrated By:
Md. Limon Mia
Calibration Engineer

Checked & Approved By
Suvra Deb Paul
Technical Cum Quality Manager

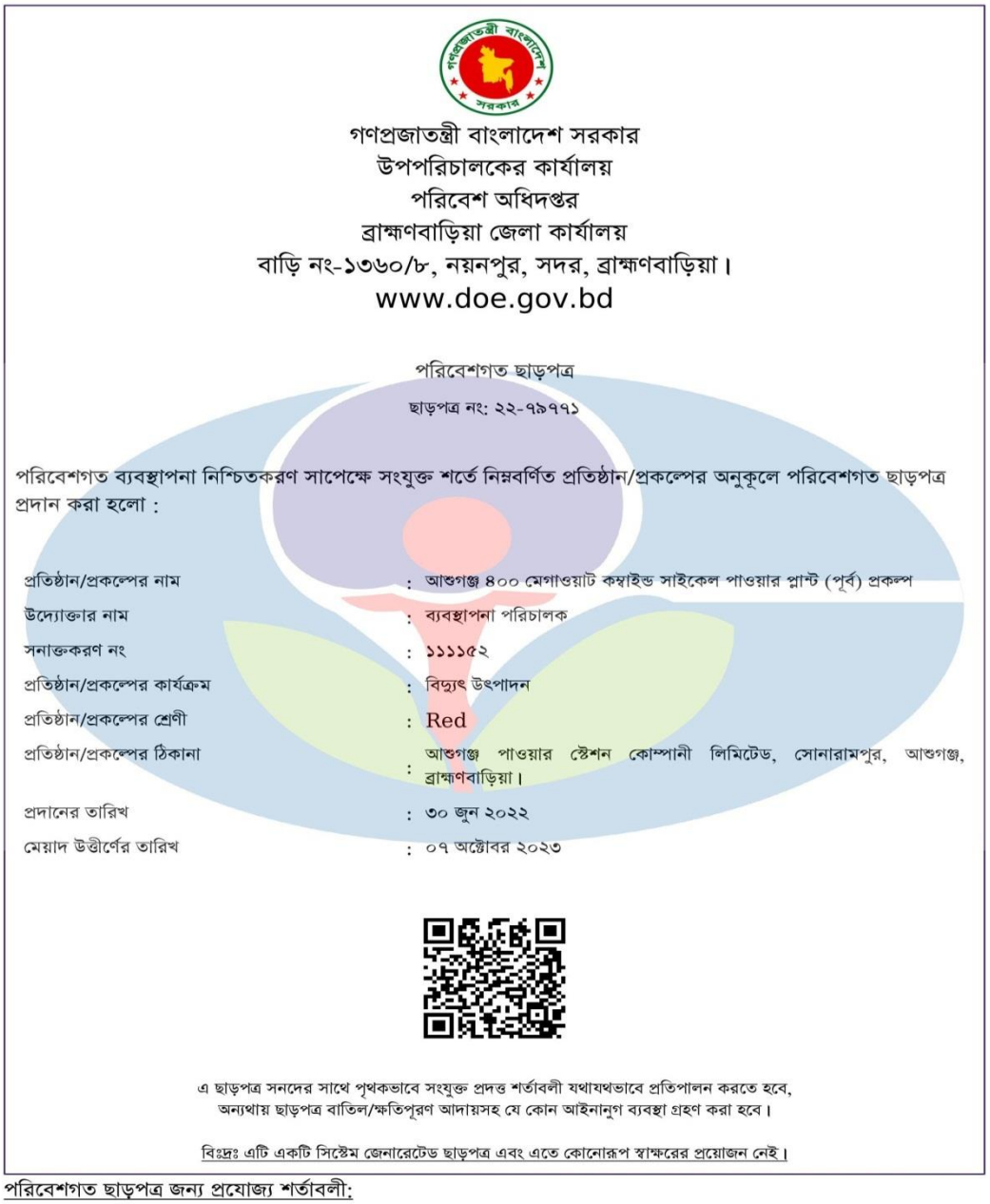
***** End of Certificate *****

PICO LABS LTD. PICO LIMITED

ISO 9001 BUREAU VERITAS Certification

Islam Plaza, Section-7, Pallabi, Mirpur, Dhaka-1216
www.pico.com.bd
info@pico.com.bd
+8801977426640
+8801977426661

ANNEX-VI: ENVIRONMENTAL CLEARANCE CERTIFICATE



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

পরিবেশগত ছাড়পত্র

ছাড়পত্র নং: ২২-৭৯৭৭১

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

প্রতিষ্ঠান/প্রকল্পের নাম	:	আশুগঞ্জ ৪০০ মেগাওয়াট কম্বাইন্ড সাইকেল পাওয়ার প্লান্ট (পূর্ব) প্রকল্প
উদ্যোক্তার নাম	:	ব্যবস্থাপনা পরিচালক
সনাক্তকরণ নং	:	১১১১৫২
প্রতিষ্ঠান/প্রকল্পের কার্যক্রম	:	বিদ্যুৎ উৎপাদন
প্রতিষ্ঠান/প্রকল্পের শ্রেণী	:	Red
প্রতিষ্ঠান/প্রকল্পের ঠিকানা	:	আশুগঞ্জ পাওয়ার স্টেশন কোম্পানী লিমিটেড, সোনারামপুর, আশুগঞ্জ, ব্রাহ্মণবাড়িয়া।
প্রদানের তারিখ	:	৩০ জুন ২০২২
মেয়াদ উত্তীর্ণের তারিখ	:	০৭ অক্টোবর ২০২৩

এ ছাড়পত্র সনদের সাথে পৃথকভাবে সংযুক্ত প্রদত্ত শর্তাবলী যথাযথভাবে প্রতিপালন করতে হবে, অন্যথায় ছাড়পত্র বাতিল/ক্ষতিপূরণ আদায়সহ যে কোন আইনানুগ ব্যবস্থা গ্রহণ করা হবে।

বিঃদ্রঃ এটি একটি সিস্টেম জেনারেটেড ছাড়পত্র এবং এতে কোনোরূপ স্বাক্ষরের প্রয়োজন নেই।

পরিবেশগত ছাড়পত্র জন্য প্রযোজ্য শর্তাবলী:

ছাড়পত্রটি যাচাই করতে ভিজিট করুন: https://ecc.doe.gov.bd/certificate_verification
Page 1 of 2

সনাক্তকরণ নং: ১১১১৫২ আশুগঞ্জ ৪০০ মেগাওয়াট কম্বাইন্ড সাইকেল পাওয়ার প্লান্ট (পূর্ব) প্রকল্প ছাড়পত্র নং: ২২-৭৯৭৭১

১ . এ ছাড়পত্র ৪০০ মেগাওয়াট বিদ্যুৎ উৎপাদনের জন্য প্রযোজ্য। প্রকল্পের উৎপাদন বৃদ্ধি, জায়গা সম্প্রসারণ, উৎপাদন প্রক্রিয়া বা তৎসংশ্লিষ্ট কোনোপ্রকার পরিবর্তনের জন্য পরিবেশ অধিদপ্তরের ছাড়পত্রের প্রয়োজন হবে।

২ . বিদ্যুৎ কেন্দ্র হতে গ্যাসীয় পদার্থের নিঃসরণ (SO2, NOx এবং CO) এবং বস্তুকণার (Particulate Matters) নির্গমন পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭-এর তফসিল-১১ এ উল্লিখিত মানমাত্রার মধ্যে হতে হবে। যে কোন সময় তাৎক্ষণিক সংগৃহীত নমুনায় এই মানমাত্রা অতিক্রম হতে পারবে না।

৩ . এ ছাড়পত্র জারীর পরবর্তী প্রতি তিনমাস অন্তর হতে বিদ্যুৎ কেন্দ্রের Down wind direction এবং যেসব জায়গায় Ground level Concentration সবচেয়ে বেশি বলে অনুমিত হয় সেসব জায়গার পরিবেষ্টক বায়ুর গুণগতমান (SO2, NOx এবং CO) এবং ইটিপি'র মাধ্যমে পরিশোধিত তরল বর্জ্যের গুণগতমান (pH, DO, BOD, COD, TSS) পরীক্ষাপূর্বক উহার বিশ্লেষিত ফলাফল অত্র দপ্তরে দাখিল করতে হবে। বিশ্লেষিত ফলাফল পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭ এর গ্রহণযোগ্য মাত্রা বহির্ভূত হলে এ ছাড়পত্র বাতিল বলে গণ্য হবে।

৪ . কুলিং ওয়াটার পুনঃব্যবহারের জন্য স্থাপিত সকল ব্যবস্থাদি যথাযথভাবে কার্যক্ষম রাখতে হবে।

৫ . বিদ্যুৎ কেন্দ্রের সীমানা প্রাচীরের সন্নিকটে শব্দের মাত্রা শব্দ দূষণ (নিয়ন্ত্রণ) বিধিমালা, ২০০৬ এর তফসিল-১ এ উল্লিখিত মানমাত্রায় থাকতে হবে।

৬ . গ্যাসীয় নিঃসরণের জন্য স্থাপিত চিমনীসমূহ সার্বক্ষণিক কার্যক্ষম রাখতে হবে।

৭ . জেনারেটরের Spent lubricating oil পরিবেশ অধিদপ্তরের ছাড়পত্র গ্রহণকারী প্রতিষ্ঠান ব্যতিরেকে অন্য কোন Vendor এর কাছে বিক্রয় করা যাবে না।

৮ . বিদ্যুৎ কেন্দ্র সৃষ্ট Residual Filtrate অথবা তৈলমিশ্রিত বর্জ্য কোন জলাশয়ে ফেলা যাবে না।

৯ . ইআইএ প্রতিবেদনে উল্লিখিত সকল মিটিগেশন মেজার্স সার্বক্ষণিক কার্যকরীভাবে চালু রাখতে হবে।

১০ . বিদ্যুৎ কেন্দ্র চত্বরের ন্যূনতম ৩৩% জায়গা উপযুক্ত প্রজাতির ফলদ ও বনজ গাছ লাগিয়ে সবুজায়ন করতে হবে।

১১ . আলোচ্য প্রকল্পের চারপাশের সীমানার সন্নিকটে শব্দের মাত্রা নিয়মিত মনিটর করতে হবে এবং মনিটরিং ফলাফল প্রতি তিন মাস অন্তর পরিবেশ অধিদপ্তরে দাখিল করতে হবে।

১২ . এ ছাড়পত্র জারীর ০৬(ছয়) মাসের মধ্যে তরল বর্জ্য রিসাইক্লিং ও জিরো ডিসচার্জ পরিকল্পনা দাখিল করতে হবে। অন্যথায় ছাড়পত্র নবায়ন করা হবে না ও ছাড়পত্র বাতিল করা হবে।

১৩ . পেশাগত স্বাস্থ্য রক্ষার্থে সকল ব্যবস্থা সার্বক্ষণিক চালু রাখতে হবে। কর্মরত শ্রমিকদের পেশাগত স্বাস্থ্য সুরক্ষার জন্য ব্যক্তিগত সুরক্ষাসামগ্রী (যেমন: হেলমেট, ইয়ার মাফলার, বুট) পরিধান করতে হবে।

১৪ . অগ্নি নিরাপত্তা ব্যবস্থা নিশ্চিত করার লক্ষ্যে বাংলাদেশ ন্যাশনাল বিল্ডিং কোড এবং ফায়ার লাইসেন্সের শর্তানুসারে উপযুক্ত ব্যবস্থাদি সার্বক্ষণিক কার্যকরী রাখতে হবে।

১৫ . বাংলাদেশ পরিবেশ সংরক্ষণ আইন, ১৯৯৫ এবং তদধীন প্রণীত বিধিমালা এ প্রদত্ত ক্ষমতাবলে উপরিল্লিখিত শর্তসমূহ Enforce করা হবে।

১৬ . ছাড়পত্রের মূলকপি প্রতিষ্ঠানে সংরক্ষণ করতে হবে। পরিবেশ অধিদপ্তরের এনফোর্সমেন্ট টীম, পরিদর্শক, পরিদর্শনের ক্ষমতাপ্রাপ্ত কর্মকর্তাগন কারখানা পরিদর্শনকালে ছাড়পত্র/নবায়ন পত্র প্রদর্শন এবং প্রতিষ্ঠানের কার্যক্রম পরিদর্শনে সহযোগিতা করতে হবে।

১৭ . উপরোক্ত সকল অনুচ্ছেদে বর্ণিত শর্তাবলী যথাযথভাবে প্রতিপালনের ক্ষেত্রে সংশ্লিষ্ট কর্তৃপক্ষের কোনরূপ উদাসীনতা, শিথিলতা বা যে কোন শর্তের লংঘন পরিবেশ দূষণ সংশ্লিষ্টতায় জনস্বাস্থ্যের প্রতি হুমকি বিবেচনায় প্রদত্ত ছাড়পত্র বাতিলসহ আপনার/আপনার প্রতিষ্ঠানের বিরুদ্ধে বাংলাদেশ পরিবেশ সংরক্ষণ আইন, ১৯৯৫ (সংশোধিত ২০১০); পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭ এবং শব্দ দূষণ (নিয়ন্ত্রণ) বিধিমালা, ২০০৬ অনুসারে আইনগত ব্যবস্থা গ্রহণ করা হবে।

ANNEX VII: CARBON FOOTPRINT ANALYSIS

BAN: Power System Expansion and Efficiency Improvement Investment Program-Tranche 3

Ashuganj 400 MW CCPP East Project

Methodology

Sl	Description		Sl	Description			
	Electricity Outputs	MW	7	New Plant Efficiency:	58.75%		
1	Grid electricity:	150	8	Emission factor for gas:	56.1 $kgCO_2/GJ$	0.0561	tCO_2/GJ
2	Existing power plant's output:	250	9	Grid emission factor for BAN:		0.648	tCO_2/MWh
3	Project Output:	400	10	fuel consumption per year, GJ/year:		3.6	
4	Time (hrs/yr):	8,760					
5	New plant availability:	85%					
6	Old plant availability:	36%					

Calculation

Sl	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**	**tCO_2/yr**
Sl	**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**	**tCO_2/yr**
	Emission Reduction from the Project (Tentative)	**754,150**	**tCO_2/yr**

ANNEX VIII: GRM REGISTER FORM

	ASHUGANJ POWER STATION COMPANY LIMITED	**Document No.** SF-OHS-23
		Revision No.: 00
	FORM	**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

ANNEX IX: Dust Control Log Book

CNTIC 中国技术进出口集团有限公司 CHINA NATIONAL TECHNICAL IMP. & EXP. CORP.

China National Corporation For Overseas Economic Cooperation

Dust Control (Water Spraying) Log Book

Location: Ashuganj 400MW CCPP (East) Project area.
Supervisor: Mr. Ratul

Month: August, 2022

Date	Morning	No. of workers	Supervisor's Comment	Noon	No. of workers	Supervisor's Comment	Afternoon	No. of workers	Supervisor's Comment
01	✓	02	OK	✓	02	OK	✓	02	OK
02	✓	02	OK	✓	02	OK	✓	02	OK
03	✓	02	OK	✓	02	OK	✓	02	OK
04	✓	02	OK	✓	02	OK	✓	02	OK
05	✓	02	OK	✓	02	OK	✓	02	OK
06	✓	02	OK	✓	02	OK	✓	02	OK
07	✓	02	OK	✓	02	OK	✓	02	OK
08	✓	02	OK	✓	02	OK	✓	02	OK
09	✓	02	OK	✓	02	OK	✓	02	OK
10	✓	02	OK	✓	02	OK	✓	02	OK
11	✓	02	OK	✓	02	OK	✓	02	OK
12	✓	02	OK	✓	02	OK	✓	02	OK
13	✓	02	OK	✓	02	OK	✓	02	OK
14	✓	02	OK	✓	02	OK	✓	02	OK
15	✓	02	OK	✓	02	OK	✓	02	OK
16	✓	02	OK	✓	02	OK	✓	02	OK
17	✓	02	OK	✓	02	OK	✓	02	OK
18	✓	02	OK	✓	02	OK	✓	02	OK
19	✓	02	OK	✓	02	OK	✓	02	OK
20	✓	02	OK	✓	02	OK	✓	02	OK
21	✓	02	OK	✓	02	OK	✓	02	OK
22	✓	02	OK	✓	02	OK	✓	02	OK
23	✓	02	OK	✓	02	OK	✓	02	OK
24	✓	02	OK	✓	02	OK	✓	02	OK
25	✓	02	OK	✓	02	OK	✓	02	OK
26	✓	02	OK	✓	02	OK	✓	02	OK
27	✓	02	OK	✓	02	OK	✓	02	OK
28	✓	02	OK	✓	02	OK	✓	02	OK
29	✓	02	OK	✓	02	OK	✓	02	OK
30	✓	02	OK	✓	02	OK	✓	02	OK
31	✓	02	OK	✓	02	OK	✓	02	OK

Ashuganj East 400MW GAS BASED COMBINED CYCLE POWER PLANT PROJECT
CNTIC & CCOEC CONSORTIUM

Dust Control (Water Spraying) Log Book

Location: Ashuganj 400MW CCPP (East) Project area.
Supervisor: Mr. Ratul**Month: Septeber, 2022**

Date	Morning	No. of workers	Supervisor's Comment	Noon	No. of workers	Supervisor's Comment	Afternoon	No. of workers	Supervisor's Comment
01	✓	02	OK	✓	02	OK	✓	02	OK
02	✓	02	OK	✓	02	OK	✓	02	OK
03	✓	02	OK	✓	02	OK	✓	02	OK
04	✓	02	OK	✓	02	OK	✓	02	OK
05	✓	02	OK	✓	02	OK	✓	02	OK
06	✓	02	OK	✓	02	OK	✓	02	OK
07	✓	02	OK	✓	02	OK	✓	02	OK
08	✓	02	OK	✓	02	OK	✓	02	OK
09	✓	02	OK	✓	02	OK	✓	02	OK
10	✓	02	OK	✓	02	OK	✓	02	OK
11	✓	02	OK	✓	02	OK	✓	02	OK
12	✓	02	OK	✓	02	OK	✓	02	OK
13	✓	02	OK	✓	02	OK	✓	02	OK
14	✓	02	OK	✓	02	OK	✓	02	OK
15	✓	02	OK	✓	02	OK	✓	02	OK
16	✓	02	OK	✓	02	OK	✓	02	OK
17	✓	02	OK	✓	02	OK	✓	02	OK
18	✓	02	OK	✓	02	OK	✓	02	OK
19	✓	02	OK	✓	02	OK	✓	02	OK
20	✓	02	OK	✓	02	OK	✓	02	OK
21	✓	02	OK	✓	02	OK	✓	02	OK
22	✓	02	OK	✓	02	OK	✓	02	OK
23	✓	02	OK	✓	02	OK	✓	02	OK
24	✓	02	OK	✓	02	OK	✓	02	OK
25	✓	02	OK	✓	02	OK	✓	02	OK
26	✓	02	OK	✓	02	OK	✓	02	OK
27	✓	02	OK	✓	02	OK	✓	02	OK
28	✓	02	OK	✓	02	OK	✓	02	OK
29	✓	02	OK	✓	02	OK	✓	02	OK
30	✓	02	OK	✓	02	OK	✓	02	OK

Dust Control (Water Spraying) Log Book

Location: Ashuganj 400MW CCPP (East) Project area.
Supervisor: Mr. Ratul**Month: October, 2022**

Date	Morning	No. of workers	Supervisor's Comment	Noon	No. of workers	Supervisor's Comment	Afternoon	No. of workers	Supervisor's Comment
01	✓	02	OK	✓	02	OK	✓	02	OK
02	✓	02	OK	✓	02	OK	✓	02	OK
03	✓	02	OK	✓	02	OK	✓	02	OK
04	✓	02	OK	✓	02	OK	✓	02	OK
05	✓	02	OK	✓	02	OK	✓	02	OK
06	✓	02	OK	✓	02	OK	✓	02	OK
07	✓	02	OK	✓	02	OK	✓	02	OK
08	✓	02	OK	✓	02	OK	✓	02	OK
09	✓	02	OK	✓	02	OK	✓	02	OK
10	✓	02	OK	✓	02	OK	✓	02	OK
11	✓	02	OK	✓	02	OK	✓	02	OK
12	✓	02	OK	✓	02	OK	✓	02	OK
13	✓	02	OK	✓	02	OK	✓	02	OK
14	✓	02	OK	✓	02	OK	✓	02	OK
15	✓	02	OK	✓	02	OK	✓	02	OK
16	✓	02	OK	✓	02	OK	✓	02	OK
17	✓	02	OK	✓	02	OK	✓	02	OK
18	✓	02	OK	✓	02	OK	✓	02	OK
19	✓	02	OK	✓	02	OK	✓	02	OK
20	✓	02	OK	✓	02	OK	✓	02	OK
21	✓	02	OK	✓	02	OK	✓	02	OK
22	✓	02	OK	✓	02	OK	✓	02	OK
23	✓	02	OK	✓	02	OK	✓	02	OK
24	✓	02	OK	✓	02	OK	✓	02	OK
25	✓	02	OK	✓	02	OK	✓	02	OK
26	✓	02	OK	✓	02	OK	✓	02	OK
27	✓	02	OK	✓	02	OK	✓	02	OK
28	✓	02	OK	✓	02	OK	✓	02	OK
29	✓	02	OK	✓	02	OK	✓	02	OK
30	✓	02	OK	✓	02	OK	✓	02	OK
31	✓	02	OK	✓	02	OK	✓	02	OK

Dust Control (Water Spraying) Log Book

Location: Ashuganj 400MW CCPP (East) Project area.
Supervisor: Mr. Ratul **Month:November , 2022**

Date	Morning	No. of workers	Supervisor's Comment	Noon	No. of workers	Supervisor's Comment	Afternoon	No. of workers	Supervisor's Comment
01	✓	02	OK	✓	02	OK	✓	02	OK
02	✓	02	OK	✓	02	OK	✓	02	OK
03	✓	02	OK	✓	02	OK	✓	02	OK
04	✓	02	OK	✓	02	OK	✓	02	OK
05	✓	02	OK	✓	02	OK	✓	02	OK
06	✓	02	OK	✓	02	OK	✓	02	OK
07	✓	02	OK	✓	02	OK	✓	02	OK
08	✓	02	OK	✓	02	OK	✓	02	OK
09	✓	02	OK	✓	02	OK	✓	02	OK
10	✓	02	OK	✓	02	OK	✓	02	OK
11	✓	02	OK	✓	02	OK	✓	02	OK
12	✓	02	OK	✓	02	OK	✓	02	OK
13	✓	02	OK	✓	02	OK	✓	02	OK
14	✓	02	OK	✓	02	OK	✓	02	OK
15	✓	02	OK	✓	02	OK	✓	02	OK
16	✓	02	OK	✓	02	OK	✓	02	OK
17	✓	02	OK	✓	02	OK	✓	02	OK
18	✓	02	OK	✓	02	OK	✓	02	OK
19	✓	02	OK	✓	02	OK	✓	02	OK
20	✓	02	OK	✓	02	OK	✓	02	OK
21	✓	02	OK	✓	02	OK	✓	02	OK
22	✓	02	OK	✓	02	OK	✓	02	OK
23	✓	02	OK	✓	02	OK	✓	02	OK
24	✓	02	OK	✓	02	OK	✓	02	OK
25	✓	02	OK	✓	02	OK	✓	02	OK
26	✓	02	OK	✓	02	OK	✓	02	OK
27	✓	02	OK	✓	02	OK	✓	02	OK
28	✓	02	OK	✓	02	OK	✓	02	OK
29	✓	02	OK	✓	02	OK	✓	02	OK
30	✓	02	OK	✓	02	OK	✓	02	OK

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Dust Control (Water Spraying) Log Book

Location: Ashuganj 400MW CCPP (East) Project area.
Supervisor: Mr. Ratul **Month:December,2022**

Date	Morning	No. of workers	Supervisor's Comment	Noon	No. of workers	Supervisor's Comment	Afternoon	No. of workers	Supervisor's Comment
01	✓	02	OK	✓	02	OK	✓	02	OK
02	✓	02	OK	✓	02	OK	✓	02	OK
03	✓	02	OK	✓	02	OK	✓	02	OK
04	✓	02	OK	✓	02	OK	✓	02	OK
05	✓	02	OK	✓	02	OK	✓	02	OK
06	✓	02	OK	✓	02	OK	✓	02	OK
07	✓	02	OK	✓	02	OK	✓	02	OK
08	✓	02	OK	✓	02	OK	✓	02	OK
09	✓	02	OK	✓	02	OK	✓	02	OK
10	✓	02	OK	✓	02	OK	✓	02	OK
11	✓	02	OK	✓	02	OK	✓	02	OK
12	✓	02	OK	✓	02	OK	✓	02	OK
13	✓	02	OK	✓	02	OK	✓	02	OK
14	✓	02	OK	✓	02	OK	✓	02	OK
15	✓	02	OK	✓	02	OK	✓	02	OK
16	✓	02	OK	✓	02	OK	✓	02	OK
17	✓	02	OK	✓	02	OK	✓	02	OK
18	✓	02	OK	✓	02	OK	✓	02	OK
19	✓	02	OK	✓	02	OK	✓	02	OK
20	✓	02	OK	✓	02	OK	✓	02	OK
21	✓	02	OK	✓	02	OK	✓	02	OK
22	✓	02	OK	✓	02	OK	✓	02	OK
23	✓	02	OK	✓	02	OK	✓	02	OK
24	✓	02	OK	✓	02	OK	✓	02	OK
25	✓	02	OK	✓	02	OK	✓	02	OK
26	✓	02	OK	✓	02	OK	✓	02	OK

ANNEX X: Training Participants List

TRAINING RECORD

Form No.: TR/3/001	Version No.: 01	Ref. TRN/1/001	Approved by:
Training Topics: Health and safety (H.S)			
Trainer: Md. Parvej Hossian		**Designation:** H.S.E Officer	
Date of Training: 20-08-2022		**Training Duration:** From ....09:00AM To .09:00AM	

Sl.	Name of the Trainee	ID No	Designation	Signature	Training Evaluation (To be filled by assessment performing officials)	
					Number achieved	Pass /Fail
01	[illegible]	2209	[illegible]	[illegible]		
02	[illegible]	[illegible]	[illegible]	[illegible]		
03	[illegible]	2262	[illegible]	[illegible]		
04	[illegible]	2073	[illegible]	[illegible]		
05	[illegible]	2076	[illegible]	[illegible]		
06	[illegible]	2066	[illegible]	[illegible]		
07	[illegible]	2028	[illegible]	[illegible]		
08	[illegible]	2[illegible]	[illegible]	[illegible]		
09	[illegible]	2268	[illegible]	[illegible]		
10	[illegible]	2069	[illegible]	[illegible]		
11	[illegible]	2267	[illegible]	[illegible]		
12	[illegible]	2226	[illegible]	[illegible]		
13	[illegible]	2262	[illegible]	[illegible]		
14	[illegible]	2262	[illegible]	[illegible]		
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TRAINING RECORD			
Form No.: TR/3/001	Version No.: 01	Ref. TRN/1/001	Approved by:
Training Topics: Personal Protective Equipment (P.P.E)			
Trainer: Md. Fanwar Hossain		Designation: H.S.E. Officer	
Date of Training: 21-09-2022		Training Duration: From ... 11:00a. To ... 1.1:30Am	

Sl.	Name of the Trainee	ID No	Designation	Signature	Training Evaluation (To be filled by assessment performing officials)	
					Number achieved	Pass /Fail
01		2209				
02		2026				
03		2268				
04		2028				
05		2066				
06		2068				
07		2029				
08		2266				
09		2266				
10		2066				
11		2262				
12		2066				
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TRAINING RECORD

Form No.: TR/3/001	Version No.: 01	Ref. TRN/1/001	Approved by:

Training Topics: Health and Safety And House keeping

Trainer: Md. Fanuez Hossin **Designation:** H.S.E Officer

Date of Training: 17 - 10 - 2022 **Training Duration:** From 08:30 To 09:10Am

Sl.	Name of the Trainee	ID No	Designation	Signature	Training Evaluation (To be filled by assessment performing officials)	
					Number achieved	Pass /Fail
01	সাইফ	২২৯৯	রক্ষণাবেক্ষণ			
02	সিফাত	১০৬৬	″			
03	কামরুল	২০২৯	″			
04	[illegible]	২৪৬৯	″			
05	কামরুজ্জামান	২০৬৫	ইলেকট্রা			
06	[illegible]	২০২৮	[illegible]			
07	[illegible]	২২৫৪	ইলেকট্রা			
08	[illegible]	২২২৬	[illegible]			
09	[illegible]	২২৬৬	[illegible]			
10	[illegible]	২২৬৪	ইলেকট্রা			
11						
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25						

29.12.2022

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