

Environmental Monitoring Report

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Semestral Report (January- June 2021)
July 2021

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

Ashuganj 400 MW (East) Combined Cycle Power Plant Project

Prepared by Ashuganj Power Station Company Limited (APSCL) for the Asian
Development Bank.

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Environmental Monitoring Report

11th Semi-Annual (January – June 2021) Report



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



Ashuganj Power Station Company Limited (APSCCL)

Rev	Date	Prepared By	Approved By	Description
00	June 2021	Md. Dilshad-Ibne-Baqui Assistant Manager (HS&E) Ashuganj 400 MW CCPP (East) Project, APSCL.	Md. Atiqur Rahman, Manager (HS&E), APSCL.	11 th Semi-Annual Environmental Monitoring Report

Contents

EXECUTIVE SUMMARY	6
1.0 INTRODUCTION.....	8
1.1 Location of the Project.....	8
1.2 Context of the monitoring report	9
1.3 Project Progress Status	9
1.4 Environmental Management Implementation Work Schedule	10
1.5 Progress Status on Implementation of Environment Management Activity	11
1.6 Corrective Action Plan (CAP)	12
2.0 ENVIRONMENTAL RESPONSIBILITIES AND INSTITUTIONAL SETUP	13
3.0 Safeguard Compliance Performance of the Project	14
3.1 Compliance with the Environmental Provisions of National Legal Instruments.....	14
3.2 SPS, 2009 Compliance Status.....	16
3.3 Compliance of environmental covenants from the ADB loan agreement.....	17
4.0 ENVIRONMENTAL STATUS.....	21
4.1 Analytical Monitoring and Observations.....	22
4.1.1 Air Quality Monitoring	22
4.1.2 Noise Measurement	25
4.1.3 Water Quality Analysis.....	29
4.1.3.1 Drinking Water Quality Analysis	29
4.1.3.2 River Water Quality Analysis.....	33
4.1.3.3 Ground Water Quality Analysis.....	35
4.1.4 Soil Quality Analysis	37
4.2 Visual Monitoring and Observations	39
4.2.1 Traffic Volume.....	39
4.2.2 Site Security	39
4.2.3 Personal Protective Equipment	40
4.2.4 Incident Record & Reporting	41
4.2.5 Solid Waste	41
4.2.5.1 Solid Waste Management Plan	42
4.2.6 Worker's Health and COVID Response	43
4.2.7 Grievance Redress Mechanism.....	45
4.2.8 Safety Orientation and Training of Workers.....	46
4.2.9 Sanitation and Drinking Water Facility	48
4.2.10 Site Drainage.....	48
4.2.11 Dust Control.....	49

4.2.12 Oily Waste Generation & Disposal System	49
5.0 CONCLUSION AND RECOMMENDATION	49
ANNEX-I: PHOTO APPENDIX.....	51
ANNEX-II: MONITORING LOCATIONS	53
ANNEX-III: MONITORING LOCATIONS MAP	55
ANNEX-IV: LABORATORY TEST RESULT	56
ANNEX-V: CALIBRATION CERTIFICATE.....	83
ANNEX-VI: DoE CLEARANCE of EIA RENEWAL	84
ANNEX VII: CARBON FOOTPRINT ANALYSIS.....	86
ANNEX VIII: GRM REGISTER FORM	87

List of Tables

Table 1: Project Progress Status	9
Table 2: Environmental management implementation work schedule for next six months working plan (July 2021 to December 2021)	10
Table 3: Implementation of Environmental Management Activity During Construction Phase	11
Table 4: Implementation of Environmental Monitoring Plan during Construction Phase of the Project (Visual)	11
Table 5: Implementation of environmental Monitoring Plan during Construction Phase of the Project (Visual)	13
Table 6: Project Environmental Key Personnel, Contact Names and Telephone Numbers	14
Table 7: National Legal Instruments Related to the Emergency Assistance Project.....	15
Table 8: ADB Safeguards Policy compliance Status for the Projects	17
Table 9: Compliance with Environmental Considerations of Loan Agreements	17
Table 10: Test Result of Ambient Air Quality	23
Table 11: Test Result of Noise Quality	28
Table 12: Drinking Water Quality Test Result.....	30
Table 13: River Water Quality Test Result	33
Table 14: Ground Water Quality.....	36
Table 15: Soil Quality	38
Table 16: Total number of vehicles based on their categories.....	39
Table 17: List of Personal Protective Equipment Used in Project Site	40
Table 18: Waste Inventory Log of CNTIC-CCOEC Consortium	42
Table 19: Members of the Committee of Grievance Redress (GRC).....	46
Table 20: Summary of HSE Management	47

List of Figures

Table 1: Project Progress Status	9
Table 2: Environmental management implementation work schedule for next six months working plan (July 2021 to December 2021)	10
Table 3: Implementation of Environmental Management Activity During Construction Phase	11
Table 4: Implementation of Environmental Monitoring Plan during Construction Phase of the Project (Visual)	11

Table 5: Implementation of environmental Monitoring Plan during Construction Phase of the Project (Visual)	13
Table 6: Project Environmental Key Personnel, Contact Names and Telephone Numbers	14
Table 7: National Legal Instruments Related to the Emergency Assistance Project.....	15
Table 8: ADB Safeguards Policy compliance Status for the Projects	17
Table 9: Compliance with Environmental Considerations of Loan Agreements	17
Table 10: Test Result of Ambient Air Quality	23
Table 11: Test Result of Noise Quality	28
Table 12: Drinking Water Quality Test Result.....	30
Table 13: River Water Quality Test Result	33
Table 14: Ground Water Quality.....	36
Table 15: Soil Quality	38
Table 16: Total number of vehicles based on their categories.....	39
Table 17: List of Personal Protective Equipment Used in Project Site	40
Table 18: Waste Inventory Log of CNTIC-CCOEC Consortium	42
Table 19: Members of the Committee of Grievance Redress (GRC).....	46
Table 20: Summary of HSE Management	47

EXECUTIVE SUMMARY

During the period from January to June 2021, the EPC Contractor has carried out mainly HRSG foundation works, Central Control Building (CCB), Main Building and Turbine Base, Gas booster and conditioning station, Exhaust Stack, Air compressor Building, Air Storage tank, Service and Firewater pump house, Service and Firewater tank, Emergency Oil pit, Oily wastewater treatment station, sewage treatment station etc. To complete those works, they mobilize the equipment's, workers and materials.

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

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

APSCL is committed to keeping the accident level in Zero by implementing its proper occupational health and safety management system. This project also has a positive effect on the socio-economic condition. Local skilled and semi-skilled peoples are engaged in different levels of construction activities and they are happy about getting employment opportunities.

On March 8, Bangladesh confirmed three cases of novel coronavirus on its territory. After that, APSCL has been paying close attention to the latest situation of COVID-19 spreading in Bangladesh and we are currently raising awareness & taking preventive action as a continuous process on this matter. During this critical period, APSCL immediately took the necessary precautions to protect all of its staff against virus infection and has taken immediate action on EPC contractors to prevent the spread of Covid-19 from new project activities like under construction 400 MW CCPP (East) Project by controlling of movement of foreigners, local workers and other construction & maintenance activities of APSCL.

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

1.0 INTRODUCTION

The objective of the environmental safeguard management and monitoring is to record environmental impacts resulting from the project activities and to ensure implementation of the “mitigation measures” identified earlier in order to reduce adverse impacts and enhance positive impacts from specific project activities. Besides, it would also address any unexpected or unforeseen environmental impacts that may arise during construction and operation phases of the project. ADB environmental safeguards objectives are: (i) to ensure the environmental soundness and sustainability of projects and (ii) to support the integration of environmental considerations into the project decision-making process. ADB environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts.

1.1 Location of the Project

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



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

1.2 Context of the monitoring report

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

1.3 Project Progress Status

APSCL and CNTIC are working so hard to reach the target within the timeframe. About 66% of work has been done where 8% 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. The updated status of Ashuganj 400 MW (East) Combined Cycle Power Plant Project (CCPP) from January 2021 to June 2021 is given below in Table 1 and **Figure 2, 3** shows the present site condition wherein construction work is going on. Foundation work of Bypass stack, Turbine, Generator, Demi water storage tank, fire & service water storage tank, unit transformer and auxiliary transformer and water intake point has been completed. Major mechanical work of casing of turbine hall, Air compressor building, central control Building (CCB), Heat Recovery Stream Generator (HRSG), Power control center, Exhaust stack super structure work, demi water storage tank, RMS is going on. Site processing is in progress for cooling water discharge, Pump house, Gas booster and transformer. Chemical treatment plant and Water intake plant construction work is going on. Site processing and foundation work is going on for Emergency Oil pit, Oily waste water treatment station, sewage treatment station and Gas booster and conditioning station. A photo index of progress status is attached in Annex I.

Table 1: Project Progress Status

Sl No.	Task Name	Progress upto December 2020	Progress from January- June 2020	Cumulative Progress
1	Design	84%	16%	100%
2	Procurement	97%	3%	100%
3	Demolition work of old plant	100%	0%	100%
4	Construction	63%	8%	71%
6	Commissioning	0%	13%	13%

Monthly Work Progress Report is attached in Annexure 1



Figure 2: Construction Works



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

1.4 Environmental Management Implementation Work Schedule

Environmental management implementation work schedule for next six months working plan (July 2021 to December 2021) is shown in Table 2.

Table 2: Environmental management implementation work schedule for next six months working plan (July 2021 to December 2021)

SL No.	Works Description	Date					
		3 rd July	7 th August	4 th September	2 nd October	6 th November	4 th December
1	Ambient Air Quality (2 Locations) & Noise Level (Day & Night)- 2 Locations						
2	Ambient Air Quality (2 Locations), Noise Level (Day & Night)-3 Location						
3	Ambient Air Quality (1 Locations), Sampling of River Water (3 Locations) and Drinking Water (4 Locations) and on-site test. Visual Monitoring.						

1.5 Progress Status on Implementation of Environment Management Activity

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

Table 3: Implementation of Environmental Management Activity During Construction Phase

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

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

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

SL 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	√			

SL No.	Issue	Key aspects	Monitoring Frequency	¹ Compliance status			Remarks/Mitigation measures
				C	PC	NC	
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		√		Need to improve <ul style="list-style-type: none"> Permanent oily waste disposal system should be constructed as early as possible.
7.	Worker's health	Monitoring process of worker's health	Monthly	√			
8.	Complain from neighbours	Any significant complain from neighbours and its remedial procedure	Monthly	√			
9.	Safety orientation & training of workers	Frequency of training & orientation of workers for safety	Monthly	√			
10.	Sanitation & drinking water facility to workers	Availability of safe drinking water and sanitation to the workers	Monthly	√			
11.	Site Drainage	Maintaining proper drainage	Monthly		√		Need to improve <ul style="list-style-type: none"> For temporary solution please kept it clean regularly. Permanent site drain should be constructed as early as possible.

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

1.6 Corrective Action Plan (CAP)

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

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

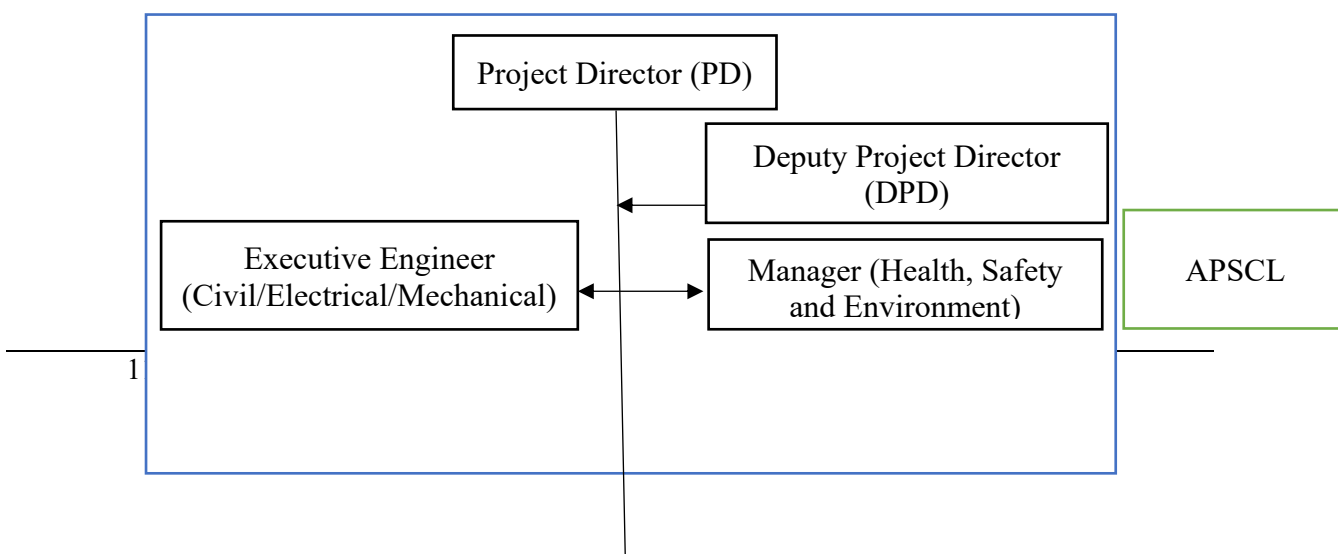
SL No.	Issue	Mitigation Measures	Time
2.	Oily waste generation & disposal system	For temporary solution please kept it at bounded place and not to dispose directly in solid and water.	Immediately / weekly basis
		Permanent oily waste disposal system should be constructed as early as possible.	December 2021 (before operation)
3.	Site Drainage	For temporary solution please kept it clean regularly.	Immediately/weekly basis
		Permanent site drain should be constructed as early as possible.	December 2021 (before operation)
4.	Drinking water	Source of drinking water at location D4 is ground water well and is contaminated with Fe. So, as mitigation measures all workers are suggested not to drink water from location D4.	Already done

2.0 ENVIRONMENTAL RESPONSIBILITIES AND INSTITUTIONAL SETUP

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

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

Management of environmental and social impacts during construction period is primary responsibility of the EPC Contractor as per the EPC contract. During the construction phase, APSCL will review and monitor EPC Contractors performance in accordance with the SEMP. The overall Project organizational structure for the implementation of the SEMP is shown in Figure 4 and key roles for implementation and supervision of the SEMP are described in Table 6.



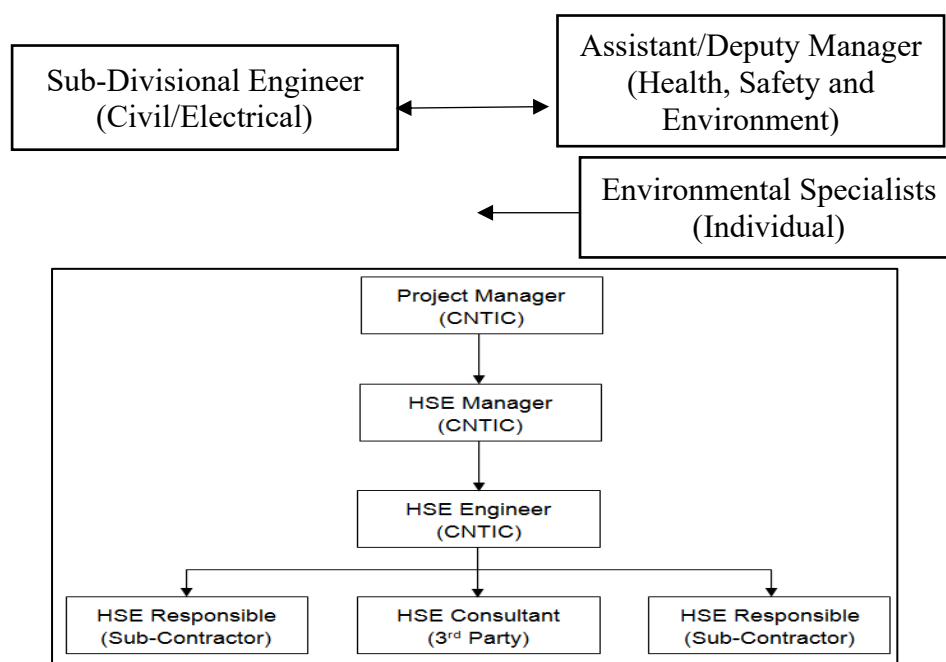


Figure 4: SEMP Organizational Structure

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

SL No.	Project Key personnel	Name of Key personnel	Telephone No.
01	Manager (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	Manager (Chemical)	Md. Ashraful Islam	01717650871
05	Assistant Manager (HS&E)	Md. Dilshad Ibne Baqui	01730026795
06	Assistant Engineer (Elect.)	Aminul Islam	01739653761
07	Assistant Manager (Chem.)	Md. Yasin Molla	01923606305
08	Operator (3 Nos.)	1. Milon Kanti Das 2. Md. Wasi Uddin 3. Ashiq Hasan	
09	Environmental Specialist	Mohammad Arifur Rahman	01711128593

3.0 Safeguard Compliance Performance of the Project

3.1 Compliance with the Environmental Provisions of National Legal Instruments

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

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

Policies, Laws and Regulations	Responsible Agency/Ministry/ Authority	Potential Applicability	Compliance Status
National Environmental Policy, 1992	Ministry of Environment and Forest; Department of Environment	<ul style="list-style-type: none"> ➤ The policy sets out policies to prevent environmental pollution and natural resource degradation. ➤ The Policy states that Environmental Impact Assessments (EIAs) must be conducted before projects are undertaken. 	Complied with: EIA report was prepared and approved by DoE. DoE clearance of EIA renewal is attached in Annex V.
The Environment Conservation Act, 1995	Ministry of Environment and Forest; Department of Environment	<ul style="list-style-type: none"> ➤ According to this law no industrial unit or project shall be established or undertaken without obtaining, in the manner prescribed by rules, an Environmental Clearance Certificate from the Director General. 	Complied with: EIA report was prepared and approved by DoE.
Environment Conservation Rules, 1997	Ministry of Environment and Forest; Department of Environment	<ul style="list-style-type: none"> ➤ The Rule sets out procedure for issuing Environmental Clearance Certificate. ➤ According to the Rule, proposed project is Red category project and needs to fulfill following requirements <ul style="list-style-type: none"> ❖ Prepare Initial Environmental Examination report. ❖ Report on the Environmental Management Plan (EMP). ❖ Prepare Environmental Impact Assessment report. ❖ Obtain No objection certificate of the local authority. 	Complied with: EIA report was prepared and approved by DoE. EMP was prepared. Obtain No objection certificate of the local authority and DoE.
National Land Use Policy, 2001	Ministry of Land	<ul style="list-style-type: none"> ➤ The policy provides guidelines for the protection of agricultural land, water bodies 	Complied with. The project area

		and the optimal use of other land, as well as for restriction or minimization of the acquisition of land for non-productive use.	does not evolve any land acquisition.
Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009	Ministry of Environment and Forest	➤ This strategy prioritizes adaptation and disaster risk reduction. The climate change action plan is built on six pillars. One of them is research and knowledge management to predict the likely scale and timing of climate change impacts on different sectors.	Complied with.
Bangladesh Labour (Amendment) 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, 2020	Ministry of Housing and Public Works	➤ Any planning, design and supervision of construction, repair, maintenance, modification and alteration of buildings, or any other work regulated by the Code shall be certified by a licensed engineer, architect or planner for its compliance with the provision of Code.	Complied with. Clearances from local authorities before start of any construction activity.

3. 2 SPS, 2009 Compliance Status

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

Table 8: ADB Safeguards Policy compliance Status for the Projects

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

3.3 Compliance of environmental covenants from the ADB loan agreement

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

Table 9: Compliance with Environmental Considerations of Loan Agreements

Covenants	Reference	Compliance status
Environment		
The borrower shall ensure, or cause APSCL to ensure, that the preparation, design, construction implementation, operation and decommissioning of the project and all project facilities comply with (a) All applicable laws and regulations of the Borrower relating to the environment, health, and safety;	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

<p>(b) The environmental safeguards;</p> <p>(c) The EARF; and</p> <p>(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</p>		<p>Quality was monitored and report was submitted each month by EPC which was verified by an independent environmental Consultant to evaluate the environmental and social safeguard policy performance.</p> <p>c) The EARF is followed as per requirements.</p> <p>d) All measures and 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.</p>
Land Acquisition and Involuntary Resettlement		
<p>The borrower shall ensure, or cause APSCL to ensure, that all land and all rights-of-way required for the project, and all project facilities are made available to the works contractor in accordance with the schedule agrees under the related works contract and all land acquisition and resettlement activities are implemented in compliance with</p> <p>(a) all applicable laws and regulations of the borrower relating to land acquisition and involuntary resettlement;</p> <p>(b) the involuntary resettlement safeguards;</p> <p>(c) the RF; and</p> <p>(d) All measures and requirement set forth in the respective RP, and any corrective or preventive actions set forth in a safeguards monitoring report.</p>	<p>LA, Schedule 5, Para 3</p>	<p>In the case of APSCL, this type of issues does not arise due to the project location. The project location is inside the premises of APSCL own land. So, There was no requirement of Land Acquisition and Involuntary Resettlement throughout the project period.</p>
Safeguards – Related provisions in bidding documents and works contracts		

<p>The borrower shall ensure, or cause each projects executing agency to ensure, that all bidding documents and contracts for works contain provisions that require the contractor to:</p> <ul style="list-style-type: none"> (a) Comply with the measures and requirements relevant to the contractor set forth in the EIA, IEE, the EMP, the RP and any small ethnic community peoples plan(to the extent they concern impacts on affected people during construction), and any corrective or preventive actions set out in a safeguards monitoring report; (b) Make available a budget for all such environmental and social measures; (c) Provide the borrower with a written notice of any unanticipated environmental, resettlement or small ethnic community people risks or impacts that arise during construction, implementation or operation of the project that were not considered in the EIA, the IEE, the EMP, the RP or any small ethnic community peoples plan; (d) Adequately record the condition of roads, agricultural and other infrastructure prior to starting to transport materials and construction; (e) Fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction. 	<p>LA, Schedule 5, Para 7</p>	<ul style="list-style-type: none"> (a) APSCL complied with the measures and requirements relevant to the contractor set forth in the EIA, IEE, the EMP, the RP and any small ethnic community peoples plan(to the extent they concern impacts on affected people during construction), and any corrective or preventive actions set out in a safeguards monitoring report; (b) Proper budget was allocated for all such environmental and social measures. (c) APSCL followed that properly as per requirements and standard of ADB Social Safeguard Policy. (d) it was maintained as given guideline. (e) it was followed as per requirements.
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Safeguards- Monitoring and Reporting		
<p>The borrower shall do the following or shall cause APSCL to do the following:</p> <p>(a) Submit semiannual safeguards monitoring reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission;</p> <p>(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;</p> <p>(c) No later than the mobilization of the turnkey contractor for APSCL,s power plant, engage qualified and experienced external experts or qualified no-governmental organizations under a selection process and terms of reference acceptable to ADB, to verify information produced through the project monitoring process, and facilitated the carrying out of any verification by such external experts; and</p> <p>(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.</p>	<p>LA, Schedule 5, Para 7</p>	<p>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.</p> <p>b) It is followed as per the ADB guideline.</p> <p>c) One Environmental Expert is engaged already, and he is monitoring and giving valuable comments and feedback to APSCL.</p> <p>d) As per SEMP, we will follow the instruction.</p>

Labor standards		
<p>The borrower shall ensure that all works contract documents to be prepared under the project incorporate provisions and budget to the effect that contractors</p> <ul style="list-style-type: none"> (a) Comply with all applicable labor laws and related international treaty obligations of the borrower and do not employ child labor as defined under Bangladesh law; (b) Provide safe working conditions for male and female workers; (c) Carry out HIV/ AIDS and human trafficking prevention and awareness campaigns in the campsites and corridors of influence; (d) Engage women worker as wage laborers depending on their skill; and (e) Provide equal wages for equal work between men and women 	<p>LA, Schedule 5, Para 10</p>	<ul style="list-style-type: none"> a) APSCL complies exiting all labor laws and related international treaty obligations of the borrower and not engaged any child labor at the project site. b) APSCL is committed to provide safe working condition both for male and female workers and follow up regularly. c) APSCL arrange this type awareness program at the foundation training of the worker. d) The women were engaged on the basis of their skill and there was no discrimination between man and women in terms of wage of equal work. e) It was maintained strictly.

4.0 ENVIRONMENTAL STATUS

The APSCL 400 MW (East) project is classified as Environmental Category A as per the ADB's SPS 2009, as significant impacts are envisioned. The related initial environmental examination (IEE) report, Environmental Impact Assessment Report (EIA) and Site-specific Environmental Management Plan (SEMPs) has been prepared in accordance with ADB SPS 2009 requirements for environment category A projects and provide mitigation and monitoring measures, for no envisaged significant impacts, as a result of implementing the project. The environmental mitigation measures, as stipulated in the SEMP's and in the obtained environmental permit, are monitored during the implementation of the programme. The environmental mitigation measures, as stipulated in SEMP's for the current construction activity were monitored as a part of this EMR (January to June 2021). Environmental compliance report has been prepared based on site visit, sampling analysis and follow ups were tracked to observe corrective measures and desired progress. Monitoring locations and Sampling locations map are attached in Annex II and Annex III.

Until date 12 environmental safeguards monitoring visits have been conducted at different times during the current cycle (January- June 2021) of monitoring period. Environmental

compliance report has been prepared based on site visit and follow ups were tracked to observe corrective measures and desired progress.

4.1 Analytical Monitoring and Observations

Laboratory Test results is attached in Annex IV.

4.1.1 Air Quality Monitoring

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




Air Quality Monitoring Location at TSK (L3)	Air Quality Monitoring Location at near APSCL dormitory (L4)
	
Air Quality Monitoring Location at Govt. Haji Abdul Jalil High School (L5)	

Figure 5: Air quality monitoring

Table 10: Test Result of Ambient Air Quality

JANUARY 2021								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	Baseline for L1 (Jan 2015) **	L2	L3	L4	L5
PM 2.5	65 µg/m ³	75 µg/m ³	54.81	57	54.86	52.27	43.38	56.16
PM 10	150 µg/m ³	150 µg/m ³	88.14	136	100.71	114.48	82.80	104.33
SPM	200 µg/m ³	NF	138.47	297	164.42	157.10	140.38	158.82
SO ₂	365 µg/m ³	125 µg/m ³	16.29	28	16.62	13.90	18.42	13.07
NO _x	NF	200 µg/m ³	28.16	33	21.16	27.36	20.34	33.74
CO	35 ppm	NF	18	2.8	2	6	8	8
FEBRUARY 2021								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	Baseline for L1 (Feb 2015) **	L2	L3	L4	L5
PM 2.5	65 µg/m ³	75 µg/m ³	54.81	51	57.19	50.13	46.06	54.81
PM 10	150 µg/m ³	150 µg/m ³	88.14	123	101.18	92.37	74.18	88.14
SPM	200 µg/m ³	NF	138.47	312	149.49	139.48	108.48	138.47
SO ₂	365 µg/m ³	125 µg/m ³	16.29	30	14.30	19.29	11.57	16.29
NO _x	NF	200 µg/m ³	28.16	34	33.16	30.23	26.61	28.16
CO	35 ppm	NF	18	2.6	2	26	19	18
MARCH 2021								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	Baseline for L1 (Mar 2015) **	L2	L3	L4	L5
PM 2.5	65 µg/m ³	75 µg/m ³	57.11	59	47.62	51.85	49.20	42.37
PM 10	150 µg/m ³	150 µg/m ³	101.48	97	90.66	97.73	82.41	69.49
SPM	200 µg/m ³	NF	153.76	214	132.38	140.29	127.16	118.30
SO ₂	365 µg/m ³	125 µg/m ³	12.48	28	11.55	16.43	14.28	13.21
NO _x	NF	200 µg/m ³	20.64	39	21.20	19.71	14.10	16.43
CO	35 ppm	NF	33	2.4	8	13	28	4

APRIL 2021								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	Baseline for L1 (April 2015)	L2	L3	L4	L5
PM 2.5	65 µg/m ³	75 µg/m ³	52.76	55	51.29	56.62	41.29	39.14
PM 10	150 µg/m ³	150 µg/m ³	91.18	108	106.24	97.69	76.47	68.82
SPM	200 µg/m ³	NF	139.93	291	148.16	151.27	119.18	108.22
SO ₂	365 µg/m ³	125 µg/m ³	11.19	27	15.53	18.72	12.55	10.29
NO _x	NF	200 µg/m ³	21.18	36	26.48	33.77	23.05	16.62
CO	35 ppm	NF	19	3.2	11	33	16	1
MAY 2021								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	Baseline for L1 (May 2014)**	L2	L3	L4	L5
PM 2.5	65 µg/m ³	75 µg/m ³	51.28	47	52.36	51.77	46.30	43.92
PM 10	150 µg/m ³	150 µg/m ³	93.44	103	103.31	90.82	87.11	71.26
SPM	200 µg/m ³	NF	141.74	296	148.71	144.20	129.43	108.16
SO ₂	365 µg/m ³	125 µg/m ³	13.82	26	15.73	12.20	14.22	14.84
NO _x	NF	200 µg/m ³	21.41	29	24.60	20.19	17.65	17.86
CO	35 ppm	NF	29	208	7	13	18	2
JUNE 2021								
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	Baseline for L1 (June 2014)**	L2	L3	L4	L5
PM 2.5	65 µg/m ³	75 µg/m ³	32.46	31	38.61	34.66	28.70	21.26
PM 10	150 µg/m ³	150 µg/m ³	59.10	54	62.39	64.92	52.02	46.36
SPM	200 µg/m ³	NF	93.88	181	94.37	93.68	72.50	64.90
SO ₂	365 µg/m ³	125 µg/m ³	9.27	18	9.64	8.33	9.48	7.10
NO _x	NF	200 µg/m ³	14.28	22	14.84	13.91	14.56	12.38
CO	9 ppm	NF	16	1,4	2	2	8	1

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

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

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

SO_x: Sulfur oxides (SO_x) are compounds of sulfur and oxygen molecules. Sulfur dioxide (SO₂) is the pre-dominant form found in the lower atmosphere. It is a colorless gas that can be detected by taste and smell in the range of 1,000 to 3,000 micrograms per cubic meter (µg/m³). Concentration of SO₂ ranges from 7.10 to 19.29 µg/m³ which are within the standard for air quality.

NO_x: In atmospheric chemistry, NO_x is a generic term for the nitrogen oxides that are most relevant for air pollution, namely nitric oxide (NO) and nitrogen dioxide (NO₂). These gases contribute to the formation of smog and acid rain, as well as tropospheric ozone. For all the location the values of NO_x ranges from 12.38 to 33.77 µg/m³ which is within the standard.

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

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

4.1.2 Noise Measurement

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

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

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

	
<p>Noise Quality Monitoring Location in front of Admin Building, APSCL (L1)</p>	<p>Noise Quality Monitoring Location at APSCL School (L2)</p>
	
<p>Noise Quality Monitoring Location at TSK (L3)</p>	<p>Air Quality Monitoring Location at near APSCL dormitory (L4)</p>
	
<p>Noise Quality Monitoring Location at Govt. Haji Abdul Jalil High School (L5)</p>	

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



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

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

Table 11: Test Result of Noise Quality

JANUARY 2021								
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	Baseline Data of EIA Date: 30/4/2015
Day (Min)	75	70	52.6	56.6	58.9	52.2	51.3	69.08
Day(Max)	75	70	63.5	61.0	65.4	64.8	56.6	76.4
Night (Min)	70	70	48.9	48.3	47.4	47.7	46.1	66.6
Night(Max)	70	70	57.1	57.1	52.2	51.2	51.3	69.93
FEBRUARY 2021								
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	Baseline Data of EIA Date: 30/4/2015
Day (Min)	75	70	53.1	56.2	52.0	51.8	55.7	69.08
Day(Max)	75	70	61.0	64.2	66.1	65.2	59.0	76.4
Night (Min)	70	70	53.9	43.2	46.3	44.2	42.2	66.6
Night(Max)	70	70	55.3	59.5	50.2	50.8	48.5	69.93
MARCH 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	50.2	57.1	51.3	53.3	52.3	69.08
Day(Max)	75	70	60.4	65.6	66.6	64.8	55.2	76.4
Night (Min)	70	70	46.2	44.6	43.1	48.0	44.9	66.6
Night(Max)	70	70	60.1	61.2	51.4	49.1	50.1	69.93
APRIL 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	51.6	53.2	54.9	50.4	48.7	69.08
Day(Max)	75	70	63.1	62.4	64.6	59.9	56.3	76.4
Night (Min)	70	70	48.4	46.4	50.2	49.2	46.2	66.6
Night(Max)	70	70	51.6	54.1	52.1	51.3	51.0	69.93
MAY 2021								
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	Baseline Data of EIA Date: 30/4/2015
Day (Min)	75	70	52.2	51.5	48.3	51.2	50.3	69.08
Day(Max)	75	70	61.4	62.8	64.2	58.1	53.1	76.4
Night (Min)	70	70	44.2	44.1	44.1	46.3	46.9	66.6
Night(Max)	70	70	60.4	57.2	56.1	56.6	51.3	69.93
JUNE 2021								
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	Baseline Data of EIA Date: 30/4/2015
Day (Min)	75	70	53.8	54.9	49.3	57.8	48.3	69.08
Day(Max)	75	70	64.3	66.2	62.2	60.3	59.4	76.4
Night (Min)	70	70	48.2	48.6	46.2	48.1	48.4	66.6
Night(Max)	70	70	57.2	59.3	55.9	57.0	53.4	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

Health, Safety & Environment Division of APSCL has provided pure drinking water at several locations in APSCL plant area that also covers the under construction 400 MW CCPP (East) project to supply pure and safe drinking water to all the workers of this project and also to other employees, contractors and visitors of 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

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



Figure 8: Drinking Water Sampling

Table 12: Drinking Water Quality Test Result

JANUARY 2021							
PARAMETER	DoE (Bangladesh) Standard *	Baseline (24.08.15)**	IFC/World Bank Standard	D1	D2	D3	D4
pH	6.5-8.5	6.8	6.5-8.5	6.86	6.98	7.10	7.13
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	-	---	0.08	<0.08	0.08	0.2
As	0.05 mg/l	-	0.01 mg/l	<0.003	<0.005	<0.005	0.008
Fe	0.3 -1 mg/l	0.13	0.3 mg/l	0.56	0.5	0.5	2.2
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
FEBRUARY 2021							
PARAMETER	DoE (Bangladesh) Standard *	Baseline (24.08.15)**	IFC/World Bank Standard	D1	D2	D3	D4
pH	6.5-8.5	6.8	6.5-8.5	7.06	6.86	6.97	6.98
Ammonia	0.5 mg/l	-	---	<0.2	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	<1	<1	<1	<1
Phosphate	6 mg/l	-	---	0.01	0.03	0.08	0.01
As	0.05 mg/l	-	0.01 mg/l	<0.01	0.005	0.005	0.008
Fe	0.3 -1 mg/l	0.13	0.3 mg/l	<0.01	0.5	0.5	0.6
Mn	0.1 mg/l	-	0.5 mg/l	<0.01	<0.1	<0.1	<0.1
Total Coliform	0/100 ml	0	0/100 ml	0	0	0	0
Fecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0
MARCH 2021							
PARAMETER	DoE (Bangladesh) Standard *	Baseline (24.08.15)**	IFC/World Bank Standard	D1	D2	D3	D4
pH	6.5-8.5	6.8	6.5-8.5	7.23	7.10	7.08	7.21
Ammonia	0.5 mg/l	-	---	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	<1	<1	1.5	2.5
Phosphate	6 mg/l	-	---	0.07	0.07	0.1	0.1
As	0.05 mg/l	-	0.01 mg/l	<0.003	<0.003	0.01	0.008
Fe	0.3 -1 mg/l	0.13	0.3 mg/l	0.66	0.46	0.21	1.26
Mn	0.1 mg/l	-	0.5 mg/l	<0.01	<0.1	<0.1	<0.1
Total Coliform	0/100 ml	0	0/100 ml	0	0	0	0
Fecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0

APRIL 2021							
PARAMETER	DoE (Bangladesh) Standard *	Baseline (24.08.15)**	IFC/World Bank Standard	D1	D2	D3	D4
pH	6.5-8.5	6.8	6.5-8.5	7.13	6.94	7.10	7.10
Ammonia	0.5 mg/l	-	---	<0.2	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	<1	<1	<1	<1
Phosphate	6 mg/l	-	---	0.03	0.01	0.05	0.02
As	0.05 mg/l	-	0.01 mg/l	<0.01	0.005	<0.005	<0.005
Fe	0.3 -1 mg/l	0.13	0.3 mg/l	<0.01	0.5	0.5	0.8
Mn	0.1 mg/l	-	0.5 mg/l	<0.01	<0.1	<0.1	<0.1
Total Coliform	0/100 ml	0	0/100 ml	0	0	0	0
Fecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0
MAY 2021							
PARAMETER	DoE (Bangladesh) Standard *	Baseline (24.08.15)**	IFC/World Bank Standard	D1	D2	D3	D4
pH	6.5-8.5	6.8	6.5-8.5	7.28	7.21	7.12	7.21
Ammonia	0.5 mg/l	-	---	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	-	50 mg/l	<1	<1	<1	1.8
Phosphate	6 mg/l	-	---	0.07	0.07	0.07	0.08
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	0.51	0.59	0.27	0.56
Mn	0.1 mg/l	-	0.5 mg/l	<0.01	<0.1	<0.1	<0.1
Total Coliform	0/100 ml	0	0/100 ml	0	0	0	0
Fecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0
JUNE 2021							
PARAMETER	DoE (Bangladesh) Standard *	Baseline (24.08.15)**	IFC/World Bank Standard	D1	D2	D3	D4
pH	6.5-8.5	6.8	6.5-8.5	7.22	7.14	7.02	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	0.08
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	0.32	0.54	0.18	0.5
Mn	0.1 mg/l	-	0.5 mg/l	<0.01	<0.1	<0.1	<0.1
Total Coliform	0/100 ml	0	0/100 ml	0	0	0	0
Fecal Coliform	0/100 ml	0	0/100 ml	0	0	0	0

*ECR'1997

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

pH: pH is a measure of the hydrogen ion concentration in water and indicates whether the water is acidic or alkaline. The measurement of alkalinity and acidity of pH is required to determine the corrosiveness of the water. From the test result of the drinking water, it is observed that pH values are within national standard ranges from 6.86 to 7.28.

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

Iron (Fe): Natural waters contain variable amounts of iron depending on the geological area and other chemical components of the waterway. Iron in groundwater is normally present in the ferrous or bivalent form $[Fe^{++}]$ which is soluble. It is easily oxidized to ferric iron $[Fe^{+++}]$ or insoluble iron upon exposure to air. The concentration of iron is within the national standard for the project area except D4 location (outside the project area) in January and March and notified the neighboring user not to use the water for drinking or cooking purpose. The value varies between <0.01 and 2.2 mg/l.

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

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

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.

From the analysis, it was found that all parameters of drinking water within standard limit of DoE, Bangladesh and WHO except Fe (January and March) in D4. D4 drinking water source is ground water well and is contaminated with Fe. So, as mitigation measure all workers are suggested not to drink water from location D4. However, this source is outside of the project. Pure drinking water is supplied by HS&E division by eight stages purification systems with alkaline RO and UV disinfection system from APSCL water plant. All employees and worker of the project are using the purified water for drinking purpose.

4.1.3.2 River Water Quality Analysis

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



Figure 9: River Water Sampling

Table 13: River Water Quality Test Result

JANUARY 2021					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38 °C	-	20.1	19.4	19.2
Dissolved Oxygen (DO)	7.3 mg/l	-	5.5	5.5	5.0
BOD5	7 mg/l	-	0.1	0.2	0.7
COD	32 mg/l	-	4.3	4.8	4.8
Chromium (Total)	-	-	0.05	0.03	<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	-	<5.0	<5.0	<5.0

FEBRUARY 2021					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38 °C	-	23.4	23.1	20.4
Dissolved Oxygen (DO)	7.3 mg/l	-	5.5	5.5	5.5
BOD5	7 mg/l	-	0.1	0.6	1.2
COD	32 mg/l	-	4.0	4.2	6.1
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	-	4.2	<5.0	5.0
MARCH 2021					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38 °C	-	24.2	23.7	23.1
Dissolved Oxygen (DO)	7.3 mg/l	-	5.2	5.8	5.5
BOD5	7 mg/l	-	0.1	0.2	1.0
COD	32 mg/l	-	9.6	7.5	11.2
Chromium (Total)	-	-	<0.02	<0.02	<0.02
Cadmium	-	-	<0.002	<0.002	<0.002
Lead (Pb)	<0.05 mg/l	-	<0.05	<0.05	<0.05
Oil & Grease	<5.5 mg/l	-	4.2	<5.0	5.0
APRIL 2021					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38 °C	-	25.1	24.6	24.3
Dissolved Oxygen (DO)	7.3 mg/l	-	6.3	6.1	6.0
BOD5	7 mg/l	-	0.2	1.3	1.4
COD	32 mg/l	-	3.0	4.6	5.9
Chromium (Total)	-	-	0.02	<0.02	<0.02
Cadmium	-	-	<0.002	<0.002	<0.002
Lead (Pb)	<0.05 mg/l	-	<0.05	<0.05	<0.05
Oil & Grease	<5.5 mg/l	-	2.2	3.3	4.1
MAY 2021					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38 °C	-	26.2	25.7	27.9
Dissolved Oxygen (DO)	7.3 mg/l	-	5.5	5.0	5.6
BOD5	7 mg/l	-	0.1	0.1	0.6
COD	32 mg/l	-	4.3	5.1	8.1
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	-	1.3	<1.0	1.2

JUNE 2021					
PARAMETER	Baseline Data from EIA (30.4.2015)*	IFC/World Bank Standard	Upstream	Downstream	Outfall
Temperature	38 °C	-	22.3	22.1	23.4
Dissolved Oxygen (DO)	7.3 mg/l	-	6.0	6.0	5.6
BOD5	7 mg/l	-	0.2	0.4	1.0
COD	32 mg/l	-	2.2	3.0	5.1
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.

** <5.0 is lowest concentration limit means zero

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

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

Chemical Oxygen Demand (COD): Chemical Oxygen Demand is the total measurement of all chemicals in the water that can be oxidized. The value of COD was ranges from 2.2 to 11.2 mg/l.

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

4.1.3.3 Ground Water Quality Analysis

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





Figure 10: Ground water sampling

Table 14: Ground Water Quality

JANUARY 2021						
PARAMETER	Baseline Data from EIA 30.4.2015	DoE/IFCStandard	G1	G2	G3	G4
pH	6.9	-	7.0	7.0	7.12	6.89
TDS	-	-	341	326	343	318
Ammonia	0.35 mg/l	-	<0.01	<0.01	<0.01	<0.01
Nitrate	2.15 mg/l	-	<1.5	<1.0	1.5	<1.0
Phosphate	3.65 mg/l	-	0.1	0.07	<0.1	0.07
As	0.003 mg/l	-	<0.003	<0.003	<0.003	<0.003
Fe	0.4 mg/l	-	0.21	<0.1	0.2	0.5
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
APRIL 2021						
PARAMETER	Baseline Data from EIA 30.4.2015	DoE/IFCStandard	G1	G2	G3	G4
pH	6.9	-	7.11	7.08	7.16	6.89
TDS	-	-	412	376	309	318
Ammonia	0.35 mg/l	-	<0.01	<0.01	<0.01	<0.01
Nitrate	2.15 mg/l	-	1.5	<1.0	1.0	<1.0
Phosphate	3.65 mg/l	-	0.1	0.1	<0.1	0.07
As	0.003 mg/l	-	<0.003	<0.003	<0.003	<0.003
Fe	0.4 mg/l	-	0.3	<0.1	0.2	0.2
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.

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 6.89 to 7.16.

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

Iron (Fe): Natural waters contain variable amounts of iron depending on the geological area and other chemical components of the waterway. Iron in groundwater is normally present in the ferrous or bivalent form $[Fe^{++}]$ which is soluble. It is easily oxidized to ferric iron $[Fe^{+++}]$ or insoluble iron upon exposure to air. The concentration of iron varies from 0.1 and 0.3 mg/l.

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

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

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.

From the analysis all parameters of ground water suggested that the project may has no influence on the quality.

4.1.4 Soil Quality Analysis

Soil is an important component of the environment and also is an integral component of the terrestrial ecosystem providing habitat and a source of food for key components of the food web. The soil samples collected from different points as prescribed have been analyzed and shown in Table 15. Soil sampling is shown in Figure 11.

Table 15: Soil Quality

PARAMETER	DoE (Bangladesh) Standard *	**OSPAR Guidelines for Management of Dredged Material	Unit	L1	L2	L3
Chromium	-	150-200	ppm	21.11	17.32	15.18
Cadmium	-	1.0-2.5	ppm	<1.0	0.5	0.6
Lead	-	---	ppm	8.81	8.54	18.31
Oil and grease	-	50 mg/l	mg/kg	1.3	1.6	1.1

*no standard for soil.

** OSPAR (The Convention for the Protection of the Marine Environment of the North-East Atlantic)



Figure 11: Soil sampling

4.2 Visual Monitoring and Observations

4.2.1 Traffic Volume

The Project is under construction phase now. The daily traffic details on day to day basis are being monitored (Table 16) 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 16: Total number of vehicles based on their categories

Name of vehicle	Number of Vehicles
Truck	118
Tailor (load>20T)	49
Microbus	92
Cars	59
Total	318

4.2.2 Site Security

CNTIC-CCOEC Consortium already constructed of site boundary fencing (Figure 12) 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 12) 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 12: Site Security & Safety Instruction Board

4.2.3 Personal Protective Equipment

The working personnel involved in the construction activities has to be under the safeguard of personal protective equipment (PPE) properly. Everyone was instructed to use proper PPE strictly. Figure 13 shows that, the workers involved in construction were using applicable PPEs. A list of PPEs that are supplied are listed in Table 17.

Table 17: 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.

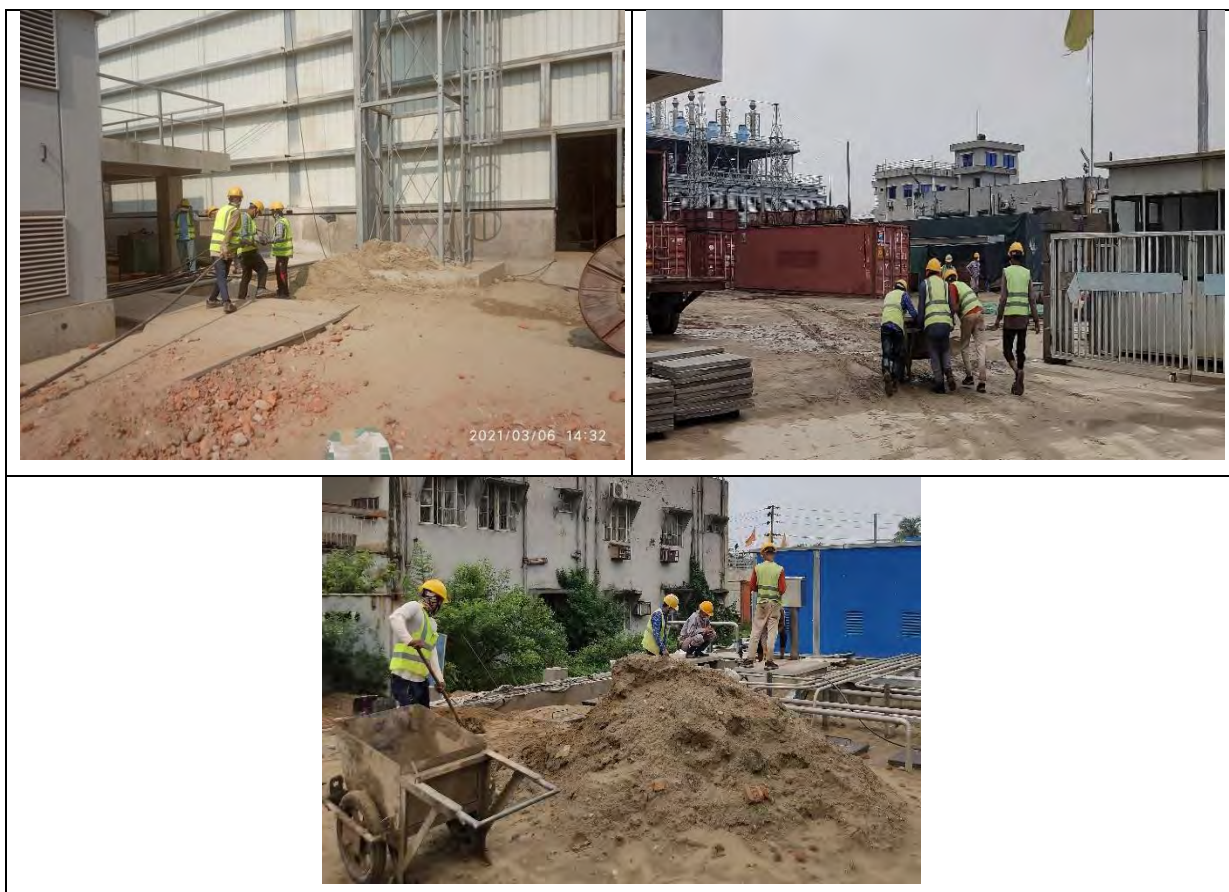


Figure 13: Use of Proper PPEs

4.2.4 Incident Record & Reporting

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

4.2.5 Solid Waste

Solid wastes were generated from construction works (construction waste) and workers activities (kitchen waste, paper waste) at the project site. The main solid waste is construction waste i.e. plastic pipe, brick, rubbish, scrab, cable and broken bricks. Waste inventory was properly maintained and Table 18 describes the amount of waste generated according to their character during the reporting time. Generated solid and domestic waste are disposed in designated Municipal area of Ashuganj gool Chottor.

**Table 18: Waste Inventory Log of CNTIC-CCOEC Consortium
(From January to June 2021)**

SI	Wastage Name	Wastage Classification	Wastage Type	Source of wastage	Wastage storage area	Storage quantity (kg)	Delivery quantity (kg)	Agreement	Remarks
1	Plastic Pipe	Hazardous	Solid	Construction Site	On site	20.4	20.4	Ok	Ok
2	Brick	Non-Hazardous	Solid	Construction Site	On site	37.2	37.2	Ok	Ok
3	Rubbish	Non-Hazardous	Solid	Construction Site	On site	28.1	28.1	Ok	Ok
4	Scrap	Hazardous	Solid	Construction Site	On site	20.9	20.9	Ok	Ok
5	Cable	Non-Hazardous	Solid	Construction Site	On site	17.2	17.2	Ok	Ok
6	Aggregate	Non-Hazardous	Solid	Construction Site	On site	51.7	51.7	Ok	Ok

4.2.5.1 Solid Waste Management Plan

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

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

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

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

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

Recyclable waste: paper, glass, metals, plastics.

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

Step- 04: Disposal System: From the transported solid waste, the recyclable inorganic solid waste will be recycled and biodegradable organic solid waste will be disposed in the selected disposal location. From this location, the Municipal Authority collects this waste to dump at their location. Remaining non-biodegradable waste will be sold to secondary vendors. The disposal location has been shown in Figure-14.



Figure 14: Photograph of Solid waste disposal location

4.2.6 Worker's Health and COVID Response

The CNTIC-CCOEC consortium will provide all kinds of treatment facilities and pay compensation according to Bangladesh Labor Law 2018. A medical center is already installed with first aid facility and an ambulance (Figure 15) 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 16) of each worker was checked two times a day and record was kept. Use of mask is mandatory and the entire worker was encouraged to sanitize their hand. Hand wash facilities were installed at different locations of project site and adequate materials were made available (Figure 17). During the period 92 Chinese people arrived and the last one arrived on 29th November 2020. After completing quarantine for 14 days and confirming COVID19 negative they were allowed to enter the site. List of equipment and medicines in the first aid box is available with all the first aid box. First Aid Box medicine list are adhesive tape, Face Mask, Hand Gloves, Hand Sanitizer, adhesive bandages (Band-Aids) in several sizes, elastic bandage, Splint, antiseptic wipes, antibiotic ointment, antiseptic solution (like hydrogen peroxide), hydrocortisone cream (1%), acetaminophen and ibuprofen, tweezers, sharp scissors, safety pins, calamine lotion, alcohol wipes or ethyl alcohol, thermometer, saline.



Figure 15: On-site Ambulance and furnished First Aid box



Figure 16: Daily Body Temperature Monitoring and COVID-19 sign

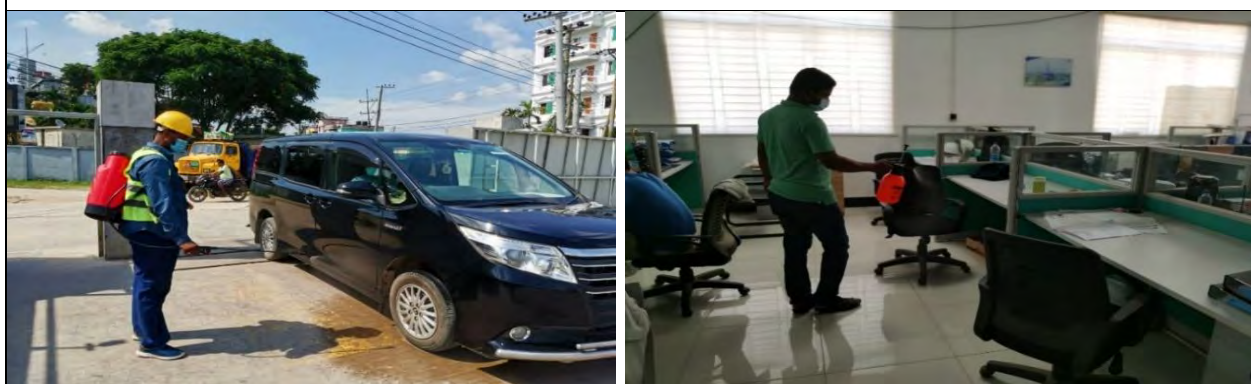
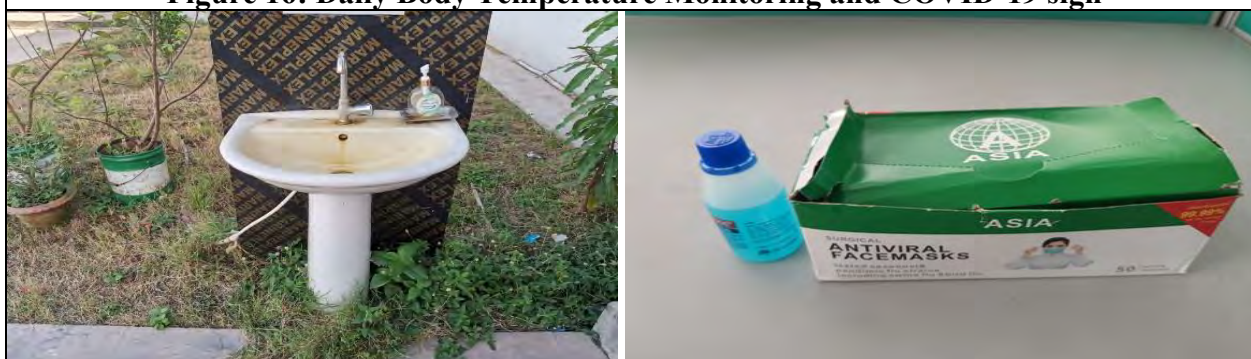


Figure 17: On-Site Wash, Sanitation and Hygiene facilities.

4.2.7 Grievance Redress Mechanism

During the construction phase of a project, the complaints that may be anticipated are mostly related to poor environmental quality, lack of job opportunity, discrimination of wage and gender, unsafe working condition and so on. However, unforeseen issues may occur. CNTIC-CCOEC consortium has already established grievance redress mechanism. Complain from neighbours are duly recorded & adequate measures are taken accordingly. Though the project site is within the APSCL boundary, the Northwest side of the project site is near to some houses of neighbors. CNTIC-CCOEC Consortium has already set up a suggestion box (Figure 18) in front of the project site to facilitate the neighbours to rise complains and take immediate measure to resolve the complaints. However, no such complaine was raised to resolve. APSCL as a project proponent also set a grievance redress committee (GRC) has been formed with following personals (Table 19) to rectify issue from different stockholders if raised. GRM register form is attached in Annex VII.

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

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



Figure 18: 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 19: 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 and Training of Workers

Training is essential to maintain the employee health and safety. Both theoretical and practical training (Figure 18) are conducted for the employees on the hazards, precautions, and procedures for the safe storage, handling, and use of all potentially harmful materials. Safety orientation & training for the workers are provided to all working personnel during the fresh enrolment /employment. CNTIC-CCOEC Consortium arrange routine safety training (Figure 19) at definite time interval for the workers throughout the construction phase of the project. In addition, Training procedure will incorporate information from the Material Safety Data Sheets (MSDS) for potentially harmful materials. Toolbox meeting is arranged in regular basis. CNTIC arrange epidemic prevention knowledge trainings that teach the correct method of wearing face masks, hand washing and other protective measures considering the present condition of Corona Virus. CNTIC has taken some protective measures for safety of worker and other employee–Wear face masks in public area. Cover the mouth and nose with bent elbow or tissue when cough or sneeze, and dispose of the used tissue immediately.

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



Figure 19: Toolbox meeting and training of workers

To improve the environmental, health & safety performance, monthly safety meeting was conducted each month with CNTIC and NEPC. Last safety meeting was conducted on 17/06/2021. About 25 issues were discussed to resolve within a set deadline. Responsibilities were also delegated to different persons from both CNTIC and NEPC for proper implementation of work. A summary of HSE management and monitoring is illustrated in Table 20.

Table 20: Summary of HSE Management

Areas to improve:		Housekeeping all area, Proper Safety, Housekeeping, Confined Space entry, toolbox, drainage system, Use of PPE, Incident reporting			
SI	Description	From January-June 2021	From July-December 2020	Till June 2021	Remarks
1	Total Man-hour	615680	294792	2065964	Increased
2	Safe man hours	615680	294792	2065964	Increased
3	Fatal Accidents	0	0	0	
4	Lost Time Injury (LTI)	0	0	0	No Change
5	Medical Treatment (MT)	0	0	4	No Change
6	First Aid Cases (FAC)	170	78	514	First aid cases are increased compared to previous period due to work volume

7	Health Incidents	0	0	0	No Change
8	Property Damage (PD)	0	0	0	No Change
9	Fire/Explosion	0	0	1	No Change
10	Security Incident	0	0	2	No Change
11	Near Miss	0	1	5	Decreased
13	Environment (EN)	0	0	0	No Change
14	Job Transfer days	0	0	0	No Change
15	Total Days Lost	0	0	0	No Change
17	Toolbox Talks	181	30	810	Increased
18	Grievance	0	0	0	No Change

4.2.9 Sanitation and Drinking Water Facility

Ground water is being supplied through the arrangement of piping network in the construction site and this water is available for the workers for the washing and toilet facilities. Besides, CNTIC-CCOEC Consortium Management supplies drinking water Jar for drinking purpose of the workers. Furthermore, eight stages robust drinking water purification system with reverse osmosis, UV disinfection system with ambient and cold-water facility (Figure 20) 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 20: Pure Drinking Water (Left) and Sanitation facility (Right) to workers.

4.2.10 Site Drainage

In the Construction site, proper outer/inter drainage system has to be developed in the project site. At present there is no inner drainage at project site. After completion of construction works, necessary outer/inner drainage will be constructed. As per ADB recommendation some

temporary cover (Figure 21) on the top of the drain are put in to avoid throwing of litters in the drain.



Figure 21: Cover slab on the top of drain

4.2.11 Dust Control

Dust poses negative impact of air quality as well as health especially in dry season. To control the dust water were sprayed regularly at least 3 times and more as required (Figure 21) and stock materials were kept covered to prevent dust emission.



Figure 222: Water spraying for dust control.

4.2.12 Oily Waste Generation & Disposal System

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

5.0 CONCLUSION AND RECOMMENDATION

The environmental monitoring report consists of 11th Semiannually environmental monitoring reporting based on monthly measured ambient air, noise, drinking water, ground and river water quality parameters. The work has been assigned EPC contractor CNTIC-CCOEC Consortium performed for the period of January to June 2021. Ambient air quality parameters

were determined in the site with the help of high-volume sampler and noise quality was done by noise level meter. Drinking water, ground and surface water quality parameters were analyzed in the laboratory. All of the mitigation measures are taken following ADB Environmental Safeguard Policy 2009, IFC/World Bank Thermal Power plant guideline 2008 and 2017 and DoE, Bangladesh guideline.

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

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

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

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

Finally, it can be concluded that though the plant has a minor detrimental impact for short period on the environment in terms of ambient air during the construction period but it was minimized and managed by proper environmental management. The plant provides a good working environment for the workers.

ANNEX-I: PHOTO APPENDIX



Construction of Central Control Building (CCB)



Construction of Turbine & Generator Hall



Superstructure Construction of HRSG and Exhaust Stack



Hydrogen Gas Receiver



Service and Fire Water Tank



Power Control Center



Generator Step up transformer



DIL Water tank



Water intake plant



Construction of chemical plant



Air Storage tank



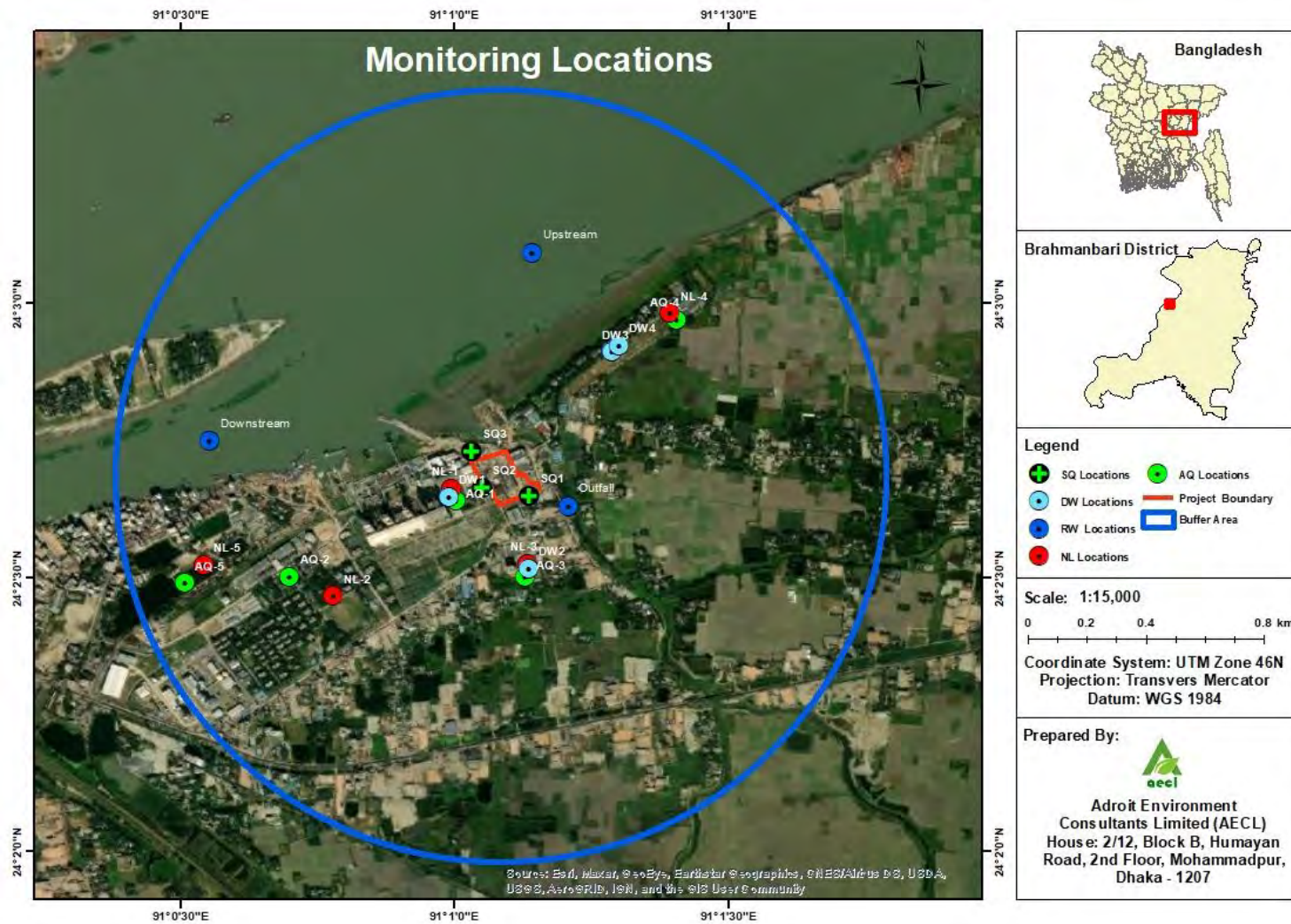
Sewage treatment station

ANNEX-II: MONITORING LOCATIONS

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

Category	Indication of Location	GPS Co-ordinate		Specific Location	Distance (m)
		Latitude	Longitude		
Drinking Water	Location-1 (D1)	24° 2'39.43"N	91° 0'58.29"E	North-West side of the project area at canteen	60.3
	Location-2 (D2)	24° 2'35.47"N	91°01'6.38"E	South-west side of Project area at admin building (Purifier)	41.53
	Location-3 (D3)	24°02'38.86'' N	91°01' .10'' E	South-west side of Project area near PDB High School.	56.51
	Location-4 (D4)	24° 2'38.51"N	91°01'1.10"E	South-West side of Project area at Haji Abdul Jalil High School.	55.63
Ground Water	Location 1: G1	24° 02'38.1''N	91°0'58.0''E	Inside the project area	60.3
	Location 2: G2	24° 2'30.5"N	91°00'42.2"E	South-west side of Project area near PDB High School	56.51
	Location 3: G3	24° 02'34.1''N	91° 1' 9.3''E	South-East side of the project	56.51
	Location 4: G4	24° 02' 47.2''N	91° 1'12.3''E	North-East side of the project area	55.63
Soil Quality	Location-1 (L1)	24° 02' 41.8''N	91° 1' 3.83'' E	Inside the project site	8.5
	Location-2 (L2)	24° 2'40.27'' N	91° 1'6.05"E	Inside the project site	10.6
	Location-3 (L3)	24° 02' 39.72'' N	91° 1' 8.25'' E	Inside the project site	5.3

ANNEX-III: MONITORING LOCATIONS MAP



ANNEX-IV: LABORATORY TEST RESULT (January 2021)



Adroit Environment Consultants Ltd.

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

Memo # AECI : 812
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 : 16th to 19th January, 2021
Reporting date : 23rd January, 2021

Description of analysis

S N	Parameters	Method	Test Duration (hours)	Unit	24°2'3 8.5° N 91°1' 0.0°E (L1)	24°2'3 0.5° N 91°0'4 2.2°E (L2)	24°2'3 4.7° N 91°1'8 .7°E (L3)	24°2'58. 5° N 91°1'23. 9°E (L4)	24°2'31. 7° N 91°00'3 0.3°E (L5)	Bangladesh (DoE) Standard	IPC /World Bank Standard
1	PM _{2.5}	Gravimetric	24	µg/m ³	41.18	54.86	52.27	43.38	56.16	65	75
2	PM ₁₀	Gravimetric	24	µg/m ³	92.22	100.71	114.48	82.80	104.33	150	150
3	SPM	Gravimetric	8	µg/m ³	129.69	164.42	157.10	140.38	158.82	200	NF
4	SO ₂	West-Gaske	24	µg/m ³	12.71	16.62	13.90	18.42	13.07	365	125
5	NO _x	Jacob and Hochheiser	1	µg/m ³	22.47	21.16	27.36	20.34	33.74	NF	200
6	CO	CO/O ₂ Meter	1	ppm	16	2	6	8	8	35	NF

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

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

1. Fine Particulate Matter (PM_{2.5}).
2. Respirable Dust Content (PM₁₀).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_x).
5. Oxides of Sulfur (SO₂).
6. Carbonyl 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
General Manager

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



AECL LABORATORY ANALYSIS REPORT AMBIENT NOISE QUALITY TEST REPORT



Memo # AECL : 812
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 : 16th to 19th January, 2021
Reporting date : 23rd January, 2021

Description of analysis

SN.	Site Location	Site Condition	Concentrations present (LA _{eq}) dBA.			
			Day Time		Night Time	
			Minimum	Maximum	Minimum	Maximum
01	Test Result in South-West side of Project area near APSCL Admin building, (location # 01) N- 24°02'38.5" E-091°01' 0.0"	Construction Stage	52.6	63.5	48.9	57.1
02	Test Result in South-West side of Project area near PDB High School, (location # 02) N-24°02'30.5" E-091°0'42.2"	Construction Stage	56.6	61.0	48.3	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	58.9	65.4	47.4	52.2
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	64.8	47.7	51.2
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	51.3	56.6	46.1	51.3
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
General Manager



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

Memo # AECL : 812
 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 : 19th January, 2020
 Reporting date : 1st February, 2020

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	20.1	19.4	19.2	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	5.5	5.5	5.0	mg/l	DO meter
BOD ₅	0.1	0.2	0.7	mg/l	5-day BOD test
COD	4.3	4.8	4.8	mg/l	Open Reflux
Chromium	0.05	0.03	<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	<5.0	<5.0	<5.0	mg/l	APHA 5520.B

***No standard was found for River Water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
General Manager



AECL LABORATORY ANALYSIS REPORT DRINKING WATER QUALITY TEST REPORT

Memo # **AECL** : **812**
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 : 18th January, 2021
Reporting date : 1st February, 2021

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	6.86	6.98	7.10	7.13	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	0.08	<0.08	0.08	0.2	6	-	mg/l	Photometric
As	<0.003	<0.005	<0.005	0.008	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	0.56	0.5	0.5	2.2	0.3-1.0	-	mg/l	Spectrophotometer
Mn	<0.1	<0.1	<0.1	<0.1	0.1	0.5	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique

* DoE Standard for drinking water.

Comment: Iron (Fe) content at location D4 i.e. drinking water source of Hazi Abdul Jalil High School doesn't conform to the given limit.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
General Manager



AECL LABORATORY ANALYSIS REPORT GROUND WATER QUALITY TEST REPORT



Memo # AECL : 812
 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 : 19th January, 2021
 Reporting date : 1st February, 2021

Description of analysis

Name of the Parameter	Concentration Present				Unit	Method of analysis
	(G1)	(G2)	(G3)	(G4)		
pH	7.0	7.0	7.12	6.89	-	pH Meter
TDS	341	326	343	318	Mg/l	TDS Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	mg/l	Photometric
Nitrate	<1.5	<1.0	1.5	<1.0	mg/l	Potentiometric
Phosphate	0.1	0.07	<0.1	0.07	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	mg/l	Atomic Absorption Spectrophotometer
Fe	0.21	<0.1	0.2	0.5	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
General Manager

(February 2021)



Adroit Environment Consultants Ltd.

A House of Complete Environmental Management Solutions



AECL LABORATORY ANALYSIS REPORT AMBIENT AIR QUALITY TEST REPORT

Memo # AECL : 815
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 : 6th ~ 9th February, 2021
Reporting date : 20th February, 2021

Description of analysis

S N	Parameters	Method	Test Duration (Hours)	Unit	24°2'3	24°2'3	24°2'3	24°2'58.	24°2'31.	Bangladesh (DoE) Standard	IPC /World Bank Standard
					8.5° N 91° 1' 0.0° E (L1)	0.5° N 91° 0'4 2.2° E (L2)	4.7° N 91° 1'8 .7° E (L3)	5° N 91° 1'23. 9° E (L4)	7° N 91° 00'3 0.3° E (L5)		
1	PM _{2.5}	Gravimetric	24	µg/m ³	54.81	57.19	50.13	46.06	45.47	65	75
2	PM ₁₀	Gravimetric	24	µg/m ³	88.14	101.18	92.37	74.18	79.20	150	150
3	SPM	Gravimetric	8	µg/m ³	138.47	149.49	139.48	108.48	120.67	200	NF
4	SO ₂	West-Gaske	24	µg/m ³	16.29	14.30	19.29	11.57	13.05	365	125
5	NO _x	Jacob and Hochheiser	1	µg/m ³	28.16	33.16	30.23	26.61	20.18	NF	200
6	CO	CO/O ₂ Meter	1	ppm	18	2	26	19	0	35	NF

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

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

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

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

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
General Manager

2/12, Humayun Road (2nd Floor), Block-B, Mohammadpur, Dhaka-1207 Tel: +88-02-9116712-13
Mob: 01733376809-10, Fax: +88-02-9116714, Email: nukhan05@gmail.com, aecldhaka@gmail.com
WWW.Aecl-bd.org



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



Memo # AECL : 815
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 : 6th ~ 9th February, 2021
Reporting date : 20th February, 2021

Description of analysis

SN.	Site Location	Site Condition	Concentrations 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	53.1	61.0	53.9	55.3
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	56.2	64.2	43.2	59.5
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	52.0	66.1	46.3	50.2
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	51.8	65.2	44.2	50.8
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	55.7	59.0	42.2	48.5
DoE (Bangladesh) Standard for Industrial area			75		70	
IFC/International Standard for Industrial/Commercial Zone			70		70	

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

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

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
General Manager



Adroit Environment Consultants Ltd.

A House of Complete Environmental Management Solutions



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

Memo # AECL : **815**
 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 : 9th February, 2021
 Reporting date : 2nd March, 2021

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	23.4	23.1	20.4	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	5.5	5.5	5.5	mg/l	DO meter
BOD ₅	0.1	0.6	1.2	mg/l	5-day BOD test
COD	4.0	4.2	6.1	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	4.2	<5.0	5.0	mg/l	APHA 5520.B

***No standard was found for River Water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
General Manager

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

WWW.Aecl-bd.org



AECL LABORATORY ANALYSIS REPORT DRINKING WATER QUALITY TEST REPORT

Memo # AECL : 815
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 : 9th February, 2021
Reporting date : 2nd March, 2021

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.06	6.86	6.97	6.98	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Photometric
Nitrate	<1	<1	<1	<1	10	50	mg/l	Potentiometric
Phosphate	0.01	0.03	0.08	0.01	6	-	mg/l	Photometric
As	<0.01	0.005	0.005	0.008	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	<0.01	0.5	0.5	0.6	0.3-1.0	-	mg/l	Spectrophotometer
Mn	<0.01	<0.1	<0.1	<0.1	0.1	0.5	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique

* DoE Standard for drinking water.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
General Manager

(March 2021)



Adroit Environment Consultants Ltd.

A House of Complete Environmental Management Solutions



Memo # **AECL**
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 : **6th ~ 9th March, 2021**
Reporting date : **28th March, 2021**

Description of analysis

S N	Parameters	Method	Test Duration (hours)	Unit	24°2'3 8.5° N 91°1' E 0.0° E (L1)	24°2'3 0.5° N 91°0'4 2.2° E (L2)	24°2'3 4.7° N 91°1'8 7° E (L3)	24°2'58 5° N 91°1'23 9° E (L4)	24°2'31 7° N 91°0'3 0.3° E (L5)	Bangladesh (DoE) Standard	IPC /World Bank Standard
1	PM _{2.5}	Gravimetric	24	µg/m ³	57.11	47.62	51.85	49.20	42.37	65	75
2	PM ₁₀	Gravimetric	24	µg/m ³	101.48	90.66	97.73	82.41	69.49	150	150
3	SPM	Gravimetric	8	µg/m ³	153.76	132.38	140.29	127.16	118.30	200	NF
4	SO ₂	West-Gaske	24	µg/m ³	12.48	11.55	16.43	14.28	13.21	365	125
5	NO _x	Jacob and Hochheiser	1	µg/m ³	20.64	21.20	19.71	14.10	16.43	NF	200
6	CO	CO/O ₂ Meter	1	ppm	33	8	13	28	4	35	NF

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

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

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

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

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

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

WWW.Aecl-bd.org



AECL LABORATORY ANALYSIS REPORT AMBIENT NOISE QUALITY TEST REPORT



Memo # AECL : 825
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 : 6th ~ 9th March, 2021
Reporting date : 28th March, 2021

Description of analysis

SN.	Site Location	Site Condition	Concentration present (LA _{eq}) dBA.			
			Day Time		Night Time	
			Minimum	Maximum	Minimum	Maximum
01	Test Result in South-West side of Project area near APSCL Admin building, (location # 01) N- 24°02'38.5" E-091°01' 0.0"	Construction Stage	50.2	60.4	46.2	60.1
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	57.1	65.6	44.6	61.2
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	51.3	66.6	43.1	51.4
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	53.3	64.8	48.0	49.1
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	52.3	55.2	44.9	50.1
DoE (Bangladesh) Standard for Industrial area			75		70	
IEC/International Standard for Industrial/Commercial Zone			70		70	

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

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

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



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

Memo # AECL : 825
 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 : 9th March, 2021
 Reporting date : 28th March, 2021

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	24.2	23.7	23.1	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	5.2	5.8	5.5	mg/l	DO meter
BOD ₅	0.1	0.2	1.0	mg/l	5-day BOD test
COD	9.6	7.5	11.2	mg/l	Open Reflux
Chromium	<0.02	<0.02	<0.02	mg/l	Atomic Absorption Spectrophotometer
Cadmium	<0.002	<0.002	<0.002	mg/l	Atomic Absorption Spectrophotometer
Pb	<0.05	<0.05	<0.05	mg/l	Atomic Absorption Spectrophotometer
Oil & Grease	4.2	<5.0	5.0	mg/l	APHA 5520.B

***No standard was found for River Water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT DRINKING WATER QUALITY TEST REPORT

Memo # AECL : 825
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 : 9th March, 2021
Reporting date : 28th March, 2021

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.23	7.10	7.08	7.21	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Photometric
Nitrate	<1	<1	1.5	2.5	10	50	mg/l	Potentiometric
Phosphate	0.07	0.07	0.1	0.1	6	-	mg/l	Photometric
As	<0.003	<0.003	0.01	0.008	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	0.66	0.46	0.21	1.26	0.3-1.0	-	mg/l	Spectrophotometer
Mn	<0.01	<0.1	<0.1	<0.1	0.1	0.5	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique

* DoE Standard for drinking water.

Comment: Iron content at Hazi Abdul Jalil School (D4) doesn't conform to the standard.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

(April 2021)



Adroit Environment Consultants Ltd.

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

Memo # AECL : 828
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 April to 5th April, 2021
Reporting date : 20th April, 2021

Description of analysis

S N	Parameters	Method	Test Duration (hours)	Unit	24°2'3 8.5° N 91°1' 0.0° E (L1)	24°2'3 0.5° N 91°0'4 2.2° E (L2)	24°2'3 4.7° N 91°1'8 .7° E (L3)	24°2'58. 5° N 91°1'23. 9° E (L4)	24°2'31. 7° N 91°00'3 0.3° E (L5)	Bangladesh (DoE) Standard	IPC /World Bank Standard
1	PM _{2.5}	Gravimetric	24	µg/m ³	52.76	51.29	56.62	41.29	39.14	65	75
2	PM ₁₀	Gravimetric	24	µg/m ³	91.18	106.24	97.69	76.47	68.82	150	150
3	SPM	Gravimetric	8	µg/m ³	139.93	148.16	151.27	119.18	108.22	200	NF
4	SO ₂	West-Geske	24	µg/m ³	11.19	15.53	18.72	12.55	10.29	365	125
5	NO _x	Jacob and Hochheiser	1	µg/m ³	21.18	26.48	33.77	23.05	16.62	NF	200
6	CO	CO/O ₂ Meter	1	ppm	19	11	33	16	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 (PM₁₀).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_x).
5. Oxides of Sulfur (SO₂).
6. Carbone Mono-Oxide (CO).

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

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



Adroit Environment Consultants Ltd.

A House of Complete Environmental Management Solutions



AECL LABORATORY ANALYSIS REPORT AMBIENT NOISE QUALITY TEST REPORT

Memo # AECL : 828
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 4th April, 2021
Reporting date : 20th April, 2021

Description of analysis

SN.	Site Location	Site Condition	Concentration present (LA _{eq}) dBA			
			Day Time		Night Time	
			Minimum	Maximum	Minimum	Maximum
01	Test Result in South-West side of Project area near APSCL Admin building, (location # 01) N- 24°02'38.5" E-091°01' 0.0"	Construction Stage	51.6	63.1	48.4	51.6
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	53.2	62.4	46.4	54.1
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	54.9	64.6	50.2	52.1
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	50.4	59.9	49.2	51.3
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	48.7	56.3	46.2	51.0
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: The results found showed conformity to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

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

WWW.Aecl-bd.org



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

Memo # AECL : 828
 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 : 5th April, 2021
 Reporting date : 27th April

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	25.1	24.6	24.3	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	6.3	6.1	6.0	mg/l	DO meter
BOD ₅	0.2	1.3	1.4	mg/l	5-day BOD test
COD	3.0	4.6	5.9	mg/l	Open Reflux
Chromium	0.02	<0.02	<0.02	mg/l	Atomic Absorption Spectrophotometer
Cadmium	<0.002	<0.002	<0.002	mg/l	Atomic Absorption Spectrophotometer
Pb	<0.05	<0.05	<0.05	mg/l	Atomic Absorption Spectrophotometer
Oil & Grease	2.2	3.3	4.1	mg/l	APHA 5520.B

***No standard was found for River Water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT DRINKING WATER QUALITY TEST REPORT

Memo # AECL : 828
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 : 5th April, 2021
Reporting date : 27th April, 2021

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.13	6.94	7.10	7.10	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Photometric
Nitrate	<1	<1	<1	<1	10	50	mg/l	Potentiometric
Phosphate	0.03	0.01	0.05	0.02	6	-	mg/l	Photometric
As	<0.01	0.005	<0.005	<0.005	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	<0.01	0.5	0.5	0.8	0.3-1.0	-	mg/l	Spectrophotometer
Mn	<0.01	<0.1	<0.1	<0.1	0.1	0.5	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique

* DoE Standard for drinking water.

Comment: All the parameters conform to the standards compared with.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT GROUND WATER QUALITY TEST REPORT



Memo # AECL : 828
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 : 5th April, 2021
Reporting date : 27th April, 2021

Description of analysis

Name of the Parameter	Concentration Present				Unit	Method of analysis
	(G1)	(G2)	(G3)	(G4)		
pH	7.11	7.08	7.16	6.89	-	pH Meter
TDS	412	376	309	318	Mg/l	TDS Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	mg/l	Photometric
Nitrate	1.5	<1.0	1.0	<1.0	mg/l	Potentiometric
Phosphate	0.1	0.1	<0.1	0.07	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	mg/l	Atomic Absorption Spectrophotometer
Fe	0.3	<0.1	0.2	0.2	mg/l	Spectrophotometer
Mn	<0.1	<0.1	<0.1	<0.1	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	n/100 ml	Membrane Filter Technique

* No standard found for ground water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

(May 2021)



Adroit Environment Consultants Ltd.

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

Memo # AECL : 832
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 5th May, 2021
Reporting date : 27th May, 2021

Description of analysis

S N	Parameter	Method	Test Duration (hours)	Unit	(L1)	(L2)	(L3)	(L4)	(L5)	Bangladesh (DoE) Standard	IFC/World Bank Standard
1	PM _{2.5}	Gravimetric	24	µg/m ³	51.28	52.36	51.77	46.30	43.92	65	75
2	PM ₁₀	Gravimetric	24	µg/m ³	93.44	103.31	90.82	87.11	71.26	150	150
3	SPM	Gravimetric	8	µg/m ³	141.74	148.71	144.20	129.43	108.16	200	NF
4	SO ₂	West-Geske	24	µg/m ³	13.82	15.73	12.20	14.22	14.84	365	125
5	NO _x	Jacob and Hochheiser	1	µg/m ³	21.41	24.60	20.19	17.65	17.86	NF	200
6	CO	CO/O ₂ Meter	1	ppm	29	7	13	18	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 (PM₁₀).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_x).
5. Oxides of Sulfur (SO₂).
6. Carbone Mono-Oxide (CO).

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

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

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



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



Memo # AECL : 832
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 5th May, 2021
Reporting date : 27th May, 2021

Description of analysis

SN.	Site Location	Site Condition	Concentration present (LA _{eq}) dBA.			
			Day Time		Night Time	
			Minimum	Maximum	Minimum	Maximum
01	Test Result in South-West side of Project area near APSCL Admin building, (location # 01) N- 24°02'38.5" E-091°01'0.0"	Construction Stage	52.2	61.4	44.2	60.4
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	51.5	62.8	44.1	57.2
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	48.3	64.2	44.1	56.1
04	Test Result in North-East side of Project area at Laydown, (location # 04) N- 24°02'58.5" E-091°01'23.9"	Construction Stage	51.2	58.1	46.3	56.6
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	53.1	46.9	51.3
DoE (Bangladesh) Standard for Industrial area			75		70	
IFC/International Standard for Industrial/Commercial Zone			70		70	

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

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

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



AECL LABORATORY ANALYSIS REPORT DRINKING WATER QUALITY TEST REPORT

Memo # AECL : 832
 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 : 5th May, 2021
 Reporting date : 27th May, 2021

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.28	7.21	7.12	7.21	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	Photometric
Nitrate	<1	<1	<1	1.8	10	50	mg/l	Potentiometric
Phosphate	0.07	0.07	0.07	0.08	6	-	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	0.51	0.59	0.27	0.56	0.3-1.0	-	mg/l	Spectrophotometer
Mn	<0.01	<0.1	<0.1	<0.1	0.1	0.5	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique

* DoE Standard for drinking water.

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

2/12, Humayun Road (2nd Floor), Block-B, Mohammadpur, Dhaka-1207 Tel: +88-02-9116712-13
 Mob: 01733378609-10, Fax: +88-02-9116714, Email: nukhan05@gmail.com, aecldhaka@gmail.com

WWW.Aecl-bd.org



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

Memo # AECL : 832
 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 : 5th May, 2021
 Reporting date : 27th May, 2021

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	26.2	25.7	27.9	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	5.5	5.0	5.6	mg/l	DO meter
BOD ₅	0.1	0.1	0.6	mg/l	5-day BOD test
COD	4.3	5.1	8.1	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	1.3	<1.0	1.2	mg/l	APHA 5520.B

***No standard was found for River Water

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



Adroit Environment Consultants Ltd.

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AECL LABORATORY ANALYSIS REPORT SOIL QUALITY TEST REPORT

Memo # AECL : 832
 Project Name : Ashuganj 400MW Combined Cycle Power Plant (East)
 Project Location : Ashuganj, Brahmanbaria.
 Sample Collector : Adroit Environment Consultants Ltd (Monitoring team)
 Description of Sample : Soil
 Sampling Location : Ashuganj, Brahmanbaria (Near project area)
 Sampling date : 5th May, 2021
 Reporting date : 27th May, 2021

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Location 1	Location 2	Location 3		
Chromium	28.38	22.46	13.79	ppm	Atomic Absorption Spectrophotometer
Cadmium	<1.0	<1.0	<1.0	ppm	Atomic Absorption Spectrophotometer
Lead	10.06	11.91	9.36	ppm	Atomic Absorption Spectrophotometer
Oil & Grease	<0.5	<0.5	<0.5	mg/kg	APHA 5520.B

*** No standard was found for Soil

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

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

WWW.Aecl-bd.org

(June 2021)



Adroit Environment Consultants Ltd.

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

Memo # AECL : 837
Project Name : Ashuganj 400MW CCPP (East)
Project Location : Ashuganj, Brahmanbaria.
Description of Sample : Ambient Air
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team).
Sampling date : 1st to 4th June, 2021
Reporting date : 23rd June, 2021

Description of analysis

S N	Para- meters	Method	Test Duration (hours)	Unit	24°2'3 8.5" N 91°1' 0.0" E (L1)	24°2'3 0.5" N 91°0'4 2.2" E (L2)	24°2'3 4.7" N 91°1'8 .7" E (L3)	24°2'58. 5" N 91°1'23. 9" E (L4)	24°2'31. 7" N 91°00'3 0.3" E (L5)	Eurochem (DoE) standard	IPC /World Bank Standard
1	PM _{2.5}	Gravimetric	24	µg/m ³	32.46	38.61	34.66	28.70	21.26	65	75
2	PM ₁₀	Gravimetric	24	µg/m ³	59.10	62.39	64.92	52.02	46.36	150	150
3	SPM	Gravimetric	8	µg/m ³	93.88	94.37	93.68	72.50	64.90	200	NF
4	SO ₂	West-Gaske	24	µg/m ³	9.27	9.64	8.33	9.48	7.10	365	125
5	NO _x	Jacob and Hochheiser	1	µg/m ³	14.28	14.84	13.91	14.56	12.38	NF	200
6	CO	CO/O ₂ Meter	1	ppm	16	2	2	8	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 (PM₁₀).
3. Suspended Particulate Matter (SPM).
4. Oxides of Nitrogen (NO_x).
5. Oxides of Sulfur (SO₂).
6. Carbone Mono-Oxide (CO).

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

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

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

WWW.Aecl-bd.org



AECL LABORATORY ANALYSIS REPORT AMBIENT NOISE QUALITY TEST REPORT



Memo # AECL : 837
Project Name : Ashuganj 400MW CCPP (East)
Project Location : Ashuganj, Brahmanbaria

Description of Sample : Ambient Noise
Sample Collector : Adroit Environment Consultants Ltd. (Monitoring team)
Sampling date : 1st to 4th June, 2021
Reporting date : 23rd June, 2021

Description of analysis

SN.	Site Location	Site Condition	Concentration present (LA _{eq}) dBA.			
			Day Time		Night Time	
			Minimum	Maximum	Minimum	Maximum
01	Test Result in South-West side of Project area near APSCL Admin building, (location # 01) N- 24°02'38.5" E-091°01'0.0"	Construction Stage	53.8	64.3	48.2	57.2
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	54.9	66.2	48.6	59.3
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	49.3	62.2	46.2	55.9
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	57.8	60.3	48.1	57.0
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	48.3	59.4	48.4	53.4
DoE (Bangladesh) Standard for Industrial area			75		70	
IEC/International Standard for Industrial/Commercial Zone			70		70	

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

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

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer



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

Memo # AECL : 837
 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 June, 2021
 Reporting date : 23rd June, 2021

Description of analysis

Name of the Parameter	Concentration present			Unit	Method of analysis
	Upstream	Downstream	Outfall		
Temperature	22.3	22.1	23.4	°C	Mercury filled thermometer
Dissolved Oxygen (DO)	6.0	6.0	5.6	mg/l	DO meter
BOD ₅	0.2	0.4	1.0	mg/l	5-day BOD test
COD	2.2	3.0	5.1	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



Adroit Environment Consultants Ltd.

A House of Complete Environmental Management Solutions



AECL LABORATORY ANALYSIS REPORT DRINKING WATER QUALITY TEST REPORT

Memo # AECL : 837
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 June, 2021
Reporting date : 23rd June, 2021

Description of analysis

Name of the Parameter	Concentration Present				DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	(D1)	(D2)	(D3)	(D4)				
pH	7.22	7.14	7.02	7.23	6.5 – 8.5	-	-	pH Meter
Ammonia	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	Photometric
Nitrate	<1	<1	<1	<1	10	50	mg/l	Potentiometric
Phosphate	0.07	0.07	0.07	0.08	6	-	mg/l	Photometric
As	<0.003	<0.003	<0.003	<0.003	0.05	0.01	mg/l	Atomic Absorption Spectrophotometer
Fe	0.32	0.54	0.18	0.05	0.3-1.0	-	mg/l	Spectrophotometer
Mn	<0.01	<0.1	<0.1	<0.1	0.1	0.5	mg/l	Atomic Absorption Spectrophotometer
Total Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	0	0	0	0	n/100 ml	Membrane Filter Technique

* DoE Standard for drinking water.

Comment: All the parameters conform to the given standards.

Md. Faisal Bin Mahmud
Sr. Chemist

Md. Saiful Islam
Chief Operating Officer

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

WWW.Aecl-bd.org

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/32	Calibration Date :- 08.10.2020	Page 1 of 1
Suggested Date of Next Calibration :- 07.10.2021		
Customer Name :- M/s Adroit environment Consultants Limited		
Address :- 2/12, Humayun Road (2nd Floor), Block B Mohammadpur, Dhaka-1207, Bangladesh		
Reference :- S.R.F. No. :- 2020/111	Date :- 25.10.2020	

01. Instrument

Name	Origin	Model	Sl.No.
Digital Sound Meter	USA	Wensn WS 1361C	Ref-AECL-04

02. Calibrator Used

Sl.No.	Standard Equipment Name	Limit	Ref. No.	Calibration Agency
1	Lutron Sound Calibrator Model- SC 942	Up to 1000 Hz	FST/113G/11	LES, CCL, Greater Noida
	Certificate No. CC22224189600012SL	Calibration Date 03.03.2020		Valid Up to 02.03.2021

03. Calibration Results

Sl.No.	Reference Concentration (dB)	Result Obtained (dB)	Error Rate (%)
1	94	94	0
2	94	94	0
3	94	94	0
4	94	94	0
5	114	114	0
6	114	114	0
7	114	114	0
8	114	114	0

Standard Uncertainty for repeated data (1-4) = ± 0.00001 ppm;

Standard Uncertainty for repeated data (5-8) = ± 0.00001 ppm

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

ANNEX-VI: DoE CLEARANCE of EIA RENEWAL



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

ইআইএ নবায়ন

স্মারকসং নং: ২০-৪৬৬০০

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

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



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

Page 1 of 2

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

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

ইআইএ নবায়ন এর জন্য প্রযোজ্য শর্তাবলী:

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

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

Page 2 of 2


ANNEX VII: CARBON FOOTPRINT ANALYSIS

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

Ashuganj 400 MW CCPP East Project


			<u>Methodology</u>			
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%				
<u>Calculation</u>						
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


04.07.2021
Md. Atiqur Rahman
 Manager (Health, Safety & Environment)
 Ashuganj Power Station Co. Ltd.
 Ashuganj, Brahmanbaria