North-West Power Generation Company Limited

Annual Public Environmental and Social Report (2020-2021)

Sirajganj 225 MW Combined Cycle Power Plant
Project (2nd Unit - Dual Fuel)

October - 2021

1. About the Project:

NWPGCL is already constructed two 225MW Combined Cycle Power Plant at Saydabad under Sirajganj district beside the Sirajganj 225MW Combined Cycle Power Plant (unit-1) with the bidder's finance. Out of two, Sirajganj 225 MW Combined Cycle Power Plant Project (2nd Unit - Dual Fuel) has been commissioned at 5th February 2018.

The configuration of the proposed Sirajganj 225 MW Combined Cycle Power Plant (2nd Unit-Dual Fuel) is multi shaft 1:1:1 consisting of one gas turbine, one HRSG and one steam turbine with by-pass stack for GT single operation of each unit. Natural Gas is the main fuel and HSD oil as alternative fuel. The guaranteed net output of the each power plant is 220 MW.

The following equipments are belong to Sirajganj 225MW Combined Cycle Power Plant (2nd Unit-Dual Fuel):

1) Gas Turbine
2) Steam Turbine
3) Generators
4) Heat Recovery Steam Generator (HRSG)
5) Gas Booster Compressor
6) 230kV Switchyard in Power Plant area
7) 230kV bay at the existing Sirajganj 230kV Switching station under PGCB
8) Underground 230 kV transmission line for power evacuation
9) Water treatment system(combined for 2nd and 3rd Unit)
10) Cooling Water System
11) Stacks (main and bypass) etc.

Natural gas or High Speed Diesel will be used as fuel for Gas turbine which will be coupled with Generator to produce around 150MWelectricity. The requirement of Natural Gas for this two Power Plant is about 35MMCFD. Natural Gas will be supplied to the proposed power plant by Paschimanchal Gas Co. Ltd. (a Company of Petro Bangla. The exhaust gas temperature of gas turbine will be about 500-600 degree Celsius. The exhaust gas with high temperature will be passed through Heat Recovery Steam Generator (HRSG) in which groundwater will be fed after treatment (demineralization& desalination) to produce the steam and then the steam will be passed through steam turbine coupled with generator to produce electricity of about 75MW. The temperature of the flue gas will be about 90 degree Celsius. The flue gas will be discharged to the atmosphere through main stack of adequate height.

The output voltage of the generators will be stepped up to 230 kV through a Step-up Transformer, to be installed close to generator outlets. This high voltage (230 kV) supply will be connected to the existing 230 kV Switching Station of PGCB through 230 kV underground cables.

2. Environmental Law

NWPGCL has been complied all the national and international environmental law. The details have been depicted in ESIA report. (http://www.nwpgcl.org.bd/en/pages/eia-report)

3. Social Law

NWPGCL has been complied all the national and international social law. The details have been depicted in ESIA report. (http://www.nwpgcl.org.bd/en/pages/eia-report)

4. Environmental and Social Permit

SL	Name of the Permits	Regulatory Body
1.	Trade License	Dhaka City Corporation
2.	License for River Water/Jetty	BIWTA
3.	Site Clearance	DoE
4.	EIA	DoE
5.	Permission of Acid/alkali Storage	Explosive Department
6.	License for Fire Permit	Fire Service
7.	License for Storage of CO2 (if required)	Explosive Department
8.	License for Storage of Diesel	Explosive Department
9.	License for Boiler	Chief Inspector of Boiler
10.	License for Propane Cylinder Storage (if required)	Explosive Department
11.	License for Compress Cylinder Storage (if required)	Explosive Department

5. Environmental and Social Action Plan

Depicted at ANNEX-A.

6. IFC Standards

NWPGCL has been complied IFC standards. The details have been depicted in ESIA report. (http://www.nwpgcl.org.bd/en/pages/eia-report)

7. The Equator Principles

NWPGCL has been complied Equator Principles. The details have been depicted in ESIA report. (http://www.nwpgcl.org.bd/en/pages/eia-report)

8. The EHS Guidelines

NWPGCL has been complied EHS guideline of IFC. The details have been depicted in ESIA report. (http://www.nwpgcl.org.bd/en/pages/eia-report)

9. ADB's Safeguard Policy Statement, 2009

The project is not funded by ADB

10. Basic Terms and Conditions of Employment

NWPGCL has an approved HR policy which is followed by all employees.

11. Core Labour Standards

WPGCL has an approved HR policy which is complying national labour law

12. Community Engagement Programs

Depicted at ANNEX-B.

ANNEX – A

Environmental and Social Action Plan

S. No	Elements	Gaps	Recommendation	Timeline	Deliverables	Frequency	Responsibility	Status upto October 2021
1	Environment and Social Management System (ESMS) and Policy	A formal EHS and Social policy at company level and dedicated ESMS for the Sirajganj complex has not been formulated by NWPGCL.	(a) Formulate a company level Environment, Health & Safety and Social policy statement duly endorsed by senior management of NWPGCL and communicated.	CP to first utilization	EHSS Policy by senior management	One time	NWPGCL Management	It has already been done before Financial Closing
			(b) Submission of annual compliance certificate	Continuous Monitoring	Annual Compliance Certificate	Annual	NWPGCL Management	Annex -c
			(c) Develop an Environment and Social Management System for whole site (considering operational Unit 1, proposed Unit 2 and other Planned Units). This should also include Stakeholder engagement plan, supply chain and grievance redress procedure. ESMS should also have elements pertaining to human resources management for direct and indirect employees for the project life cycle.	CP to first utilization	ESMS with all the procedures to the satisfaction of E&S Advisor of the investor (s)	One time	NWPGCL Management/ Consultant appointed by NWPGCL Management	It has already been done before Financial Closing
			(d) Legal Register to be developed for the entire Sirajganj Complex (as part of ESMS)	CP to first utilization	Legal Register is a part of the ESMS being developed	One time	NWPGCL Management/ Consultant appointed by NWPGCL Management	It has already been done before Financial Closing/ It is depicted in ESMS report

S. No	Elements	Gaps	Recommendation	Timeline	Deliverables	Frequency	Responsibility	Status upto October 2021
			(d) Organization structure to include deployment of dedicated EHS and Social officer during the construction and operation phase. The compliance requirements to HR policies and procedures to be part of contract documents of contractor including compliance with accommodation standards.	CP to first utilization	Organogram for EHS & Social Management before contract sign with formal consent of EPC Contractor	One time	NWPGCL Management	It has already been done before Financial Closing/ It is depicted in ESMS report
			(e) Procedure for monitoring, review and reporting to be developed.	CP to first utilization	Procedure development Implementation is Continuous	Monthly Internal Audits	NWPGCL Management	It has already been done before Financial Closing/ It is depicted in ESMS report
			(f) GHG emissions disclosure	Continuous Monitoring	Report GHG emissions from the facility	Annual	NWPGCL Management	Annex D
			(g) Engage a suitably qualified independent consultant to help develop and implement the ESMS.	CP to first utilization	Appointment letter of consultant	One time	NWPGCL Management	It has already been done before Financial Closing/ It is depicted in ESMS report
2	Identification of Risks and Impacts	ESIA Report needs to be updated to incorporate the following elements	(a) Obtain prior permission from the Bangladesh Bridge authority before starting any up gradation works of Jetty.	CS	Before jetty up gradation	One time	NWPGCL Management	Provided in Public Environmental and Social Report -2017
		- HAZOP for plant equipment's and utilities - Job Safety Analysis and	(b) The baseline conditions updation for of the Jamuna Eco Park, social baseline with land use map of the project site covering 5 km around the site.	CP prior to first utilization	Updated ESIA Report	One time	NWPGCL Management / EAL engaged by NWPGCL Management	It has already been done before Financial Closing/ It is depicted in upgraded ESIA report.

S. No	Elements	Gaps	Recommendation	Timeline	Deliverables	Frequency	Responsibility	Status upto October 2021
		Risk assessment - Social Baseline information - Updation of baseline and impacts of Jetty on Jamuna Eco Park	(c) HAZOP for plant equipment and utilities to be included	CP prior to first utilization	HAZOP - will be a part of updated ESIA	One time	NWPGCL Management / EAL engaged by NWPGCL Management	It has already been done before Financial Closing/ It is depicted in upgraded ESIA report.
			(d) Job Safety Analysis and Risk assessment procedure to be included	CP to first utilization	JSA/HIRA for plant to be covered in the updated ESIA	One time	NWPGCL Management / EAL engaged by NWPGCL Management	It has already been done before Financial Closing/ It is depicted in upgraded ESIA report.
			(e) ESIA to include air quality dispersion modeling and water balance (considering emissions from Sirajganj 1 and 2)	CP prior to first utilization	Updated ESIA Report	One time	NWPGCL Management / EAL engaged by NWPGCL Management	It has already been done before Financial Closing/ It is depicted in upgraded ESIA report.
			(f) ESIA to include Environmental Management Plans for construction and operations phase including the following – - Traffic Safety Management Plan - Security Policy - Construction Labour - Management Plan - Stakeholder Engagement Plan	CP prior to first utilization	Updated ESIA Report	One time	NWPGCL Management / EAL engaged by NWPGCL Management	It has already been done before Financial Closing/ It is depicted in upgraded ESIA report.
			(g) Environment and Social Management Plan to be developed based on the risks and impacts for Jetty upgradation	CS	Develop ESMP for within 60 days before Jetty upgradation	One time	NWPGCL Management / EAL engaged by NWPGCL Management	Already Provided in Public Environmental and Social Report -2017

S. No	Elements	Gaps	Recommendation	Timeline	Deliverables	Frequency	Responsibility	Status upto October 2021
3	Occupational Health and Safety	NWPGCL has not developed occupational health and safety procedures for construction and operation phase for compliance to legal requirements, IFC performance standards and World Bank EHS and Thermal Power Sector guidelines. Emergency response procedures has not been developed and implemented.	As part of the ESMS develop a comprehensive occupational health and safety procedures in line with applicable regulations and World Bank EHS Guidelines, for operation and construction phase of the project and ensure compliance.	CP to first utilization	Develop procedures in one month and implement throughout the project life cycle Emergency Preparedness to be developed as a part of the ESMS	One time	NWPGCL Management / Consultant appointed by NWPGCL Management	It has already been done before Financial Closing/It is depicted in ESMS report.
4	Environment Management	Environment management procedures for the construction and operation phase have not been developed.	(a) Ensure Contractor formulate an intensive environment monitoring programme during construction and operation phase of the project comprising of frequency of monitoring permitting comparison with the General Worldbank/IFC Environmental, Health and Safety Guidelines und EHS Guidelines for Thermal Power Plants.	CP to first utilization	Develop Procedure and formally communicated and agreed by EPC contractor	One time	NWPGCL	It has already been done before Financial Closing.

S. No	Elements	Gaps	Recommendation	Timeline	Deliverables	Frequency	Responsibility	Status upto October 2021
			(b) Install pollution control facilities during construction and operation phase of the project.	Continous Monitoring	Implementation during construction and operation phase	Continuous	NWPGCL and Contractor	• Continuios Emission Monitoring Station (CEMS) has been installed; • Low NOx burner has been installed.
			(c) Environmental Monitoring Programme to be developed	CS - 60 days to first utilization	Development of environmental monitoring plan to the satisfaction of the E&S advisor of the investors	One time	NWPGCL and Contractor	Third party environmental monitoring team has been engaged during operational Phase
			(d) Implementation of the programs developed	Continuous Monitoring	Implementation during construction and operation phase	Continuous	NWPGCL and Contractor	Already Provided in Public Environmental and Social Report -2017
			(e) Identify DoE approved vendors and starts initiate signing an agreement with them for disposal of oily sludge to the vendors.	CS –Within 60 days of first utilization	Contract with the vendors	One time	NWPGCL	Already Provided in Public Environmental and Social Report -2017
			(f) Inventorize hazardous materials to be used during construction and operation of the project.	CS –Within 60 days of first utilization	Inventorisation and risk assessment	One time	NWPGCL	Already Provided in Public Environmental and Social Report -2017
			(f) Adequate labels, secondary containment and spill response kit should be provided wherever the hazardous material (HAZMAT) is used and workers should be trained to respond to accidental spills and emergencies due to hazardous material.	CP to first utilization	Development of HAZMAT procedure as part of ESMS and implement	One time	NWPGCL	It has already been done before Financial Closing/ It is depicted in ESMS report.

S. No	Elements	Gaps	Recommendation	Timeline	Deliverables	Frequency	Responsibility	Status upto October 2021
5	Community Health and Safety	Studies for identification of community health and safety impacts, ensuring infrastructure design and safety and offsite emergency management has not been identified and implemented.	(a) Adequate studies for existing and proposed infrastructure, design and equipments should be undertaken by engaging a third party consultant should be undertaken	CS - 60 days to first utilization	Infrastructure design and safety report by engaging third party	One time	NWPGCL Management	Already Provided in Public Environmental and Social Report -2018
			(b) Offsite emergency preparedness plan should be developed.	CP to first utilization	Offsite Emergency preparedness and response plan to the satisfaction of Investor E&S Advisor	One time	NWPGCL Management	Already Provided in Public Environmental and Social Report -2018
			(c) Assist and collaborate with the potentially affected Communities (see Performance Standard 4) and the local government agencies in their preparations to respond effectively to emergency situations.	Continuous Monitoring		Annual	NWPGCL Management	Annex E
			(d) Document emergency preparedness and response activities, resources, and responsibilities, and should provide appropriate information to potentially affected Community and relevant government agencies.	Continuous Monitoring	Emergency preparedness and response Plan and its implementation to the satisfaction of Investor E&S Advisor	Continuous	NWPGCL Management	Already Provided in Public Environmental and Social Report -2018

ANNEX – B

Community Engagement Program

North-West Power Generation Company Ltd. (NWPGCL)
Sirajganj Power Station
Soydabad, Sirajganj

Community Development Programme

Date: 12.04.2021

Title	**High Flow Nasal Cannula handover to provide medical services to the people affected by Covid-19**
Organizer	Sirajganj Power Station, NWPGCL, Soydabad, Sirajganj
Time	05.30 AM-06.30 PM
Venue	Divisional Commissioner Office, Rajshahi
Participants	Employees of Divisional Commissioner Office and Sirajganj Power Station. Honorable Secretary of Power Department Mr. Md. Habibar Rahman and Chief Executive Officer (CEO) of North-West Power Generation Company Ltd. A.M. Khursheidul Alam was also present through video conference.
No. of Nasal Cannula	05 (Five) High Flow Nasal Cannula

Pictorial Evidence

North-West Power Generation Company Ltd. (NWPGCL)
SirajganjPower Station
Soydabad, Sirajganj

Community Development Programme

Date: 15.04.2021

Title	**Handover of Oxygen Concentrator to provide medical services to the people affected by Covid-19**
Organizer	Sirajganj Power Station, NWPGCL, Soydabad, Sirajganj
Time	12.00 AM-01.00 PM
Venue	Office of Deputy Commissioner, Sirajganj District
Participants	Employees of Office of Deputy Commissioner and Sirajganj Power Station.
No. of Oxygen Concentrator	05 (Five) Oxygen Concentrator

Pictorial Evidence

North-West Power Generation Company Ltd. (NWPGCL)
SirajganjPower Station
Soydabad, Sirajganj

Community Development Programme

Date: 30.05.2021

Title	**Cheque handover to the Superintendent of Police, Sirajganj for implementation of security measures with closed circuit cameras in all important areas of Sirajganj Municipality.**
Organizer	**Sirajganj Power Station, NWPGCL, Soydabad, Sirajganj**
Time	5.00PM-06.00 PM
Venue	Office of Superintendent of Police, Sirajganj Sadar.
Participants	Employees of Office of Superintendent of Police and Sirajanj Power Station
Monetary Amount	BDT 5,00,000 (Five Lakh Taka Only)

Pictorial Evidence


30.05.2021


30.05.2021

North-West Power Generation Company Ltd. (NWPGCL)
Sirajganj Power Station
Soydabad, Sirajganj

Community Development Programme

Date: 03.08.2021

Title	**Distribution of relief among destitute and helpless families of Sirajganj.**
Organizer	**Sirajganj Power Station, NWPGCL, Soydabad, Sirajganj**
Time	10.00 AM-06.00 PM
Venue	Office of Deputy Commissioner, Sirajganj.
Participants	Employees of Office of Deputy Commissioner and Sirajganj Power Station. Mr. Abu Naser, Director of NWPGCL was also present as special guest.
No of Bags	1000 (One Thousand) Bags
Each bag contains:	1. 12 kg rice 2. 2.5 kg pulse 3. 1-liter soyabean oil 4. 3 kg potato 5. 2 kg salt 6. 1 kg onion 7. 1 piece soap

Pictorial Evidence


03.08.2021


03.08.2021


03.08.2021

North-West Power Generation Company Ltd. (NWPGCL)
Sirajganj Power Station
Soydabad, Sirajganj

Community Development Programme

Date: 14.08.2021& 15.08.2021

Title	**Distribution of relief among unemployed and helpless families of Sirajganj.**
Organizer	**Sirajganj Power Station, NWPGCL, Soydabad, Sirajganj**
Time	10:00 AM-06.00 PM
Venue	Office of Deputy Commissioner, Sirajganj.
Participants	Employees of Office of Deputy Commissioner, Sirajganj and Sirajganj Power Station.
No of bags	2000 (Two Thousand) bags
Each bag contains:	1. 12 kg rice 2. 2.5 kg pulse 3. 1 liter soyabean oil 4. 3 kg potato 5. 2 kg salt 6. 1 kg onion 7. 2 piecesof soap 8. 5 pieces of mask

Pictorial Evidence


14.08.2021


14.08.202


15.08.2021


15.08.2021


15.08.2021


15.08.2021

North-West Power Generation Company Ltd. (NWPGCL)
SirajganjPower Station
Soydabad, Sirajganj

Community Development Programme

Date: 24.08.2021

Title	**Cheque handover to Bangladesh Scouts Sirajganj District for renovating the Sirajganj District Scouts Building and constructing an auditorium.**
Organizer	**Sirajganj Power Station, NWPGCL, Soydabad, Sirajganj.**
Time	11.00 AM-12.00 PM
Venue	Office of Bangladesh Scouts Sirajganj District.
Participants	Employees of Bangladesh Scouts Sirajganj District and Sirajanj Power Station.
Monetary Amount	BDT 5,00,000 (Five Lakh Taka Only)

Pictorial Evidence


বাংলাদেশ স্কাউটস্, সিরাজগঞ্জ জেলা শাখার
চেক হস্তান্তর
24.08.2021


সিরাজগঞ্জ জেলা স্কাউটস্ ভবন সংস্কার ও একটি অডিটোরিয়াম নির্মাণের লক্ষ্যে
CSR কার্যক্রমের
নিকট

ANNEX – C

Compliance Certificate

"শেখ হাসিনার উদ্যোগ, ঘরে ঘরে বিদ্যুৎ"
নর্থ-ওয়েস্ট পাওয়ার জেনারেশন কোম্পানি লিমিটেড
NORTH-WEST POWER GENERATION COMPANY LIMITED
ISO 9001:2015, ISO 14001:2015 & ISO 45001:2018 Certified
(An Enterprise of Bangladesh Power Development Board)
UTC Building (Level- 4), 8 Panthapath,Kawranbazar, Dhaka- 1215, Bangladesh
Phone 9145291-92, 9145427-28 Fax : 9143745, e-mail : info@nwpgcl.gov.bd,web : www.nwpgcl.gov.bd

Memo No. 27.28.0000.300.99.001.21.040 Date: 02/02/2021

CERTIFICATE OF COMPLIANCE

To: Standard Chartered Bank- as Intercreditor Agent

From: North-West Power Generation Company Ltd- as Borrower

Dear Sirs,

North-West Power Generation Company Limited–Common Terms Agreement dated 27-Octber, 2015 (the "Common Terms Agreement")

1. We refer to the Common Terms Agreement. This is a Compliance Certificate. Terms defined in the Common Terms Agreement have the same meaning as used in the Compliance Certificate unless given a different meaning.

2. On the basis of Annual Environmental Audit, Environmental Health and Safety (EHS) condition has been improved. We confirm that EHS condition will be improved continuously in future.

02/02/2021
(Mashuda Parvin)
Manager (EHS), Corporate Office
North-West Power Generation Co. Ltd

2.2.2021
(Md. Abdus Samad)
Chief Engineer
Planning & Design, Corporate Office
North-West Power Generation Co. Ltd

ANNEX – D

GHG Emission

Sirajganj 225 MW CCPP Power Plant (2nd Unit_ Dual fuel)

(01February-2020 to 31 January-2021)

GHG Emission calculation: Using IFC Carbon Emissions Estimation Tool (CEET)

SL	Particular	Value		Unit
		Gas	HSD	
A*	Net Heat Rate (Combined Cycle)	8249.73	-	KJ/KWH
B*	Gross Generation Capacity (Combined Cycle)	228500	-	KW
C	Operating Days	230.51	-	days
D	Daily Operating Hours	24	-	Hours/day
E	Total Annual Output (= B x C x D)	1,264,116,840	-	KWH
F	Annual Fuel Consumption (= E x A)	10,428,622,618,453.2	-	KJ
		10428.622	-	TJ
G*	Annual GHG Emission	595,253		tCO_2e/year

ANNEX – E

Stakeholder Engagement Report

225 MW Combined Cycle Power Plant Dual Fuel – 2nd and 3rd Unit, Sirajganj, Bangladesh

Operation Stage

Stakeholder Engagement Report

Prepared By

ELRC

Badda Link Road, Gulshan, Dhaka

September 2021

EXECUTIVE SUMMARY

The sustainable power supply is an important precondition for the socio-economic development of Bangladesh. At present, about 92.2% (including off-Grid & Renewable) population of Bangladesh has access to electricity (World Bank, 2019) with an installed generation capacity of around 25,235 MW. Considering fuel gas & High-Speed Diesel (HSD) supply facilities in the area, the North-West Power Generation Company Limited (NWPGCL), an enterprise of the Ministry of Power, Energy and Mineral Resources (MoPEMR) in line with the Government's Power Sector Master Plan of 2016, has planned to enhance the electricity generation by constructing a new Combined Cycle Power Plant (CCPP), 3rd and 2nd unit at Saidabad Sirajganj. The North-West Power Generation Company Limited (NWPGCL), an enterprise of the Bangladesh Power Development Board (BPDB) has taken the initiative to enhance the power generation capacity of Bangladesh to address the growing electricity demand. This initiative will involve the operation of a 225 MW Combined Cycle Power Plant in Sirajganj.

This stakeholder engagement report deals with the impacted stakeholder engagement in the project as per baseline study, EIA guide of the GOB. This report will be concluded by considering the real-time PCM, FGD, and KII during the operation period on the project site. Considering the importance of stakeholders and their engagements, the NWPGCL has identified, mapped its relevant stakeholders, and developed an engagement plan to approach the stakeholders throughout the project life cycle. According to the Stakeholder Engagement Plan (SEP), the NWPGCL establishes a sustainable relationship along with its stakeholders. This report has been prepared on the stakeholder engagement activities guided by the established SEP of the NWPGCL. The Area of Influence (AoI) is determined by considering the impacts related to transportation activities, the hiring and use of laborers during construction and operation of the Project, noise generated during operation of the Project, land use, dust generation, and air quality impacts related to operational activities.

There are several trainings, stakeholder meetings, FGDs, and KIIs that have been conducted with different stakeholder parties to understand the present situation of the project activity of the surrounding peoples, existing environmental settings as well as the institutional system. Most of the primary, secondary and other stakeholders presented in the interview session with NWPGCL personnel for assessing the feedback from the local people about the project activity.

All of the impacted stakeholders are considered for this interview session including the local healthcare unit, family welfare, agriculture office, fisheries department, fishing community, agricultural community, and local people. All of them are well responded and well behaved. All of the stakeholders are commented about the operational activity as positive view and they demand just to continue the activities with considering the adverse impacts. The proponent is recommended to properly maintain the stakeholder engagement following the stakeholder engagement plan regularly.

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1 CHAPTER 1: INTRODUCTION

1.1 Study Background

Power is the main driving force of current progress and also the foundation of the growth rate. The vision of the Bangladesh Government is to give access to moderate and reliable power to all by the year 2021 and following this present government's goal is to guarantee continuous and quality power supply for all by 2021 through a change in generation, transmission, and distribution methods. The Government of Bangladesh has announced the new policy, "Vision 2041" targeting Bangladesh to be a developed country by 2041. With the consistency of economic development, a secure power system would be necessary. The government has further expanded its vision focusing on the coming years up to 2041 and arranged the Power System Master Plan 2016 (PSMP). This plan expresses that in 2020, 2030, and 2041, the power demand would be 12545MW, 27434 MW, and 52034 MW where the power supply would be 12949 MW, 30178 MW, and 57238 MW. Based on the future economic growth, fuel, demand, and supply, international cooperation, a new Power System Master Plan 2016 have been finalized Power System Master Plan (PSMP) 2016, aims at assisting Bangladesh in formulating extensive energy and power development plan up to the year 2041, covering energy balance, power balance, and tariff strategies. As per PSMP 2016, achieving middle to long term development issues and risks and formulate a comprehensive and result-oriented aid strategy for the energy sector by examining effective approaches for each issue. At present, about 92.2% (including off-Grid & Renewable) population of Bangladesh has access to electricity (World Bank, 2019) with an installed generation capacity of around 25,235 MW (September 2021). Considering fuel gas & High-Speed Diesel (HSD) supply facilities in the area, the North-West Power Generation Company Limited (NWPGCL), an enterprise of the Ministry of Power, Energy and Mineral Resources (MoPEMR) in line with the Government's Power Sector Master Plan of 2016, has planned to enhance the electricity generation by constructing a new Combined Cycle Power Plant (CCPP), 2nd and 3rd unit at Saidabad Sirajganj.

As per the definition of the Environment Conservation Rules (ECR), 1997 of Bangladesh, the proposed project falls under the "Red" Category Project. Hence, for the fulfillment of the condition required under this Category, an Environmental Impact Assessment (EIA) study has been carried out to assess the impacts of this Project, propose mitigation measures and its implementation plan (Environmental Management Plan). NWPGCL has engaged Engineers Associates Limited (EAL), an experienced firm for such activities, for the preparation of EIA for the project following the Terms of Reference. Engineers Associates Limited (EAL) has conducted an EIA study and submitted the EIA report to DoE on May 11, 2014, for DoE approval. Finally, DoE has issued a Letter for Approval of EIA on July 16, 2014. NWPGCL is seeking financial assistance from Standard Chartered Bank (hereinafter referred to as „SCB or „Bank or the „Lenders). AECOM India has been engaged by NWPCL as independent auditors for carrying out the Environmental and Social Due Diligence of the project. The due diligence report is to be prepared following the International Finance Corporations Sustainability Framework 2012 (IFC) and its Performance Standards (PS) on Social and Environmental Sustainability to assess the compliance of the Project and the ability of the Project to comply with the requirements of the suggested reference framework.

1.2 Stakeholder Engagement

Stakeholder engagement is the process by which an organization involves people who may be affected by the decisions it makes or can influence the implementation of its decisions. More specifically, stakeholder engagement is a more inclusive and continuous process between a company and those potentially impacted that encompasses a range of activities and approaches and spans the entire life of a project. Additionally, Engagement is not an end in itself, but a means to help build better relationships with the societies in which we operate, ultimately resulting in improved business planning and performance.

Considering the importance of Stakeholders and their engagements, NWPGCL has identified, mapped its relevant stakeholders, and developed an engagement plan to approach the stakeholders throughout the project life cycle. According to this Stakeholder Engagement Plan (SEP), NWPGCL establishes a sustainable relationship along with its stakeholders. This report has been prepared on the stakeholder engagement activities for 2018-2019 as guided by the established SEP of NWPGCL.

1.3 Objectives

The overall objective of the consultation process will disseminate project information and incorporate the views of stakeholders in the design of the environmental and social mitigation measures, management plan, and monitoring plan. The specific objectives of the consultation process are to:

a. Local people comments and suggestions on the project activity;
b. Improve project design and thereby, minimize conflicts and delays in implementation;
c. Increase long term project sustainability and ownership;
d. Reduce problems of institutional coordination; and
e. Consult stakeholders to gather the information needed to complete the assessment

1.4 Methodology for Consultation

The approach undertaken for information disclosure and consultation involved the following key processes.

a. Mapping and identification of key stakeholders such as primary (direct project influence) and secondary (indirect project influence) stakeholders according to SEP;
b. Undertaking expert consultations, interviews, and FGD's with the respective stakeholders;
c. Assessing the influence and impact of the project on these stakeholder groups;
d. Summarizing of key findings and observations from the consultations; and
e. Preparing a future stakeholder engagement strategy consultation plan for a more detailed assessment at a microscopic level taking into account the various project lifecycle phases and their implications on the stakeholder.

2 CHAPTER 2: PROJECT DESCRIPTION

2.1 Project Location

The project site is located at about 15 km south-east of Sirajganj town, about 130 km North-West of Dhaka, and 1.8 km south-west from the western end of Bangabandhu bridge. Subsequently, NWPGCL has applied for getting the land of 17.5acres (10 acres for Sirajganj 225MW 2nd Unit and 7.5 acres for Sirajganj 225MW 3rd Unit) leased from BPDB as per the decision of GDB to establish the said power plants in the Sirajganj Generation Hub. The major components include a 150 MW gas turbo generator (GTG) with a bypass stack of 60 meters high, one horizontal type Heat Recovering Steam Generator (HRSG) with the main stack of 60 meters high for outdoor installation, and a heavy-duty condensing type Steam Turbo Generator (STG) for indoor installation in the configuration of 1:1:1, feedwater pumps, condensate extraction pumps, cooling towers, 230 KV plant sub-station, transformers, Gas Regulating Metering Station (RMS), Oil Separator Unit, Water Treatment Plant (WTP), Administration building, workshop, warehouse, guardhouses, internal roads, etc.

The project is a dual fuel-based Combined Cycle Power Plant (CCPP), which will be operated predominantly by Natural Gas (NG) but has also the provision of High-Speed Diesel (HSD) in case of emergency and non-availability of NG. The natural gas required for the Plant is 35 MMCFD and the Pashchimanchal Gas Company Limited (PGCL) will supply natural gas at a pressure of 500 psi through a 1.7 Km long and 16-inch diameter pipeline from its existing valve station to the PGCL RMS, which is to be constructed. From this RMS a 12-inch line will be extended up to the Power Plant's RMS (to be constructed inside the Plant's boundary) at a pressure of 350 psi. Liquid fuel (HSD) requirement is estimated to be about 920 m3/day at 80% PF. The oil will be supplied by Bangladesh Petroleum Corporation (BPC) from its Daulatpur and/or Khulna depot by railway wagons to Bangabandhu Bridge (Satu) West Railway Station and stored in the HSD tanks in the Plant.

The hot flue gas that is produced in the combustor will then be directed to the GTG, where it expands, loses pressure and temperature, and causes the GTG to spin and generate about 150 MW of power. The hot exhaust gas of GTG will pass through the HRSG and main stack to the atmosphere. The HRSG in turn will generate High Pressure (HP), Intermediate Pressure (IP), and Low Pressure (LP) steam that will be directed to the STG, which would, in turn, generate 75 MW of power, thus totaling the Plant output to 225 MW. The generated power of GTG and STG will be stepped up to grid voltage level (11/230 KV) by station transformers (240 MVA for GT and 120 MVA for ST) and feed to the national grid, via underground cables (Sirajganj sub-station), through the Plant sub-station.

Total water demand for Units 1-3 is 1400 m3/h, with the third Unit requiring 400 m3/h as per the feasibility Report. There is a provision for the fourth Unit to be constructed beside the third Unit. These units altogether will raise the water requirement to 2560 m 3/h. Water requirement for Plant construction and operation can be fulfilled from groundwater and it was reported from the feasibility study that the maximum allowable withdrawal of groundwater is 3,200 m 3/h without causing the conspicuous problem in the groundwater table of the SPS area (EAL, 2014 and SDCPL, 2015). The major air pollutants that are produced from the power generating units due to the burning of fossil fuels are SOx, NOx, CO2, CO, and SPM. Major sources of contaminated water from the proposed power plant are blowdowns of HRSG, cooling tower, backwash and rejects of the water treatment plant, oily water from turbine floor and transformer area, etc.

2.2 Importance of the Project

At present total installed electricity generation capacity is 25,235 MW with 92.2% of the population of the country has the access to electricity. The Ministry of Power, Energy and Mineral Resources (MoPEMR) has forecasted that the increase in power demand in response to the desired economic growth of the country, will reach 34,000 MW by 2040. The Power System Master Plan (PSMP) also projected some scenarios of power demand concerning different GDP growth rates. All these variable projections are depicted in Figure 2-1.

To address the conflict between increasing power demand and prevailing shortage, BPDB has adopted a power generation enhancement plan till 2021 which is in line with the PSMP, 2016. The summary of the plan to increase power generation is depicted in Table 2-1. The plan includes different initiatives to generate additional electricity by diversifying fuel, rehabilitating age-old power plants, and importing electricity from neighboring countries. The Sirajganj 225 MW CCPP Project is one of such steps for contributing to meet the growing demand.

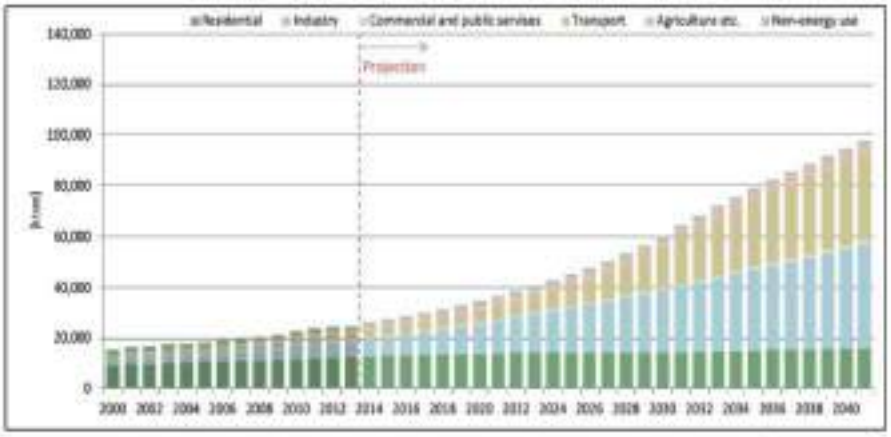

Figure 2-1: Projection of Final Energy Consumption (Energy Efficiency Scenario)[1]

Table 2-1: Power Generation Enhancement Plan2

Sl. No.	Type	2015	2016	2017	2018	2019	2020	2021	Total
1.	Public (MW)	1,218	770	2,202	846	2,070	1,000	2,400	10,506
2.	Private (MW)	1,130	748	799	1,270	568	1,287	1,912	7,670
3.	Import (MW)	---		---	---	---	---	---	---
4.	Total	2,348	1,518	3,001	2,116	2,634	2,247	4,312	18,176

2.3 Potential Major Benefits

The power Plant will trigger regional development, creation of employment opportunities, and thereafter improvement of livelihood. The power plant may also bring social and economic development to the

[1] Source: PSMP 2016

[2] Source: Power Sector Emergency Information, System Planning Department, BPDB, February 16, 2015

region through infrastructural improvement, reducing energy shortfall, rural electrification, and industrial (power loom) development. The communication network will also be improved significantly and will increase livelihood opportunities during the construction period. Finally, the project would improve Environmental Performance by providing a means of effluent treatment of existing units; thus, significantly reducing the discharging of effluents in the canal around the site connected to the Jamuna River.

2.4 Area of Influence

The Area of Influence (AoI) is determined by considering the impacts related to transportation activities, the hiring and use of laborers during operation of the Project, noise generated during operation of the Project, land use, dust generation, and air quality impacts related to operational activities.

The nearest settlements to the Project Site will be considered as the first impact zone. In other words, locals in the first impact zone may experience direct impacts from the Project. Operational works will cause dust and noise emission, in which nearest Ponchosona village area (distanced 0.2 km to the Project Site) and Boroshimul Village (distanced 1 km to the Project Site) may experience dust and noise impacts during the operation phase of the Project. Therefore, the first impact zone includes the Ponchosona village and Boroshimul village which are within a 2 km radius around the Project Site. The second impact zone includes the other residential area, which is within a 5 km radius of the Project site. Inhabitants within the second impact zone may experience indirect Project impacts such as direct and indirect job opportunities, providing goods and services to the Project and Project employees. Inhabitants in the first impact zone are more likely to experience impacts related to community health and safety than inhabitants located in the second impact zone. Further information on these impacts can be found in the EIA report.

Due to operational activity, local people may face dust or noise pollution and also other environmental hazards. For assessing the people's present status due to project activity this interview was conducted. Considering the primary stakeholders near the project area, a day-long interview has been conducted to ensure their comments on the project activity. According to the baseline study, this interview has been conducted on the premises of the project. As stated, the allocation of the Project Site causes no private land acquisition. Therefore, there will be no need to take mitigation measures for economic or physical displacement for the allocated site.

3 CHAPTER 3: LEGAL REQUIREMENTS

This section outlines the regulatory framework for the Project's stakeholder engagement activities, namely-

3.1 Asian Development Bank (ADB) Safeguard Policy Statement (2009)

ADB's Safeguard Policy Statement requires ADB's borrowers/clients to carry out meaningful consultation processes in all projects financed by ADB.

a. For policy application, ADB will require borrowers/clients to engage with communities, groups, or people affected by proposed projects, and with civil society through information disclosure, consultation, and informed participation in a manner commensurate with the risks to and impacts on affected communities. For projects with significant adverse environmental, involuntary resettlement, or Indigenous Peoples impacts, ADB project teams will participate in consultation activities to understand the concerns of affected people and ensure that such concerns are addressed in project design and safeguard plans.
b. The ADB's Safeguard Policy Statement emphasizes requirements for establishing a grievance mechanism that receives and facilitates the resolution of affected people's concerns, complaints, and grievances about a Project's environmental and social performance. The grievance mechanism should be scaled to Project risks and adverse impacts, address affected people's concerns and complaints promptly. It should also ensure the process is understandable and transparent, gender-responsive, culturally appropriate, and readily accessible to all segments of affected people. It should also not impede access to judicial or administrative remedies. The grievance mechanism should be delivered to the affected people inappropriate manner. ADB. 2011. Public Communications Policy. The policy promotes greater transparency and accountability by enabling ADB's stakeholders—especially people affected by development activities—to better participate in the decisions that affect them. ADB-assisted activities are expected to consider the right of people to seek, receive, and impart information and ideas, and consider feedback from its stakeholders, including affected people. Information shall be given to affected people early enough for them to provide meaningful inputs into project design and implementation.
c. ADB's Policy on Cooperation with Civil Society Organizations (1998). The policy recognizes that NGOs can contribute valuable advice on the design of projects and can participate directly in implementation. To support effective cooperation with NGOs, the policy indicates that as appropriate, mechanisms to expand and strengthen interaction with NGOs in loan and technical assistance activities will be identified and existing mechanisms for consultation and dialogue with NGOs will be pursued and strengthened. Under this policy and the 2009 SPS, the Borrower is expected to carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation.
d. Stakeholder Engagement requires clients to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities and, where relevant, Other Stakeholders.

3.2 The IFC Performance Standards (IFC PS:1 Stakeholder Engagement)

a. **Stakeholder Engagement:** According to IFC PS-1 Stakeholder engagement is an ongoing process that may involve, in varying degrees, the following elements: stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism, and ongoing reporting to Affected Communities. The nature, frequency, and level of effort of stakeholder engagement may vary considerably and will be commensurate with the project's risks and adverse impacts, and the project's phase of development. Stakeholder Analysis and Engagement Planning: Clients should identify the range of stakeholders that may be interested in their actions and consider how external communications might facilitate a dialog with all stakeholders. The client will develop and implement a Stakeholder Engagement Plan that is scaled to the project risks and impacts and development stage, and be tailored to the characteristics and interests of the Affected Communities.

b. **Disclosure of Information:** Disclosure of relevant project information helps Affected Communities and other stakeholders understand the risks, impacts, and opportunities of the project. The client will provide Affected Communities with access to relevant information.

c. **Consultation:** When Affected Communities are subject to identified risks and adverse impacts from a project, the client will undertake a process of consultation in a manner that provides the Affected Communities with opportunities to express their views on project risks, impacts and mitigation measures, and allows the client to consider and respond to them. The extent and degree of engagement required by the consultation process should be commensurate with the project's risks and adverse impacts and with the concerns raised by the Affected Communities. Informed Consultation and Participation: For projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation (ICP) process that will build upon the steps outlined above in Consultation and will result in the Affected Communities' informed participation.

d. **External Communications and Grievance Mechanisms:** Clients will implement and maintain a procedure for external communications that includes methods to (i) receive and register external communications from the public; (ii) screen and assess the issues raised and determine how to address them; (iii) provide, track, and document responses, if any; and (iv) adjust the management program, as appropriate. In addition, clients are encouraged to make publicly available periodic reports on their environmental and social sustainability. Where there are Affected Communities, the client will establish a grievance mechanism to receive and facilitate resolution of Affected Communities' concerns and grievances about the client's environmental and social performance.

4 CHAPTER 4: CONSULTATION

For the SEP, a stakeholder is defined as any individual, organization, or group which is potentially affected by the Project or which has an interest in the Project and its impacts. The objective of stakeholder identification is to establish which stakeholders may be directly or indirectly affected – either positively or negatively - ("affected parties"), or have an interest in the Project ("other interested parties"). Particular effort must be made to identify any disadvantaged and vulnerable stakeholders who may be differentially or disproportionately affected by the Project or who may have difficulty participating in the engagement and development processes. Stakeholder identification is also an ongoing process and will require regular review and update.

There are several stakeholder meetings, FGDs, and KII that have been conducted with different stakeholder parties to understand the present situation of the project activity of the surrounding peoples, existing environmental settings as well as the institutional system. Most of the primary, secondary and other stakeholders presented in the interview session with NWPGCL representative for assessing the feedback from the local people about the project activity. The agenda and discussed issues are presented in the following section.

4.1 Fire Service and Civil Defense

4.1.1 Consultation Details

Name of the Stakeholder (Institution/Community)	Fire Service and Civil Defence Sub-Station, Sirajganj Sadar, Sirajganj
Consulted Person	Md. Yakub Ali
Designation/Position	Station In-Charge
Cell No.	01313425824
Consulted By	Md. Abdur Rahman
Designation/Position	Consultant, ELRC
Date	10 August 2021
Time	03:03 PM

4.1.2 Discussions

Concerned Issues	Discussions
Involvement with the Emergency Preparedness Programs Taken by the NWPGCL	Every month (1st week of the month and last week of the month)
Frequency of Programs Taken	Two times per month per unit
Fire Incidents Reported	Not yet occurred
Remarks/Recommendation	Need to be more practical and time-oriented

4.1.3 Photographs

Photo 4-1: Consultation with Fire Safety Personnel at Project Sub-Station

4.1.4 Recommendations

Fire drilling/ fire safety training needs to be conducted periodically and the NWPGCL should take necessary steps for fire training of its workers and staff regularly. Fire drilling and demo should be taken for any kind of fire hazards.

4.2 Ministry of Health and Family Welfare

4.2.1 Consultation Details

Name of the Stakeholder (Institution/Community)	Upazila Health and Family Welfare Office, Sirajganj Sadar, Sirajganj
Consulted Person	Dr. Iftekhar Ahmed Toslim
Designation/Position	Upazila Health and Family Welfare Officer
Cell No.	01919848050
Consulted By	Md. Abdur Rahman
Designation/Position	Consultant, ELRC
Date	12 August 2021
Time	11:28 AM

4.2.2 Discussions

Concerned Issues	Discussions
Available Health Facilities	Primary Treatment, Maternal Consultation, Communicable and Non-communicable Disease Related Awareness
Common Exposure Diseases (Last One Year)	No Records Available
Health Problems Created from The Project Activities (If Any)	No
Health Improvement Initiatives Taken by NWPGCL	A professional doctor has been engaged in the project admin office from the beginning of the project with medical facilities and check-up. If any kind of support need from the Upazila Health and Welfare Office, they will try their best to support.
Remarks	Denied to take pictures

4.2.3 Photographs

Denied to Take Photographs

Photo 4-2: Consultation with Upazilla Medical Officer at Upazila Health and Family Welfare Office

4.2.4 Recommendations

Next time health related information should be taken from the nearest Union Health Complex or Upazilla Health Complex.

4.3 Department of Agriculture

4.3.1 Consultation Details

Name of the Stakeholder (Institution/Community)	Bangladesh Agricultural Development Corporation (BADC), Sirajganj Sadar, Sirajganj
Consulted Person	Md. Majud Alam
Designation/Position	Executive Engineer
Cell No.	N/A
Consulted By	Md. Abdur Rahman
Designation/Position	Consultant, ELRC
Date	22 July 2021
Time	01:22 PM

4.3.2 Discussions

Concerned Issues	Discussions
Agricultural Practices	Two crops field maximum and some of them three crops
Irrigation Practices	Shallow tube well, River water, and Deep tube well (rare)
Irrigation Cost	Rice production cost per bigha (33 decimal): 10000-12000 BDT
Production Rate	Not recorded
Annual Revenue	Not recorded
Availability of Agricultural Labor	Not available all the season
Labor Wages	Vary season to season 400-700 BDT
Agricultural Problems Created from The Project Activities (Yes/No)	No problem has been reported yet
Remarks	Need Deep tube-well installation for proper irrigation

4.3.3 Photographs

Photo 4-3: Consultation with Executive Engineer, BADC, Sirajganj Sadar, Sirajganj

4.3.4 Recommendations

Deep tube-well installation may help to increase agricultural productivity. Try not to acquire agricultural land if the project is extended or for other purposes.

4.4 Department of Fisheries

4.4.1 Consultation Details

Name of the Stakeholder (Institution/Community)	Upazila Fisheries Office, Sirajganj Sadar, Sirajganj
Consulted Person	Md. Anowar Hosen
Designation/Position	Senior Fisheries Officer
Cell No.	01722372791
Consulted By	Md. Abdur Rahman
Designation/Position	Consultant, ELRC
Date	10 August 2021
Time	11:55 PM

4.4.2 Discussions

Concerned Issues	Discussions
Fishing Scenario and Practices Around the Project Site	Aquaculture, open water fishing, home pond. Generally used current net, ber net, wheel, dragnet, etc. Fishes: Chital, Rui, Katla, Bhangan, Kalbaosh, Punti, Baila Cavasi Tengra, Chanda, Chela, Pangas, Horina Chingri, Darkina, Parshi, Golda Chingri, Mrigal, Koi, Kolisha, Madhu pabda, Magur, Mola, Tilapia, Phasa, Pholi, Gazar/Gojar, Tara Baim, Tengra, Veda, Shal Baim, Shol, Taki
Yearly Yield	8439 metric ton total (Upazila wise)
Total Fishing Activities (Around the Project Site)	Not updated
Fish Availability (Around the Project Site)	The fish availability rate is satisfactory
Fishing Areas (Around the Project Site)	River/open water fishing areas near the plant
Fishing Problems Created from The Project Activities (Yes/No)	No

Concerned Issues	Discussions
Remarks	The NWPGCL may support fishermen in the lean season by any kind of CSR program or other available ways.

4.4.3 Photographs

Photo 4-4: Consultation with Senior Upazilla Fisheries Officer, Sirajganj Sadar, Sirajganj

4.4.4 Recommendations

The NWPGCL may support fishermen in the lean season by any kind of CSR program or other available ways.

4.5 Department of Public Health Engineering

4.5.1 Details of Consultation

Name of the Stakeholder (Institution/Community)	Department of Public Health Engineering (DPHE)
Consulted Person	Md. Wali Ullah,
Designation	Executive Engineer
Cell No.	N/A
Consulted By	Md. Abdur Rahman
Designation	Consultant, ELRC
Date	22 July 2021
Time	11:27 AM

4.5.2 Discussion

Concerned Issues	Discussions
Ground Water Condition Around the Project Site Area	The overall quality is good. Iron problem found in the groundwater around the project area
DTW Depth	150-300 ft
STW Depth	35-40 ft
DTW Installation Cost	No recent installation has been incurred by DPHE
STW Installation Cost	2000 BDT per feet
Observation Well near the Project	There is no observation well near the plant site
Ground Water Level Related Complaints	There are no complaints yet from the local people regarding groundwater level
Remarks	Use surface water as an alternative to groundwater for cooling tower

4.5.3 Photographs

Photo 4-5: Consultation with Executive Engineer, DPHE, Sirajganj Sadar, Sirajganj

4.5.4 Recommendations

It's better if the mega-project use surface water. The NWPGCL may intervene to mitigate iron contamination of groundwater and use surface water as much as possible instead of using groundwater.

4.6 Fishing Community

4.6.1 Consultation Details

Name of the Stakeholder (Institution/Community)	Fishing Community, Boroshimul Village, Saidabad, Sirajganj
Consulted By	Md. Abdur Rahman
Designation/Position	Consultant, ELRC
Date	23 July 2021
Time	10:25 AM

4.6.2 Participants Details

Sl. No.	Name	Age	Locations
1.	Md. Joynal Abedin	38	Ponchosona Village
2.	Md. Abdul Alim	43	Ponchosona Village
3.	Md. Al Amin	25	Ponchosona Village
4.	Shafiqul Islam	37	Ponchosona Village
5.	Sajedul Islam	47	Ponchosona Village
6.	Harun Rashid	33	Boroshimul Village
7.	Mozammel Mia	40	Boroshimul Village
8.	Tasir Sheikh	30	Boroshimul Village

4.6.3 Discussions

Concerned Issues	Discussions
Fishing Areas Around the Project Site (Number)	Mainly the Jamuna riverside and some ponds nearest the local residential area but not nearest to the project area
Fishing Practices	Current net, ber net, wheel, dragnet, etc.
Available Fisheries	Chital, Rui, Katla, Bhangan, Kalbaosh, Punti, Baila, Cavasi Tengra, Chanda, Chela, Pangas, Horina Chingri, Darkina, Parshi, Golda Chingri, Mrigal, Koi, Kolisha, Modhu Pabda, Magur, Mola, Tilapia, Phasa, Pholi, Gazar/Gojar, Tara Baim, Tengra, Veda, Shal Baim, Shol, Taki
Quantity of Fisheries	Enough for a season (no decrease of fisheries quantity)
Fishing Problems Created by Project Activities Around the Project Site Area (Yes/No)	Not yet observed any problem relating to project activities
Remarks	The fisheries community has no any important or drastically impacted observation during this monitoring period.

4.6.4 Photographs

Photo 4-6: Focus Group Discussion (FGD) with Fishing Community

4.6.5 Recommendations

It is reported that the riverside fisheries quantity has not changed dramatically. According to the flood scenario of the project area, every year a few of fishes impacted by the flood high tide and sedimentation. The project has no any direct or indirect impact on the fisheries growth or mortality.

4.7 Agricultural Farmers

4.7.1 Consultation Details

Name of the Stakeholder (Institution/Community)	Farmers Community, Boroshimul Village, Saidabad, Sirajganj
Consulted By	Md. Abdur Rahman
Designation/Position	Consultant, ELRC
Date	21 July 2021
Time	03:30 PM

4.7.2 Participants Details

Sl. No.	Name	Age	Locations
1.	Md. Jalal Mia	35	Boroshimul Village
2.	Md. Helal Hossain	24	Boroshimul Village
3.	Md. Yakub Ali	31	Boroshimul Village
4.	Md. Golam Rosul	26	Boroshimul Village
5.	Md. Shagor Ahmed	36	Boroshimul Village
6.	Md. Bilal Bhuiyan	49	Ponchosona Village
7.	Md. Anwar Hossain	34	Ponchosona Village
8.	Shah Alam Howlader	45	Ponchosona Village

4.7.3 Discussions

Concerned Issues	Discussions
Agricultural Practices (Single, Double and Triple)	Double (paddy-jute)
Crop Types	Common Crops are paddy, jute, wheat, pulse, mustard, vegetables, etc.
Production Rate	Decrease in productivity is being experienced for the last few years
Irrigation Practices	Deep and shallow tube well, natural and surface water
Irrigation Cost (Last and Present Year) Annual Revenue	10000-12000 BDT per Bigha (33 Decimal)
Agricultural Labor Availability	Scarce in peak season
Labourer Wages (Male, Female)	450-500 BDT per day in last season (male only); female workers are unavailable in this area
Remarks	Production rate is decreasing

4.7.4 Photographs

Photo 4-7: Focus Group Discussion (FGD) with Agricultural Farmers Community

4.7.5 Recommendations

Concerning issues are unavailability of deep tube-well and low agricultural productivity. The NWPGCL may take initiative to increase agricultural productivity with the involvement of the respective Upazila Agriculture Department.

4.8 Community Consultation

Community Health, Safety, and Emergency Preparedness Program has been conducted on 30th September 2021 at Saidabad Union Parishad in Sirajganj Sadar Upazila under Sirajganj district with proper COVID-19 precaution and following management guidelines. The proceedings commenced at 11:00 AM. The program has been attended by a total of 53 people, which represent local people, day laborers, businessmen, students, teachers, senior citizens, and political leaders. The community has been made aware of the Community Health, Safety, and Emergency Preparedness related to the following issues;

a. Flood
b. Gas Pipeline leakage
c. Oil Pipeline leakage
d. Traffic accident
e. Communicable and non-communicable diseases

4.8.1 Consultation Details

Name of the Stakeholder (Institution/Community)	Local Residence/Community
Consulted By	Md. Abdur Rahman
Designation/Position	Consultant, ELRC
Date	30.09.2021
Time	11:00 AM

4.8.2 Photographs

Photo 4-8: Public Consultation Meeting (PCM) with Local Community

4.9 EMF Awareness Training

An EMF Awareness training has been conducted on 03rd October 2021 at conference room of Sirajganj 225 MW Combined Cycle Power Plant (Unit 2 & 3), Saidabad, Sadar, Sirajganj with proper precaution of COVID-19 pandemic. The proceedings commenced at 03:30 PM. The training has been attended by a total of 10 people, which represent officers, staffs and workers of NWPGCL and ELRC personnel. The presented personnel have been trained on EMF phenomenon, precaution, reduction and other safety issues. The details of the training session have been presented below.

4.9.1 Training Details

Target Audience	Officers, Staffs and Workers of NWPGCL
Trainer	Md. Abdur Rahman
Designation/Position	Consultant, ELRC
Date	03.10.2021
Time	03:30 PM

4.9.2 Photographs

Photo 4-9: EMF Awareness Training with NWPGCL

5 CHAPTER 5: CONCLUSION

The project operation is the major concern for the proponent to establish a fully functioning power plant. Before the operation activity, a management plan had been submitted. Before the activity, different responses had been observed but during the operation activity and according to the interview session, a positive response is achieved. The local people in the interview look happy about the project and also have no objection to the operation of the power plant activity. Besides, this interview is so effective on future stakeholder engagement. Different professionals are participated in the interview and showed their positive responses on the whole agenda as well as operation activity.

All of the impacted stakeholders are considered for this interview session including the local healthcare unit, family welfare, agriculture office, fisheries department, fishing community, agricultural community, and local people. All of them are well responded and well behaved. All of the stakeholders are commented about the operation as positive view and they demand just to continue the activities with considering the adverse impacts. A training has also been conducted on electromagnetic field exposure and the personnel of NWPGCL trained on it with precaution, prevention and reduction.

The proponent is recommended to properly maintain the stakeholder engagement following the stakeholder engagement plan regularly.

ANNEXURE

Annex A: PCM Presentation Slides

WELCOME/স্বাগতম

Community Health Safety and Emergency Preparedness Program2021

"সামাজিক স্বাস্থ্য নিরাপত্তা ও জরুরি প্রস্তুতিমূলক কার্যক্রম ২০২১"

Date: 30.09.2021 Time: 11:00 AM

Venue: Saidabad UP Auditorium, Saidabad, Sadar, Sirajganj

North-West Power Generation Company Limited

Sirajganj225 MW Combined Cycle Power Plant (Uni2 and 3)

ELRC 1

সামাজিক স্বাস্থ্য নিরাপত্তা ও জরুরি প্রস্তুতিমূলক কার্যক্রম ২০২১

❑ আলোচ্যসূচি

- বন্যা
- গ্যাস নিঃসরণ
- তেল নিঃসরণ
- সড়ক দুর্ঘটনা
- সংক্রামক এবং অসংক্রামক রোগ

ELRC 2

INTRODUCTION/ভূমিকা

❑ কমিউনিটিতে স্বাস্থ্য হুমকি, রাসায়নিক পদার্থ, ধোঁয়া, ডাইঅক্সিন, ব্যাকটেরিয়া, নিম্ন স্তরের বিকিরণ এবং পরিবেশে অন্যান্য সম্ভাব্য ক্ষতিকারক সাধারণ পদার্থ

❑ কমিউনিটি হেলথ অ্যান্ড সেফটি বলতে স্থানীয় কমিউনিটিগুলিকে প্রকল্পের কার্যক্রম (বন্যা, ভূমিধস, ভূকম্প বা অন্যান্য প্রাকৃতিক বা মানবসৃষ্ট বিপদ সহ), রোগ এবং দুর্ঘটনাজনিত পতনের কারণে সৃষ্ট বিপদ থেকে রক্ষা করাকে বোঝায়।

❑ কমিউনিটি প্রস্তুতি বলতে নাগরিকদের প্রশিক্ষণ, শিক্ষা এবং সম্পদ প্রদানের জন্য প্রচেষ্টা বোঝায় যা তাদের ব্যক্তিগত এবং সমষ্টিগত স্তরে সম্ভাব্য স্থানীয় দুর্যোগের হুমকির বিরুদ্ধে আঘাত প্রস্তুতি নিতে সহায়তা করে থাকে।

ELRC 3

FLOODS/বন্যা

Floods in Bangladesh/বাংলাদেশে বন্যা

- বাংলাদেশে প্রতি বছর প্রায় ২৬,০০০ বর্গ কিলোমিটার প্লাবিত হয়
- ৫০ হাজারেরও বেশি লোক মারা যায় এবং সাত মিলিয়নেরও বেশি বাড়ি ধ্বংস করে
- এদের অধিকাংশই দেশের উত্তরাঞ্চলে ঘটে

ELRC 4

FLOODS/বন্যা

Floods in Project Area

- গত বছর গাইবান্ধা জেলার ৯ টি উপজেলার প্রধান অংশ প্লাবিত হয়েছিল
- এটি প্রতি বছরের ঘটনা
- অনেক মানুষ গৃহহীন এবং অনাহারে ছিল
- উন্নয়নের অভাব, আজকাল অনেক লোকই দুর্ভোগী

ELRC 5

FLOODS/বন্যা

Preparation

- বন্যা হওয়ার পূর্বে করণীয়
  - বন্যা সম্পর্কিত তথ্যের পূর্বাভাস জানা
  - কোথায় যেতে হবে তা সম্পর্কে সুস্পষ্ট ধারণা রাখা
  - বিকল্প পথ সম্পর্কে জানা এবং আলাদা হয়ে গেলে কোথায় গিয়ে মিলিত হবে পূর্বেই আলোচনা করা
  - গুরুত্বপূর্ণ জিনিস ও গৃহপালিত পশু বিষয়ে পূর্বেই করণীয় সম্পর্কে আলোচনা করা
  - বৈদ্যুতিক সংযোগ বিচ্ছিন্ন করা
  - আকস্মিক বন্যার জন্য প্রস্তুত থাকা এবং প্রয়োজনে দ্রুত স্থান ত্যাগ করা

ELRC 6

FLOODS/বন্যা

During A Flood

- বন্যার সময় করণীয়
  - স্থানীয় নির্দেশনা অনুযায়ী শুকনো পথ চলাচলের জন্য ব্যবহার করা
  - ঘূর্ণিমান পানির মধ্যে দিয়ে হেটে না যাওয়া এবং প্রয়োজনে লাঠি ব্যবহার করা
  - বৈদ্যুতিক সুইচ বা সংযোগ তার ভিজা অবস্থায় স্পর্শ না করা
  - বন্যার পানি পুরোপুরি সরে না যাওয়া পর্যন্ত নিরাপদ স্থানে থাকা
  - আকস্মিক বন্যা হলে উঁচু স্থানে সরে যাওয়া এবং গৃহপালিত পশু ছেড়ে দেওয়া

ELRC

FLOODS/বন্যা

After A Flood

- বন্যা পরবর্তী করণীয়
  - সাপ ও ক্ষতিকর পোকামাকড় থেকে রক্ষা পেতে প্রয়োজনীয় ব্যবস্থা নেয়া
  - বিশুদ্ধ পানি পান করা। সম্ভব হলে দশ মিনিট পানি ফুটিয়ে বা পানি বিশুদ্ধকরণ ট্যাবলেট ব্যবহার করা
  - ঘরের ভেতর শুকানোর জন্য দরজা জানালা খুলে আলো বাতাসের ব্যবস্থা করা
  - শিশুদের নিরাপদ খেলার জায়গা তৈরি করে দেওয়া

ELRC

গ্যাস এবং তেল পাইপলাইন

ELRC

GAS PIPELINE LEAKAGE/ গ্যাস পাইপলাইনের ছিদ্র

Activities During Gas Leaking

- গ্যাস নিঃসরণের সময় করণীয়
  - গ্যাস নিঃসরণের স্থান ভাল করে পর্যবেক্ষণ করা
  - গ্যাস নিঃসরনের উপস্থিতি নিশ্চিতের জন্য পাইপ লাইন থেকে অস্বাভাবিক (যেমন হিসিং শব্দ বা কটু গন্ধ) হলে তা পর্যবেক্ষণ করা
  - গ্যাস নিঃসরণের উপস্থিতি নিশ্চিত হওয়া মাত্র স্থানটিকে খালি করতে হবে
  - সংশ্লিষ্ট কর্তৃপক্ষকে অবহিত করে পাইপ লাইনের সংযোগ বন্ধ করতে হবে

ELRC 10

GAS PIPELINE LEAKAGE/ গ্যাস পাইপলাইনের ছিদ্র

Activities After Gas Leaking

- গ্যাস নিঃসরণে পরবর্তী করণীয়
  - নিঃসৃত গ্যাস পাইপ লাইন এলাকা থেকে দ্রুত লোকজনকে দূরে সরিয়ে নেয়া
  - কোন ধরনের আগুন বা দাহ্য পদার্থ পাইপ লাইনের সংস্পর্শে না রাখা

ELRC 11

OIL PIPELINE LEAKAGE/তেল পাইপলাইনের ছিদ্র

Activities During Oil Leaking

- তেলের পাইপলাইন ফুটোর সময় করণীয়
  - যতদ্রুত সম্ভব স্থান ত্যাগ করতে হবে
  - তেল জাতীয় পদার্থ ধরা, ছোঁয়া বা স্পর্শকরা করা যাবে না
  - তেল যেন ছড়িয়ে না পড়ে সেদিকে খেয়াল রাখতে হবে

ELRC 12

OIL PIPELINE LEAKAGE/তেল পাইপলাইনের ছিদ্র

Activities After Oil Leaking

- তেলের পাইপলাইন ফুটোর পরবর্তী করণীয়
  - ছাদটিকে বেষ্টন করে নিচে হবে যাতে কেউ এর সংস্পর্শে না আসে
  - যতদ্রুত সম্ভব কন্ট্রোল রুমের সাথে যোগাযোগ করতে হবে
  - ফুটো হওয়া পাইপ লাইনের আশেপাশে কোন ধরণের দাহ্য পদার্থ থাকলে তা সরিয়ে ফেলতে হবে

ELRC 13

TRAFFIC ACCIDENT/ সড়ক দুর্ঘটনা

Causes/কারণসমূহ

- অতিরিক্ত গতি
- ফোন ব্যবহার
- ঘুমাল
- অতিরিক্ত বোঝা
- সিট বেল্ট ব্যবহার না করা
- না দেখে রাস্তা পারাপার






ELRC 14

TRAFFIC ACCIDENT/ সড়ক দুর্ঘটনা

Prevention/প্রতিরোধ

- সিট বেল্ট ব্যবহার করা
- ফোন ব্যবহার না করা
- গতি সিমীত রাখা
- রাস্তা পারাপারে সতর্ক থাকা

ELRC 15

TRAFFIC ACCIDENT/ সড়ক দুর্ঘটনা

During An Accident

- দুর্ঘটনার সময় করণীয়
  - দুর্ঘটনাকবলিত যানবাহন থেকে যাত্রীদের নিরাপদে সরিয়ে আনতে হবে
  - দুর্ঘটনাকবলিত স্থানে গাড়ি চলাচল সাময়িকভাবে বন্ধ রাখতে হবে
  - প্রাথমিক চিকিৎসা সেবা প্রদানকারী টিমের সাথে যোগাযোগ করতে হবে
  - দুর্ঘটনায় গুরুতর ধেণি হলে আহত ব্যক্তিদের স্থানীয় যানবাহনে করে চিকিৎসাকেন্দ্রে বা কোম্পানী কর্তৃক নির্ধারিত চিকিৎসাসেবা কেন্দ্রে নিতে হবে
  - নিকটস্থ থানায় দ্রুত যোগাযোগ করতে হবে

ELRC 16

TRAFFIC ACCIDENT/ সড়ক দুর্ঘটনা

After An Accident

- দুর্ঘটনা পরবর্তী করণীয়
  - আহত ব্যক্তিদের যতদ্রুত সম্ভব নিকটস্থ স্বাস্থ্যকেন্দ্রে নিয়ে প্রাথমিক চিকিৎসা দিতে হবে
  - দুর্ঘটনাকবলিত এলাকা নিরাপদ ফিতা দিয়ে বেষ্টন করতে হবে
  - দুর্ঘটনা সংক্রান্ত তথ্য সংগ্রহ করতে হবে

ELRC 17

COMMUNICABLE DISEASES/ সংক্রামক রোগ

- সংক্রামক রোগ সংক্রমক এজেন্টসমূহ (যেমন ভাইরাস, ব্যাকটেরিয়া, ফাংগাস, ইনফেকশন) দ্বারা সৃষ্ট হয় যা সংক্রামিত ব্যক্তি, প্রাণী বা পরিবেশের উৎস থেকে অন্য মানুষের কাছে প্রেরণ করা যেতে পারে।
- সংক্রামিত রোগসমূহঃ
  - যক্ষা
  - হেপাটাইটিস
  - ম্যালেরিয়া
  - কলেরা
  - ইনফ্লুয়েঞ্জা
  - এইচআইভি/এইডস

ELRC 18

COMMUNICABLE DISEASES/ সংক্রামক রোগ

Prevention/প্রতিরোধ

- পরিষ্কার -পরিচ্ছন্ন থাকুন
- টিকা দেওয়া
- স্বাস্থ্যকর খাদ্য

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NON-COMMUNICABLE DISEASES/অসংক্রামক রোগ

- এমন রোগ যা ব্যক্তি থেকে ব্যক্তির কাছে প্রেরণ করা যায় না - এতে কার্ডিওভাসকুলার রোগ (যেমন হার্ট অ্যাটাক এবং স্ট্রোক), ক্যান্সার, দীর্ঘস্থায়ী শ্বাসযন্ত্রের রোগ (যেমন দীর্ঘস্থায়ী প্রতিরোধী ফুসফুসের রোগ এবং হাঁপানি) এবং ডায়াবেটিস অন্তর্ভুক্ত।
- ঝুঁকির কারনসমূহঃ
  - ধূমপান
  - উচ্চ রক্তচাপ
  - স্থূলতা
  - মানসিক দুশ্চিন্তা
  - শারিরীক পরিশ্রম না করা

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NON-COMMUNICABLE DISEASES/অসংক্রামক রোগ

Prevention/ প্রতিরোধ

- ধূমপান মুক্ত থাকুন
- শারীরিক ব্যায়াম করুন
- নিয়মিত চেকআপ করান

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CONCLUSIONS/উপসংহার

- এই কর্মসূচি অনুযায়ী, আমাদের স্বাস্থ্য ও নিরাপত্তা-সংক্রান্ত সতর্কতা মেনে চলা উচিত
- ব্যক্তিগত বা সম্মিলিতভাবে যে কোন ধরণের কমিউনিটি স্বাস্থ্য সুরক্ষার ব্যাঘাত সম্পর্কে আমাদের আরো সচেতন হওয়া উচিত
- গ্যাস এবং পাইপলাইন লিকেজের মতো কোন প্রকল্প-ভিত্তিক সমস্যা হলে, অবিলম্বে যথাযথ কর্তৃপক্ষকে জানাতে হবে

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Annex B: PCM Attendance Sheets

Public Consultation Meeting

Community Health, Safety and Emergency Preparedness Program 2021

Sirajganj 225 MW Combined Cycle Power Plant (Dual Fuel), Saidabad, Sadar, Sirajganj

Organized By: North-West Power Generation Company Limited (NWPGCL)

Supported By: Environmental Laboratory and Research Center (ELRC)

Date: 08:09:2021 Time: 11:00AM Location: Saidabad Union Parishad Auditorium.

SN#	Participant Name	Profession	Address	Mobile No.	Signature
1.	[illegible]	[illegible]	[illegible]	01790[illegible]	
2.	[illegible]	"	"	01370[illegible]	
3.	[illegible]	"	"		
4.	[illegible]	"	"	01[illegible]	
5.	[illegible]	"	"	01[illegible]	
6.	[illegible]	[illegible]	"	01[illegible]	
7.	[illegible]	[illegible]	"	01[illegible]	
8.	[illegible]	[illegible]	"	01[illegible]	
9.	[illegible]	"	"	01[illegible]	
10.	[illegible]	"	"	01[illegible]	
11.	[illegible]	"	[illegible]	01[illegible]	
12.	[illegible]	[illegible]	"	01[illegible]	
13.	[illegible]	-	"	01[illegible]	
14.	[illegible]	-	"	01[illegible]	
15.	[illegible]	[illegible]	"	01[illegible]	

Public Consultation Meeting

Community Health, Safety and Emergency Preparedness Program 2021

Sirajganj 225 MW Combined Cycle Power Plant (Dual Fuel), Saidabad, Sadar, Sirajganj

Organized By: North-West Power Generation Company Limited (NWPGCL)

Supported By: Environmental Laboratory and Research Center (ELRC)

Date: 20.09.2021 Time: 11:00 AM Location: Saidabad VT Auditorium

SN#	Participant Name	Profession	Address	Mobile No.	Signature
16.	[illegible]	[illegible]	[illegible]	01961[illegible]	
17.	[illegible]	[illegible]	"	[illegible]	
18.	[illegible]	[illegible]	"	[illegible]	
19.	[illegible]	—	"	[illegible]	
20.	[illegible]	[illegible]	[illegible]	01909[illegible]	
21.	[illegible]	[illegible]	"	—	—
22.	[illegible]	"	"	01771333453	
23.	[illegible]	"	"		
24.	[illegible]	"	"	01780567536	
25.	[illegible]	"	—	—	—
26.	[illegible]	"	—	—	—
27.	[illegible]	"	—	01751713856	
28.	[illegible]	"	—	01928[illegible]	
29.	[illegible]	"	[illegible]	01795031947	
30.	[illegible]	"	"	01759037407	

Public Consultation Meeting

Community Health, Safety and Emergency Preparedness Program 2021

Sirajganj 225 MW Combined Cycle Power Plant (Dual Fuel), Saidabad, Sadar, Sirajganj

Organized By: North-West Power Generation Company Limited (NWPGCL)

Supported By: Environmental Laboratory and Research Center (ELRC)

Date: [illegible] Time: 11:00 AM Location: Saidabad U.P. Auditorium

SN#	Participant Name	Profession	Address	Mobile No.	Signature
31.	[illegible]	জেলে	[illegible]	01753682318	
32.	[illegible]	"	[illegible]	01733055775	
33.	[illegible]	[illegible]	[illegible]	01706176475	
34.	[illegible]	[illegible]	"	01745249741	
35.	[illegible]	দিনমজুর	"	01753325290	
36.	[illegible]	জেলে	"	01729104115	
37.	[illegible]	"	"	01792497493	
38.	[illegible]	"	"	0175380712	
39.	[illegible]	কৃষক	"	—	—
40.	[illegible]	—	[illegible]	—	—
41.	[illegible]	—	"	01716720563	
42.	[illegible]	[illegible]	"		
43.	[illegible]	—	"	01821352169	
44.	[illegible]	—	"	—	—
45.	[illegible]	—	"	—	—

Public Consultation Meeting

Community Health, Safety and Emergency Preparedness Program 2021

Sirajganj 225 MW Combined Cycle Power Plant (Dual Fuel), Saidabad, Sadar, Sirajganj

Organized By: North-West Power Generation Company Limited (NWPGCL)

Supported By: Environmental Laboratory and Research Center (ELRC)

Date: [illegible] Time: 11:00 Location: Saidabad OP Auditorium

SN#	Participant Name	Profession	Address	Mobile No.	Signature
46.	[illegible]	–	–	[illegible]	
47.	[illegible]	[illegible] –	–	–	–
48.	[illegible]	" –	[illegible]	–	–
49.	[illegible]	" –	"	0171325[illegible]325	
50.	[illegible]	[illegible]	" –	–	
51.	[illegible]	–	[illegible]	01725392531.	
52.	[illegible]	–	– "	"	–
53.	[illegible]	–	"	[illegible]	
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Annex C: EMF Awareness Training Presentation Slides

WELCOME

ELECTROMAGNETIC FIELD (EMF) EXPOSURE AWARENESSTRAINING

Date: 03.10.2021 Time: 03:30 PM

North-West Power Generation Company Limited
Sirajganj 225 MW Combined Cycle Power Plant (Unit 2 and 3)

ELRC

ELECTROMAGNETIC FIELD (EMF) EXPOSURE AWARENESSTRAINING

❑ **OUTLINE**

- Introduction
- Sources
- Health Effect
- Precaution
- Reduction
- Awareness
- Conclusion

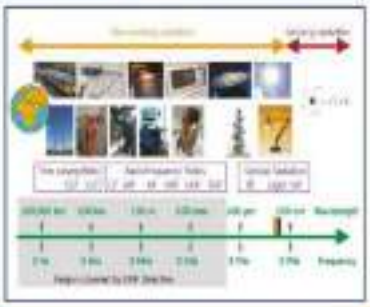
ELRC

INTRODUCTION

❑ Electromagnetic fields (EMF) are ubiquitous in our daily life

❑ EMFs are static electric, static magnetic and time-varying electric, magnetic and electromagnetic (radio wave) fields with frequencies

❑ In certain working environments, the application of high electric currents leads to extremely low frequency magnetic fields or electric fields with a frequency range of 1 Hz to 100 kHz



ELRC

SOURCES

❑ **Typical Outdoor Sources of Exposure:**

- Overhead Powerlines
- High Power Transmission Lines
- Electric Means of Transportation, such as Trams and Trains
- Higher doses of EMF occur in the workplace, for example with MRI scanners, welding equipment, induction heaters, and in power plants

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HEALTH IMPACT

❑ **Two Categories of health effect:**

- Thermal Effects – a body absorbs the radiation leading to localized tissue heating
- Non-thermal Effects – more subtle effects

Field and frequency range	Effects	Examples of activities and equipment
Static electric and static magnetic fields 0-1 Hz	**Indirect effects:** Uncontrolled attraction of ferromagnetic objects [illegible] **Sensory effects:** Nausea, vertigo, metallic taste in the mouth, flickering sensations (magnetophosphenes) in peripheral vision **Health effects:** Micro shocks	MRI scanners (static magnet) Electrochemical processes, eg industrial electrolysis, aluminium extraction Nuclear magnetic resonance spectrometers Electromagnetic lifting cranes Electric vehicles (cars, underground trains

ELRC

HEALTH IMPACT

Field and frequency range	Effects	Examples of activities and equipment
Low frequency magnetic and electric fields [illegible]	**Indirect effects:** [illegible] [illegible] **Sensory effects:** [illegible] **Health effects:** [illegible] [illegible]	[illegible]

ELRC

HEALTH IMPACT

Intermediate frequency fields: 100 kHz to 10 MHz	This health effects of both high and low frequencies can be experienced as detailed above and below (see also Annex 1)	Surgical diathermy Broadcasting systems and devices (AM radio) Anti-theft devices Military and research radiofrequency systems
High frequency fields: 100 kHz to 300 GHz	**Indirect effects:** Interference with active or passive implanted or body worn medical devices (more information is provided later in this guidance), electric shocks, causing electro explosive devices to initiate, or when used in close proximity to explosives that have an electrical means of initiation Sparks caused by induced fields triggering fires or explosions where flammable fuels, vapours or gases are present	MRI (RF coils) Broadcasting and TV antennas Radar and radio transmitters Diathermy Dielectric heating (eg vulcanising, plastics welding or microwave drying) Anti-theft systems

ELRC

HEALTH IMPACT

Field and frequency range	Effects	Examples of activities & equipment
100 kHz-300 GHz	**Sensory effects:** Auditory effects such as perception of clicks or buzzing caused by pulsed radar systems **Health effects:** Thermal stress, heating effects leading to a rise in core body temperature or localised limb heating (eg knees or ankles) Contact with charged conducting bodies can lead to RF shock or deep tissue burns (see also Annex 1)	Broadcasting and TV antennas Radar and radio transmitters Diathermy Dielectric heating (eg vulcanising, plastics welding or microwave drying) Anti-theft systems

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HEALTH IMPACT

❑ **Direct Effect**

❑ **Indirect Effects**
- Interference with active or passive medical devices
- Projectile risks from ferromagnetic objects
- Electric shocks or burns from a conductive object in an EMF
- Ignition of electrical detonators / fires / explosions

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PRECAUTION

- Warning Signs Indicating Strong Electromagnetic Fields
- Fencing Around the EMF Generating Area
- Entry Restriction Signage
- Additional Warning Stickers
- Adequate Use of BodyWorn Medical Devices
- Proper Use of Full Covered Safety Gown or Vest

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REDUCTION

- Assess the Levels of EMFs
- Ensure that Exposure is Below a Set of ELVs, " Exposure Limit Values "
- Assess the Risks of Employees' Exposure and Eliminate or Minimize Those Risks
- Plantation Around the EMF Area
- Displace Multi EMF Generating Devices
- Initiating EMF Absorbing Devices

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AWARENESS

- Provide Information and Training on the Particular Risks Posed to Employees by EMFs in the Workplace
- The Information should also be Made Available to Safety Representatives, as Appropriate
- Take Action if Employees are Exposed to EMFs in Excess of the ELVs
- Provide Health Surveillance or Medical Examination, as Appropriate

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CONCLUSIONS

- Precaution, Prevention and Reduction is the best way to control the EMF exposure in work place
- Proper guidance and controlled environment can be important for reducing EMF
- Considering health impact scenario, proper management should be demonstrated for reducing EMF
- Awareness training, knowledge sharing, information exchanging etc. may help to manage the low level EMF exposure in workplace

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Annex D: EMF Awareness Training Attendance Sheets

Electromagnetic Field (EMF) Exposure Awareness Training

North-West Power Generation Company Limited

Sirajganj 225 MW Combined Cycle Power Plant (Unit 2 and 3)

Date: 03.10.2021 **Time:** 03:30 PM

Location: Conference Room, Unit 2 & 3, NWPGCL **Organizer:** ELRC, Badda, Dhaka

Participant Details:

SN#	Participant Name	Profession	Address	Mobile No.	Signature
1.	Mashiur Mahmod Khan	AM (EHS)	Sirajganj Power Station, NWPGCL	01709152295	[illegible] 03-10-21
2.	Romana Sultana	JAM (EHS)	Sirajganj Power Station, NWPGCL	01666051963	[illegible] 03-10-2021
3.	Md. [illegible]	SAE (EMD)	"	[illegible]	[illegible] 03-10-21
4.	[illegible]	[illegible]	"	[illegible]	3-10-21
5.	[illegible]	W/A	"	01760823713	3-10-21
6.	[illegible]	Electrician	Sirajganj NWPGCL	[illegible]	3-10-21
7.	Md. [illegible] Hossain	Electrician	"	01912842368	3-10-21
8.	Tofazzal Hossain	ELRC	Dhaka	0172816[illegible]77	[illegible]
9.	MD. Abdur Rab	ELRC	Dhaka	01714333491	[illegible]
10.	MD. [illegible]	Electric	"	[illegible]	[illegible]
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