Addendum to Environmental Monitoring Report

PUBLIC

Semestral Report: January 2023 – June 2023
July 2024

India: Assam Power Sector Investment Program - Tranche 3

Prepared by Assam Power Generation Corporation Limited (APGCL) for the Asian Development Bank (ADB). This is an addendum to the environmental monitoring report originally posted in February 2024 available on https://www.adb.org/projects/documents/ind-47101-004-emr-3.

Asian Development Bank

Reference No: FIPL/ED/APGCL/Semi Annual Summary Jan-June23/June/01

June 2024

External Semi-annual Monitoring Validation Report
for
Environmental Safeguards Implementation from Jan to June 2023
120 MW Lower Kopili Hydroelectric Project

Submitted to
Assam Power Generation Corporation Limited

SFG Log: 6233

Submitted by
Feedback Infra Private Limited ENERGY DIVISION
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Jade Consult Pvt. Ltd.

Validation of Six-Monthly Environmental Monitoring Report (Jan-June'23)

Action → / Category ▼	Description	1	2	3	4	5
A	For Approval	Released For Construction	Clear Approval	Approved With Comments	Approved With Comments but Resubmit with Revision	Disapproved
B	For Reference					
C	As Built					
D	Preliminary For Information Only					

Consultancy Services for External Monitoring of 120 MW Lower Kopili Hydroelectric Project

CONTRACT No 01
DATED: 24th December 2021

PURPOSE:

External Monitoring for implementation of Environment Safeguards for the period Jan to June 2023.

Rev.	Description	Date	Prepared	Checked	Approved
1	Submission to Client	30.06.2024	AQ, AW, JK, VR, SM, AA, LC	SM	SM

Client: Assam Power Generation Corporation Ltd, Bijulee Bhawan, Paltan Bazar, Guwahati - 781001

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List of Abbreviations	
ADB	Asian Development Bank
AMD	Acid Mine Drainage
APGCL	Assam Power Generation Corporation Limited
APO	Assistant Personnel Officer
APSIP	Assam Power Sector Investment Program
ASTM	American Society for Testing and Materials
CAP	Corrective action plan
CATP	Catchment Area Treatment Plan
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CEMP	Contractor Environmental Management Plan
CGWB	Central Ground Water Board
CP	Contract Packages
CIA	Cumulative Impacts Assessment
CTO	Consent to operate
CTE	Consent to establish
DC	Double Circuit
EA	Executing Agency
EC	Environment Clearance
EIA	Environmental Impact Assessment
EHS	Environment Health and Safety
EMC	External Monitoring Consultant
EMP	Environmental Management plan
EMoP	Environmental Monitoring Plan
EMR	External Monitoring Report
FAC	Forest Advisory Committee
FC	Forest Clearance
FIPL	Feedback Infra Private limited
GIIPS	Good International Industrial Practices
GIS	Gas Insulated Substation
GOI	Government of India
GOA	Government of Assam
GRC	Grievance Redressal Committee
GRM	Grievance Redress Mechanism
ICT	Interconnected Transformers
IWRMP	Integrated Water Resources Management Plan
L&T	Larsen & Toubro
LKHEP	Lower Kopili Hydroelectric Project
MEPF	Meghalaya Environmental Protection Fund
MS	Management of Study
MOC	Memorandum of Change

MoEF & CC	Ministry of environment Forest and Climate Change
MPR	Monthly Progress Reports
MSL	Mean Sea Level
MW	Megawatt
NOC	No Objection Certificate
NGT	National Green Tribunal
NGO	Non-Governmental Organization
PESO	Petroleum and Explosives Safety Organization
PMC	Project Management Contractor
PMU	Project Management Unit
SEMR	Six-Monthly Environment Monitoring report
SESC	Social and Environment Safeguards Cell
SRC	Sulphate Resistant Cement
SPS 2009	Safeguard Policy Statement (ADB,2009)
TL	Transmission Line
UMB	Umrangsu Municipal Board
WQR	Water Quality Restoration
WQRP	Water Quality Restoration Plan

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1.0 PROJECT BACKGROUND

1. Assam Power Generation Corporation Limited (APGCL), is in the process of building a 120 MW Lower Kopili Hydroelectric Project. The Lower Kopili H.E. Project (LKHEP or "project") involves the construction of 120 MW hydroelectric power plants and an associated 50 km long 220 kV transmission line in Karbi Anglong and Dima Hasao Districts in the north-eastern State of Assam, India. The project will use the hydropower potential of the Kopili River, a south bank tributary of the Brahmaputra River, at Longku, utilizing the regulated discharge from Kopili HEP, spills from Khandong and Umrong Dams in the upstream, and the discharge from the intermediate catchment. The project is designed to operate as a run-of-river power plant with diurnal storage with a total capacity of 120 megawatts (MW), comprising a main plant rated at 110 MW (2X55 MW) and an auxiliary plant rated at 10 MW (1x5 MW+2x2.5 MW) at the toe of the dam for utilizing the mandatory releases for ecological purposes. The scheme has been contemplated to run at full potential in the monsoon season and operate as a peaking station in the non-monsoon season.

2. APGCL, through the Government of Assam (GoA) and subsequently through the Government of India (GOI), has applied for a loan from the Asian Development Bank (ADB) towards the cost of LKHEP under the Assam Power Sector Investment Programme (APSIP) in Environment Tranche 3.

3. The project has been accorded environmental clearance by MoEF&CC on September 4, 2019, as it falls under **Category 'A'** of the Environmental Impact Assessment (EIA) Notification, dated September 14, 2006 (and amendments thereafter). The project has also received stage 1 and stage 2 forest clearance from MoEF&CC on February 5, 2019, and December 4, 2020, respectively, as a result of the project's requirement to divert forest land.

1.1 PROJECT SALIENT FEATURES

4. The proposed dam will be a concrete gravity dam with a top longitudinal cross section of 335 m and a height of 66.5 m. The crest of the dam will be 229 m above mean sea level (MSL). The dam will create a reservoir at Longku with a spread of 620 hectares (ha) and live storage of 77 million cubic metres. The designed discharge capacity is 112.71 cubic metres per second (m/s) at a flow velocity of 3.86 m/s and 5.31 m/s. Within the Project Site Area of LKHEP, 14 new Access Roads are included for access to various Project Components. The Civil work and electromechanical work are in progress. The project's salient features are given in **Table 1.1**.

Table 1.1: Project Salient Features

Particulars	Description	
Name of the Project	Lower Kopili Hydroelectric Project	
State	Assam	
District	East of Karbi Anglong and West of Dima Hasao (North Cachar) Hills District (Project Location Map is attached as **Annexure-I**)	
River	Kopili	
Catchment area	2,076.62 sq. km	
Environmental flow (e-flow)	Minimum 5.345 m^3/s	
DAM		
Dam Type	Concrete Gravity Dam	
Maximum height of the dam	66.50 m	
Overflow spillway for debris removal size (W x H)	4.0 m x 3.0 m	
Sluice spillway No. & size (W x H)	6 Nos., 10 m x 12.50 m	
Sluice spillway capacity	11,030 m^3/s	
Gate type and Number	Radial gate and 6 No. with hydraulic hoist	
RIVER DIVERSION		
Diversion type	Coffer dams, Diversion Tunnel of 10.5 m diameter at right bank	
Upstream Coffer dam		
Type	Plum Concrete	
Height	21.50 m	
Top Length and Level	179.5 m, EL. 193.0 m	
Downstream Coffer dam		
Type	Earth & Rockfill	
Height	10.0 m	
Top Length and Level	132.0 m, EL.181.0 m	
INTAKE	**MAIN POWERHOUSE**	**AUXILIARY POWERHOUSE**
Number of openings	1	1
Nominal discharge	112.71 m^3/s	24.94 m^3/s (e-flow of 5.345 m^3/s within this)
HEAD RACE TUNNEL		
Location	Right bank of Kopili river	
Length	3,641.22 m	
Nominal discharge	112.71 m^3/s	

ADIT-1 TO HRT		
Shape and Size	D-Shape, 6.0 m	
Length	354.66 m	
Type & Number of Gate	Hinge type, One	
Gate Size (W x H)	2.5 m x 2.5 m	
SURGE SHAFT		
Type	Restricted orifice type	
Diameter	25 m	
VALVE HOUSE		
Type & Number	Surface, 1	
Size (L x W x H)	14 m x 23 m x 27.50 m	
PRESSURE SHAFT	**MAIN POWERHOUSE**	**AUXILIARY POWERHOUSE**
Type	Circular steel lined	Circular steel lined
Nominal discharge	112.71 m^3/s	24.94 m^3/s
Length of pressure shaft Length of Surface Penstock	610m (Dia 6.1m)/ 81.9 m (Dia 5.2m)	64 m
Number of pressure shaft	1	1
Specification of steel plates	ASTM A537 Class ll (YS-415 Mpa)	ASTM A537 Class ll (YS-415 Mpa)
Penstock	2	3
Internal diameter	3.70 m	2 Nos.1.65 m & 1 No.2.35 m
Length	16.3 m	26.20 m/ 26.20 m/ 24.20 m
POWERHOUSE	**MAIN POWERHOUSE**	**AUXILIARY POWERHOUSE**
Installed capacity	2x55 MW=110 MW	2x2.5 MW+1x5 MW=10 MW
Location	Right side of river Kopili	Right side of river Kopili
Type	Surface powerhouse	Surface powerhouse
Powerhouse dimensions (L x W x H)	76.5 m x 19.1 m x 30 m	50.5 m x 10 m x 27 m
Average gross head	114 m	48.30 m
Type of turbines	Francis, vertical	Francis, horizontal
Number of units	2	3
Installed capacity per unit	55 MW	2.5 MW / 5 MW
TRANSFORMER YARD		

Type	Single phase, ONAN/ONAF	Three phase, ONAN/ONAF Cooled Generator Transformer
Location	Upstream of powerhouse	Upstream of powerhouse
Number	7 (6+1 spare) nos.	2 nos.
Rated capacity	24 MVA	6.5 MVA
TAIL RACE CHANNEL		
Type	Rectangular	Three separate ducts merging into one common duct
Numbers	1	[2 Nos of 2m (W) X 1.8m (H) and 1 No of 3m (W) X 1.8m (H)] – merging into (3+4) m (W) X 1.8m (H)
Size (L x W)	40 m x 26 m	
SWITCH YARD		
Type & Size	Outdoor-146 m x 72 m	Outdoor-24 m x 21 m
Voltage level	220 kV	33 kV
CONSTRUCTION PERIOD		
Total construction period	4 Years	

5. In addition to the dam and its structures, an officer's colony is being established with adequate facilities for the treatment of wastewater generated from the colony.

6. The power evacuation system includes the construction of a 220 kV Double Circuit (DC) transmission line (TL) from the Main Powerhouse (MPH) site of LKHEP to an existing 132/33 kV Substation (S/S) at Sankardev Nagar (Lanka) and the construction of a 33 kV Single Circuit (SC) Transmission Line (TL) from the Auxiliary Powerhouse (APH) site of LKHEP to an existing 132/33 kV S/S at Umrangsu. The length of TL between the MPH and Sankardev Nagar is 46.013 km, and between the APH and Umrangsu it is 22 km. The power evacuation system will also involve upgrading an existing132/33 kV S/S at Sankardev Nagar with the existing 2 power transformers of capacity 2x25 MVA to 220kV with 2 interconnected transformers (ICT) of capacity 2x160 MVA. The relevant switchgear type proposed is a gas-insulated substation (GIS).

7. As per ADB's Safeguard Policy Statement (SPS 2009), the Project is classified as **Category A for Environment.**

1.2 PROJECT PROGRESS STATUS

8. The project is segmented into four packages, and their selection and work progress are detailed in **Table 1.2** below. Notably, during the current reporting period, the progress of most packages has shown improvement, with the most significant incremental advancement observed in Package 4 (transmission line).

Table 1.2: Project Progress Status

S. N.	Contract Packages	Nature of Work	Date of Award	Name of Contractor	Work Status/ Physical Progress (Jan-June 23)	Work Status/ Physical Progress (Jul-Dec 22)
1	CP-1	Establishing Housing colony for APGCL officers	30.09.2022	BVG India Ltd.	11%	1%
2	CP-2	Civil and Hydro mechanical works for the Dam and ancillary structures	21.08.2020	L&T	47.1%	38.9
3	CP-3	Electromechanical Works	09.09.2021	Andritz Hydro (P) Ltd.	24%	10%
4	CP-4	Transmission Lines	20.04.2022	M/s Salasar Techno Engineering Limited JV with M/s. Akelik Group	49.4%	17%

9. In the current period (Jan-June 2023), good progress has been achieved by all the contractors while the progress achieved by CP-4 contractor from the previous reporting period (Jul-Dec 2022) can be considered significant.

1.3 MONITORING REQUIREMENT

10. The proposed project is a '**Category A**' project under the ADB Environmental Safeguard Project categorization (ADB SPS, 2009). Accordingly, an Environmental Impact Assessment (EIA) was carried out by APGCL. In the EIA report, applicable laws and legislation and the policy framework have been reviewed, and environmental mitigation measures have been recommended for implementation during the construction and operation stages of the project and its associated facilities. Accordingly, a comprehensive Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) were provided, along with guidelines for a detailed construction method statement to be prepared by the contractor (and subcontractors). Also, a Biodiversity Management Plan (BMP) under the EMP has been formulated and is part of the package of activities designed to meet the requirements of ADB's Safeguards Policy Statement (SPS) 2009.

1.4 SCOPE OF WORK, VALIDATION OF SEMR BY EXTERNAL MONITORING CONSULTANT:

11. An External Monitoring Consultant (EMC) has been engaged under the project to provide technical guidance and monitor the implementation and effectiveness of Environmental and Social (E&S) Safeguards activities as per the requirements of national regulatory requirements and ADB's SPS 2009 safeguards requirements with respect to project construction activities. External Monitoring Consultant are required to verify the status of mitigation and monitoring activities for the project, with overall supervision of the implementation of:
    - ✓ Compliance conditions stipulated under various clearances, permits, and NOCs obtained for the project.

- ✓ Environmental safeguard requirements as given in the ADB SPS 2009
- ✓ Compliance with loan covenants related to Environmental Safeguards
- ✓ Independent monitoring of the implementation of the Environmental Management Plan by the Construction Contractors

12. EMC has already validated the Six-Monthly Environmental Monitoring report (SEMR) and Six-Monthly Social Monitoring report (SSMR) for the periods July–December 2021, January–June 2022 and July-December 2022. In addition, regular site visits are conducted, and site visits and monthly and quarterly reports are submitted to APGCL. The SEMR verification report for the period Jan–June 2023 was submitted to APGCL on November 29, 2023. The current report is the Draft SEMR Validation Report covering the period from Jan to June 2023, is based on revised SEMR as received from APGCL, site visits and review of the other progress reports. The verification and validation of SEMR was carried out employing the following approach:

- ✓ Desktop-based review of documentation and literature such as previous Monthly and Quarterly Progress reports for the project, Six-month Environmental Monitoring Reports, other records, and plans.
- ✓ Site inspections of different construction sites, labour camps, and the staff accommodation areas upstream and downstream of the dam.
- ✓ Interaction with project staff, the contractor's EHS team, the local community, and other stakeholders where needed.
- ✓ Validation and verification of compliance status of various permissions (CTEs, CTOs, groundwater abstraction permissions, tree cutting permissions, etc.)
- ✓ Validation, verification, and compliance status of ADB's loan covenants
- ✓ Validation and verification of the compliance status of EMP implementation measures

2.0 IMPLEMENTATION OF THE ENVIRONMENTAL SAFEGUARDS

Implementation Arrangement:

13. As the project's Executing Agency (EA), APGCL is responsible for carrying out all environmental protection measures. APGCL has a fully operational Project Management Unit (PMU) and a dedicated Social and Environmental Safeguards Cell (SESC), both of which are overseen by a Project Director (PD). The SESC coordinates overall environmental safeguards activities for the project, including the implementation of environmental and social safeguards plans and compliance monitoring. The SESC has one qualified environment expert and one qualified social expert, both on a contract basis. There was no change in staffing during the reporting period. As indicated in previous SEMR validation, it is suggested that SESC appoint a dedicated biodiversity or ecology expert and an Environment, Health, and Safety (EHS) professional for the project. As of this date, it has been communicated that one site engineer has been designated with additional responsibility for EHS compliance for the project.

14. The APGCL is supported by the Project Management Consultant (PMC). The safeguard team of PMC comprised of a qualified Environmental Expert, One Social Safeguard Expert and also supported by one EHS expert. The EHS expert has been deployed in the current reporting period.

15. During the assessment period, EMC also had interactions with the personnel of the contractors for Packages 1, 2, 3, and 4 and noted that:
    - ✓ During the reporting period the Package 1 contractor was **yet to deploy** the environmental and EHS experts;
    - ✓ The Package 2 contractor has appointed a qualified environment expert, a cluster EHS head followed by an EHS manager, and trained EHS field staff. They prepares and regularly submits Monthly Environmental report and Monthly Safety Reports to APGCL.
    - ✓ Package 3 contactors appointed qualified EHS expert during this period but yet to appoint the qualified Environmental expert.
    - ✓ The Package 4 contractor had an environment expert on site but has resigned; however, there was no EHS expert site.

16. An organogram showing the relationships and staffing for environmental and social protections between the executing and implementing agencies, the project management consultant, contractors, and the external monitoring consultant is presented below in figure 2.1.

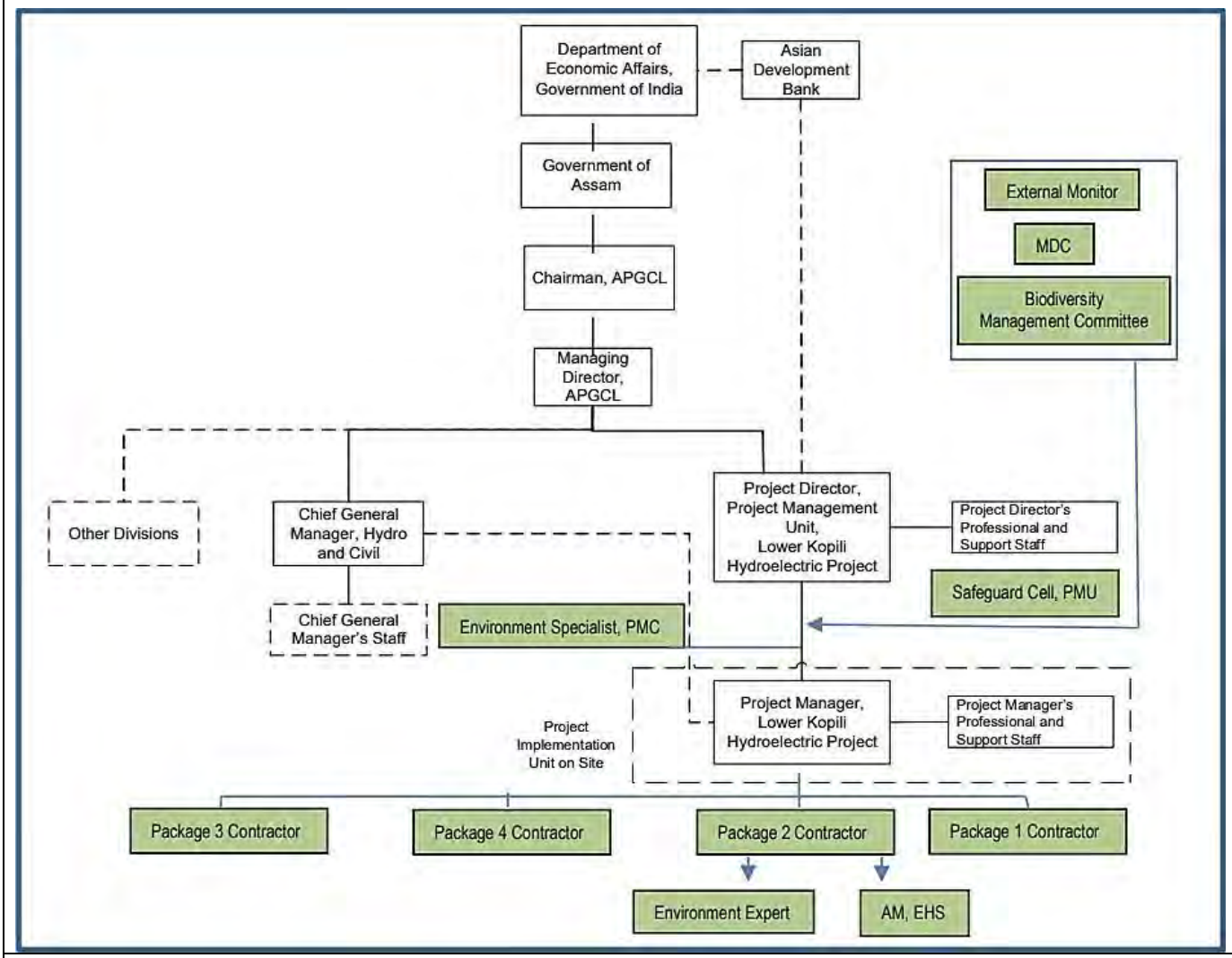


Figure 2.1: Organogram for implementation of Environmental and Social Safeguard for the LKHEP (120 MW)

Assessment of prerequisite for EMP implementation:

17. To assess the readiness of EMP implementation, the External Monitoring Consultant first determined if the APGCL was prepared to proceed with the construction of the proposed project and transmission line. The indicators used for the assessment are listed in **Table 2.1** below:

Table 2.1: EMP Readiness Assessment

Indicator	Assessment Criteria	Compliance	Remarks
EIA approval and disclosure	The EIA was cleared by ADB and disclosed on ADB's project website	Complied	
Mitigation measures described in the EMP adopted during detailed design and construction of the project	Measures defined in EIA and EMP are included in detailed designs for each project component.	Complied	EMP and the EMoP have been included as part of the contract documents with all contractors involved.
EIA/EMP update	Whether the EIA/EMP is updated after detailed design and cleared by ADB.	Being Complied	An update EIA and EMP is needed and is under preparation
Compliance with loan covenants	The borrower complies with loan covenants related to project design and environmental management planning.	Being Complied	Detail provided in section 2.3.
Environmental Monitoring	The monitoring parameters, locations, and methods for the ambient air, noise and surface water defined in the EMoP.	Being Complied	This is a continuous process and has been taken up by APGCL in the reporting period.

2.1 ENVIRONMENTAL COMPLIANCE STATUS

18. The compliance status of the project's implementation has two aspects:
    - Compliance status with National/State/Local statutory environmental requirements
    - Compliance status with ADB's loan covenants affecting environmental parameters.

19. Checking the status of compliance serves the objective of confirming and validating any deviations from loan covenant conditions and project-specific environmental law requirements. If there are any deviations, the APGCL must be consulted before proposing any corrective measures.

2.2 COMPLIANCE WITH NATIONAL/LOCAL STATUTORY REQUIREMENT

20. The SEMR have rightly presented the availability and pending status of all the necessary statutory consent, approval, permit, and clearance during the period Jan to Jun 2023.
21. The project has received the following clearances and permissions:
    - ✓ Environment Clearance was accorded to the project on **4th September 2019**.
    - ✓ **Stage-I** forest clearance received on 5th February 2019 and **Stage-II** on **4th December 2020**
    - ✓ Permission for extraction of boulders from quarry (Location: Longku, Dima Hasao), stage-I clearance received from North Cachar Hills Autonomous Council (NCHAC) on **8th July 2022**; Stage 2 from Department of Geology and Mining Department Govt. of Assam (GoA) on 11th May 2022 and DFO (Dima-Hasao) gave order to RO to realize Royalty from Hi-Tech Rock Products and Aggregates Limited for 3,36,000 cum on **11th July 2022.**
    - ✓ Permission for crushing of boulders from excavated materials received from DFO (Dima Hasao) for 80,000 cum on **20th Dec, 2021** and from NCHAC for 20,000 cum, on **8th Mach 2022**;
    - ✓ Permission for installation of batching plant at Totelangso, Dima Hasao received from Gaon Burah on **30.06.21** and from NCHAC on **19th Oct 21**;
    - ✓ CTE and CTP for the batching plant at Totelangso, Dima Hasao (near Power House) received from PCBA on 11th November 2021 and 27th December 2021 respectively;
    - ✓ CTE and CTO for the batching plant near Dam site received from PCBA on **23rd June 2022 and on 31st October 2022**; however, the CTO is only for 714cum/day as against 1000cum/day required.
    - ✓ Permission received from Gaon Burah for the establishment of crusher plant ;
    - ✓ Permission for installation of crusher plant at Totelangso, Dima Hasao received from Gaon Burah ;
    - ✓ CTE and CTO for the crusher plant at Totelangso, Dima Hasao received from PCBA on 22nd October 2021 and on 7th December 2021; However, the CTO is only primary and secondary crusher; CTO for the tertiary crusher to be obtained/amended.
    - ✓ The CTO for the crusher plant obtained on 11.01.2023 and the same is for stone aggregate of 33378MT/Month and by product (Quarry wastage 5006 MT/Month and stone dust 3337 MT/month)
    - ✓ NOC for tree cutting has been obtained for CP-2.
    - ✓ (NOC) from Deputy Commissioner Govt. of Assam, for setting up Fuel dispensing Unit at Project location has been obtained.
    - ✓ NOC from controller of explosives for the fuel dispensing unit on **18.01.2023 and is valid till 31.12.2023** (included in SEMR) for existing petrol pump at village Longku for the CP-2 contractor.
    - ✓ NOC also received from Joint Chief Controller of Explosives for storage of only 20 KL of petrol received on 18.01.2023 to CP-2 contractor.
    - ✓ NOCs for Magazine area for the storage of explosives are obtained including file NOC/license and is prior to **July 2022.**
    - ✓ NOC for Blasting operation have been received from Deputy commissioner, SP, DM, and Sr. Station Officer (SSO) -Fire and Emergency service station, Dima Hasao
    - ✓ CP-2 contractor has obtained group personal accident policy for staff and labours along with insurance for contractor plant and machinery and car insurance.
    - ✓ CP-3 and CP-4 contractors have obtained workmen compensation insurance.
    - ✓ Memorandum of Changes was approved by CEA, CWC, GSI, CSMRS, Govt. of India on 9th November 2022.
    - ✓ Environmental clearance for the 4.6 ha quarry near Kala Nala received on **28.03.2023**

- ✓ Consent to Establish for the Hydro-Power Plant received on **28.02.2023.**
- ✓ NOC for surface water use for construction was received by CP-2 contractor on **03.05.2023** and included in the SEMR (Jan-June 2023) in Annexure 21.
- ✓ Confirmation from Dima Hasao autonomous council received to mention that the site near Longku Nala, Longku adjacent to NH-627 under Dima Hasao district is not listed with the archaeological Department of the council.
- ✓ Consent from Gaon-Burrah received on **10.12.2022** for sourcing water for construction from Longku Nala for CP-2.
- ✓ Labour license received for CP-1 (received on **15.03.2023 and valid till 11.03.2024**), CP-3 (Received on **02.03.2023 and valid till 26.02.2024**) and CP-4 (received on **20.02.2023 and valid till 12.02.2024**) for maximum of 20, 50 and 20 labours on a given date respectively.
- ✓ Migrant labour license obtained by CP-4 contractor for 30 labours and is valid till 24.05.2024.
- ✓ (NOC) from PESO for the fuel unit was valid till **31.12.21** and finally renewed on 18.01.2023 valid till 31.03.2024.
- ✓ NOC for the extraction of 600cum/day of water from river Kopili for construction water has been obtained by CP-2 contractor from PCBA on 03.05.2023.
- ✓ CTE for RO plant received by CP-2 contractor on 14.03.2023; CTO for RO plant received by CP-2 contractor on 26th April 2023
- ✓ CTE for the water treatment plant received by CP-2 contractor on 14.02.2023 and CTO for the water treatment plan received by CP-2 contractor on 26th April 2023.
- ✓ Insurance policies are obtained by CP1 is valid till 19.02.2024 (included in SEMR), insurance policy obtained by CP-2 with coverage period till 31.03.2024 (included in SEMR), insurance policy obtained by CP-3 with coverage till 13.03.2025 (included in SEMR), insurance policy of CP-4 is valid till 11.07.2023 (included in SEMR).
- ✓ CP-1 contractor received NOC for ground water extraction from CGWA, MoJS on 17.04.2023 and is valid up to 16.04.2028.
- ✓ CP-4 is using water from landowner's borewell.
- ✓ CTO amendment for batching plant near dam site for the 1000 cum/day obtained on 03.01.2023 (included in SEMR) and is valid till 31.03.2025.

During this period the consents, permits that are still pending are reported in **Table 2.2** along with their latest position (if the permission is received in the subsequent months) is also mentioned.

Table 2.2: Compliance with Statutory Requirements

S.N.	Outstanding issue	Compliance Status	Remarks
1	Amendment ofEnvironment Clearance	APGCL sent letters to MoEF&CC on 28.11.22 for the EC amendment. Further the EC amendment process was initiated. However, application through Parivesh portal was yet to be done during the reporting period.	**Annexure III**
2	Permission for abstraction of ground water CP3	Pending	Application submitted but permission is yet to be received from CGWA.

S.N.	Outstanding issue	Compliance Status	Remarks
3	NOC for surface water use for construction by CP-3 and CP-4	Pending	
4	CTE for the proposed STP under CP-1	Pending	CTE will be applied before the construction of STP
5	NOC for tree cutting CP-1	Pending	
6	NOC for tree cutting CP-4	Pending	
7	Blasting permission at Hamren Division, Karbi Anglong [Left Bank of Dam] was received on 14th October 2022 with a validity till 30th April 2023 for CP-2.	To be renewed further	No blasting performed in the left bank since expiry of the permission.
8	Night shift blasting permission received and is valid till March 2023.	To be renewed further	It has been renewed on 2nd May 2023 with a validity till 31st March 2024. No night blasting has been carried out by CP-2 contractor in the month of April 2023. Same has been confirmed by CP_2 contractor through e-mail dated 29.06.24.

Verification & Validation of Statutory Clearances:

22. The available NOCs and NOC's pending are clearly indicated in the SEMR (Jan-Jun 2023). However, following corrections/clarification are suggested SEMR verification report are concluded as follows and status need to be included either in the current SEMR or next SEMR:

- ✓ Night shift blasting at inside tunnel (Panipur Range) has been expired in March 2023. The status of application is not clear from SEMR. It is **suggested to include the status in the next SEMR.**
- ✓ The status of blasting permission at Hamren Division, Karbi Anglong [Left Bank of Dam] expired in April 2023, the renewal for the same was yet to be taken in the reporting period (Jan-June 23). The compliance status for the same will be reported in the next SEMR.
- ✓ Tree cutting for CP-2 is being carried out in presence of the officials of Forest Department. Panimur Range, Dima Hasao (West) Division and APGCL.
- ✓ The status of ground water extraction and its NOC status is not clear for the CP-4 contractor and status need to be captured in SEMR. Currently it is mentioned that they are using the ground water from the borrower's land.
- ✓ The need of permission from Gaon Burah for the extraction of surface water by CP-1 contractor is not clear in the SEMR and to be included in the next SEMR.
- ✓ Status Migrant Labour license for CP-1, CP-2 and CP-3 need to be included in the next SEMR.

2.3 ENVIRONMENTAL LOAN COVENANT COMPLIANCE

23. The loan agreement between ADB and the Government of India was signed for the Assam Power Sector Investment Programme (Project 3) on December 30, 2020. The Environmental loan covenants are mostly described in Schedules 4 and 5 of the loan agreement. Schedule 4 of the agreement provides details of "Procurement of Goods, Works, and Consulting Services." Under this schedule, Paras. 6 and 8 pertain to compliance. Paragraph 6 specifies that no work shall commence until and unless the EIA for the scheme is approved, and Paragraph 8 mentions the selection of an external monitoring consultant and the validation of Environmental Monitoring reports by APGCL. Schedule 5, on the other hand, is related to "Execution of Projects", its implementation arrangements, safeguarding the environment and social, safeguard-related provisions in the bidding documents and works contracts, and safeguard monitoring and reporting.

24. The loan covenants for environmental safeguards stated under various schedules of the loan agreement are either complied with or being complied with and are presented in **Table 2.3.**

Table 2.3: Compliance with Loan Covenants

S. N.	Reference	Specific covenant/condition	Compliance as on June 2023	Remark
1	Schedule 4, Para 6 related to clearance of updated EIA by ADB	The borrower shall ensure or cause the APGCL to ensure that it shall not allow commencement of civil works under a works contract which involves environmental impacts until the APGCL has obtained the final approval of the EIA from the relevant Environmental Authority of the borrower and the state and the ADB;	Being complied.	The main EIA, along with three supplementary EIAs, cleared by ADB in 2018, received Environmental clearance from MoEF&CC on September 4th, 2019. An EIA addendum, aligned with the Memorandum of Changes (MOC) dated 9th November 2022, is in progress. The first phase was submitted on 30th May 2023 (as per SEMR) and is under ADB review. Amendments to the EC are underway, with an application process set to conclude by August 2023 through the Parivesh Portal, following agreements during the ADB mission (20-25th of March 2023).
		(ii)APGCL has incorporated the relevant provisions from the EMP into the works contract;	Being Complied	
		(iii) the EIA is updated to reflect the turnkey contractors detailed design and up to date baseline and	Being Complied.	
		(iv) such updated EIA is cleared by ADB		
2	Schedule 4, Para8 related to engagement of EM and submission of various reports to ADB	The borrower shall ensure or cause the APGCL to ensure to recruit a consulting firm for external validation of the Environmental Monitoring report produced by APGCL.	Being complied	APGCL has appointed M/S Feedback Infra Private Limited (JV) with Jade Consult P. Ltd. and Aqualogus-Engenharia Ambienteas EMC. Contract awarded on 24thDecember 2021.
		The Borrower shall ensure or cause the APGCL to apply individual consultant selection for Consulting Services.	Being complied by APGCL	
3	Schedule 5, Para 5, related to Health and Safety measures and its inclusion in Contractor's design	The borrower shall ensure or cause the APGCL to ensure that the preparation, design, construction, implementation, operation and decommissioning of the project	Partially complied.	There are still a few permits, clearances, and NOCs required for the project, which are pending and are mentioned in the SEMR prepared by APGCL.

S. N.	Reference	Specific covenant/condition	Compliance as on December 2022	Remark
		and all the project facilities comply with (a) all applicable laws and regulations of the borrower and the state relating to Environment, Health and Safety (b) The Environmental Safeguards, (c) the EARF (d) all the measures and requirements set forth in the EIA and EMP and any corrective or preventive action set forth in a Safeguard Monitoring Report.		The amended EC from MoEFCC, inter-state labor licenses for CP-2 and 4, and the renewal of certain permissions are in progress. Although applications for approval of changes due to detailed engineering were submitted on 28.11.22, 14.2.23, 24.4.23, the pending approval is awaited from MoEF&CC. The application will soon be uploaded to the PARIVESH portal. CP-2 has submitted the necessary fees for the interstate labor license. The process of changing the registration number of four vehicles under CP-2 is currently underway.
4	Schedule 5, Para 9, budgetary provision, and human resource provision related to full implementation of EMP	The borrower shall ensure or cause the APGCL to ensure that all necessary budgetary and human resources to fully implement the EMP and the RIPP as required are made available on a timely basis.	Being complied	One qualified Health and Safety Expert as inducted in PMC from 25th March, 2023. The appointment of a Sr. Env. Expert in PMC is under consideration at APGCL.
5	Schedule 5, Para 10: Safeguard related documents in bidding document and works document.	Safeguard Related Provisions in Bidding Document and Works contracts: The borrower shall ensure or cause the APGCL to ensure that all bidding documents and contractor for works contain provisions that require contractors to: comply with the measures and requirements relevant to the contractor set forth in the EIA, EMP and the RIPP and any corrective or	Being Complied.	Such details are included in the bid document for the individual work items. Any revisions to the amended EMP that are necessary must also be updated in the Bid document.

S. N.	Reference	Specific covenant/condition	Compliance as on December 2022	Remark
		preventive actions set forth in a safeguard Monitoring Report;		
		(ii) budget for environment and social measures;	Being Complied	
		(iii) unanticipated environmental and social risks that arise during construction, implementation and operation stage of the project and is not included in the EIA/EMP or RIPP, RF or IPPF.	Being complied	
		(iv) Record conditions of roads, agricultural land other infrastructure prior to starting transport materials and construction.	Being Complied	The CP-2 contractor has already constructed approach roads for reaching the dam site, powerhouse site, and other ancillary areas of the project for the transport of construction materials and E&M equipment to be installed by the CP-3 contractor.
		(v) fully reinstate pathways, other local infrastructure, and agricultural land to their pre-project conditions upon completion of construction	Being Complied	
6	Scheule5, Para 11: Safeguard Monitoring and Reporting	The borrower shall ensure or cause the APGCL to ensure the following: Submit semi-annual Safeguard Monitoring Reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission.	Being Complied	Semi-annual safeguards monitoring reports are being submitted to ADB for review on a regular basis; the revised SEMR for the period July–December 2022 was submitted on May 18, 2023.
		(ii) if any unanticipated environmental and or social risks and impacts arise during construction, implementation, or operation of the Project that were	Being Complied	The EIA addendum is being finalized and a version submitted to ADB on 30th May 2023.

S. N.	Reference	Specific covenant/condition	Compliance as on December 2022	Remark
		not considered in the EIA, EMP, RIPP, RF or the IPPF as applicable promptly inform ADB of the occurrence of such risks or impacts with detailed description of the event and proposed corrective action plan and		
		(iii) report any breach ofcompliance with the measures and requirements set forth in the EMP or RIPP promptly after becoming aware of the breach.	Being complied	Semi-annual safeguards monitoring reports are being submitted to ADB for review. Further compliance with corrective actions suggested during past missions is also submitted by APGCL subsequently.
7	Schedule 5 para 12, (Prohibited Investment Activities)	The Borrower shall ensure, or cause the APGC to ensure, that no proceeds of the Loan under the Project are used to finance any activity included in the list of prohibited investment activities provided in Appendix 5 of the SPS.	Being complied	The project scope does not include any activity included in the list of prohibited investment activities.
8	Schedule 5 para 13, Labour Standards, Health and Safety	Labour Standards Health and Safety. The Borrower shall ensure or cause the APGCL to ensure that works contracts under that Project follow all applicable labour laws of the Borrower and the State and that these further include provisions to the effect that the contractors: (i) carry out HIV / AIDS awareness programs for labour and disseminate information at worksites on risks of sexually transmitted diseases and HIV / AIDS	Partially Complied	CP-1, CP-2, CP-3 and CP-4 is complying with the labour laws of the GoI; and having valid labour licences andinsurance. No instance of child labour, forced labour, or discrimination in job opportunities was observed during the assessment surveys. PMC reported that HIV/AIDS awareness camps was organized by CP-2 contractor. Social, HIV/AIDS awareness, and labour law-related trainings need to be organized regularly and scheduled in every quarter.

S. N.	Reference	Specific covenant/condition	Compliance as on December 2022	Remark
		as part of health and safety measures for those employed during construction.		
		(ii) follow and implement all statutory provisions on labour (including not employing or using children as labour, equal pay for equal work) health, safety welfare, sanitation, and working conditions.	Partially complied	Sanitation facilities in labour camps and kitchen areas need improvement. Only the CP-2 contractor has established a proper plant for drinking water facilities.
		(iii) Such contracts shall also include clauses for termination in case of any breach of the stated provisions in the contract.	Being complied	

Verification and Validation of Environmental Loan Covenants:

- ✓ The EIA addendum is under preparation as per the approved Memorandum of Changes (MOC) dated 9th November 2022; the first phase of the revised EIA addendum was submitted on 30th May 2023 (mentioned in SEMR) and is under review by ADB.
- ✓ Based on these changes necessary EC amendment/modification is also required and the same is under process and clearance is yet to be obtained. During the ADB mission (5-9th December 22 and 20-25th March 23) it was agreed that the application shall be made through Parivesh Portal of MoEF&CC latest by 15th January 2023 and finally agreed to be done by August 2023 (mentioned in SEMR).
- ✓ Rest of the covenants are being complied and accordingly reported in the SEMR.
- ✓ Correctly the status of loan covenants is mentioned in the SEMR.

3.0 COMPLIANCE TO ENVIRONMENT MANAGEMENT PLAN:

25. The main EIA, along with three supplementary EIAs, was cleared by ADB in 2018, and Environmental clearance was granted by MoEF&CC via an EC letter dated September 4th, 2019. The revised EIA Addendum is under preparation, and the amendment of the EC is also under process.
26. The Main EIA and the supplementary EIAs also consist of an Environment Management Plan (EMP) with detailed mitigation measures. The time frame and location for implementation of such mitigation measures are also defined in the EMP, along with costs and responsible agencies for the implementation and supervision of the EMP.
27. In addition, an Environmental Monitoring Plan (EMoP) has been prepared to guide key monitoring activities and ensure the effectiveness of EMP implementation. Contractors who are currently working on the project (CP1, CP-2, CP-3, and CP-4) are assigned the duty of adhering to all management strategies outlined in the EMP. Each contractor must adhere to all applicable laws and ADB's safeguard specifications. Additionally, contractors will need to adhere to any project-specific regulations for soil, water, air, noise, and biodiversity.

3.1 BIODIVERSITY CONSERVATION AND WILDLIFE MANAGEMENT PLAN

28. **Establishment of a Biodiversity Management Committee:** The Biodiversity conservation and wildlife management plan requires the formation of a Biodiversity Management Committee (BMC) for effective implementation of the Biodiversity Conservation Programme enlisted in the EMP. The committee is required to have representatives from the project authority, members of the Autonomous Council of Dima Hasao and Karbi Anglong, the Department of Environment and Forests, the Forests and Wildlife Division, and the Assam Biodiversity Board.

29. A Biodiversity Management Committee, as required, has been established, including members of the autonomous council (Dima Hasao and Karbi Anglong), the department of environment and forest and wildlife division, and the Assam biodiversity board. Till June 2022, no meeting has been initiated by the committee; however, in the period (July–Dec 2022), one meeting was held on December 21,2022. The second meeting was conducted on 21.06.23 and Minutes of meeting is included in Annexure 23 of SEMR. Biodiversity conservation plan is yet to be initiated by BMC.

30. **Conservation Plan for Floral Species:** The plan requires rehabilitation and restoration of all cleared sites; further, as required under the plan, there is no proposal review suggesting up-gradation of a recreational area at Panimur Forest Ranger Station downstream of the dam, which is currently used as a picnic spot by the general public.

31. **Promote Wildlife Surveys and Monitoring in and around the Project Area**- This activity is aimed at adding to the existing knowledge base on wildlife presence and movements in the vicinity of the project area. The presence of wildlife will be monitored by using camera traps provided by the project. The wildlife survey has to be conducted with the assistance of the Wildlife Division, Department of Environment and Forests. SEMR lacks information on the camera traps installed.

32. Awareness Raising Programs: It requires raising awareness among workers and contractors regarding

illegal poaching. SEMR has a mention about the poaching activities monitored and awareness carried out among the workers.

33. Strengthen patrolling: To minimize the risks of poaching, awareness raising programs will be combined with an increase in patrolling by local forest rangers (in coordination with forest department) and construction of check posts and watch towers at key locations. The choices of location of check posts and watch towers will be guided by consultations with forest rangers in the area. Construction of Check posts have not been initiated yet.

34. **Compensatory Afforestation Programme:** An amount of Rs. 15, 94, 23,850.00 (Rs. Fifteen Crores, Ninety-Four Lakhs, and Twenty-Three Thousand Eight Hundred Fifty) has already been paid to the Forest Department for Compensatory Afforestation (CA) by the Compensatory Afforestation Fund Management and Planning Authority (CAMPA). As per departmental norms, the Forest Department will implement the CA. The 8 patches of revenue land have already been notified as "reserved forest" by the government of Assam. The Forest Department, Govt. of Assam, has taken up the CA for Dima Hasao and Karbi Anglong in the APO of 2022–2023. APGCL will monitor the activities, and the Department will submit the six-monthly progress report to EA so that EA can update the status of CA to the MoEF&CC.

35. The Forest Department, Govt. of Assam, has taken up the CA for Dima Hasao and Karbi Anglong in the APO of 2022–2023. APGCL will monitor the activities, and the Department will submit the six-monthly progress report to EA so that EA can update the status of CA to the MoEF&CC. At present Forest Department, Govt. of Assam, has taken up the CA for Dima Hasao district in Harmen range through establishment of five nurseries at locations namely: (i) Wayungdisa RF; (ii) Tartelangso RF; (iii) Bagha Dima RF; (iv) Choto Longku RF; and (v) Bagha Dima RF, including site selection, preparation of the beds, seed collection, clearance of weeds etc. Details mentioned in SEMR. It appears that the implementation status of the CA is yet to be included in the APO (FY 2023-24).

36. After reviewing the EMP and BMP and communicating with the site staff, the EMC suggests that the following activities be initiated in close coordination with the Forest Department:

    - Compensatory Afforestation is a seasonal activity and therefore can only be carried out during the pre-monsoon season to ensure a high survival rate for plant species. Therefore, it is suggested to initiate the process of plantation at least 30-45 days before the onset of the pre-monsoon.
    - A biodiversity monitoring awareness programme can be developed with a timeline to provide awareness of biodiversity to the local community.
    - Rehabilitate and restore all cleared sites through compensatory afforestation as and when the structures are complete.

37. Tree Cutting: As per tree cutting permission, permission has been accorded for 45349 trees in Karbi Anglong and 20846 trees in Dima Hasao as per Forest Clearance. NOC for tree cutting has been received for CP-2 and the trees were felled in the presence of officials of the forest department, Panimur Range, Dima Hasao (West) Division and APGCL. All the trees are marked and felled by the respective Forest department. However, in the SEMR, it's not clear whether the 241 trees have been cut by CP-2. EMC

checked, and it was found that 241 trees have actually been cut by the CP-2 contractor in progress with the assistance and presence of officials of the Forest Department, Panimur Range, Dima Hasao (West) Division, and APGCL.The same was also verified by EMC during site visit in the reporting period.

3.2 CATCHMENT MANAGEMENT PLAN

38. As a requirement, the Catchment Area Treatment Plan (CATP) as proposed in the EIA/EMP report needs to be implemented in consultation with the State Forest Department and in synchronization with the construction of the project.

39. As communicated by EA, an amount of Rs. 28, 29, and 67,000.00 (Rs. Twenty-Eight Crore, Twenty-Nine Lakh, and Sixty-Seven Thousand) has already been paid to the Forest Department for the implementation of CATP.

40. The CATP includes afforestation in 683 ha of area, for which work has yet to start. However, 5 nurseries in Dima Hasao district in Harmen range have been established. More details will come up in the next SEMR Validation report (July.–December 2023).

41. GAP Plantation on 281 ha of land is yet to be started. SEMR can mention about the status of GAP plantation in 281 Ha. Pasture development on 574 ha of land is yet to start, and further developments will be reported in the next SEMR (July–Dec2023).

42. As per the EIA and EMP, 17 Check dams are to be constructed, for which work has yet to be initiated.

43. Nursery in village TorteLangsu and Longku near the highway around the Forest office has Seedling of different sizes ready for plantation.

44. Baseline biodiversity assessment was carried out by EMC and the reference of the same is included in the SEMR with a mention to include them in the EIA addendum. However, the annual bird count study is yet to be done by EA. EA has indicated that the Annual bird count will be initiated in the winter months with support of the forest department. The data will be needed by EMC for analysis and additional feedback.

3.3 FISH MANAGEMENT PLAN

45. As per the supplementary EIA (Vol. 3), It is estimated that total annual fish production is about 254 million metric tonnes in this area (Kopili-Kallang Basin Master Plan, Brahmaputra Board, 1995). The supplementary EIA report also mentions that indigenous lotic (fast-water) fish species are found along the Kopili River and its hilly tributaries.

46. The many hydropower schemes that are being constructed or are in planning will affect these indigenous fisheries by reducing the lean season flows downstream of the dams. Designing and implementing a comprehensive fisheries reintroduction plan is therefore very important in conjunction with the environmental flow measures, including specifications of lotic and lentic species, timing and locations of reintroduction, as well as the implementation budget and responsibilities.

47. As stated in the EIA, no fish or fishing activities were recorded in the main channel of the Kopili River. However, fish are present in the local streams, which support small-scale fisheries using traps and small gear. As per environmental monitoring reports, the pH of the water has increased (but it varies seasonally), but it is not clear whether the change in pH is due to an influx of floodwater or due to the mining ban in the upstream catchment of the river. During the field visit, no local fish were recorded in the market. Interviews with the local communities revealed that small-scale fishing is done in local streams during the monsoon and post-monsoon periods. The proposed fish management plan should investigate the reason for the change in pH to have a more practical fish management plan.

48. Once the College of Fisheries, Raha will submit their report, reintroduction plan to be to prepared. This may be reported in upcoming report

49. After reviewing the management plans and communicating with the site staff and locals, EMC suggests that the following activities be initiated or implemented for fish management:

- ✓ Care should be taken to avoid alien invasive species in the river, both fish and fauna. Lentic water is more likely to have invasive plant species, such as *Eichornia* and *Ludvegia Pruviana* (Barua et al., 2017), and fish species, such as Tilapia.
- ✓ There should be a regular invasive species monitoring at all stages of the project, including the operational phase. Monitor invasive aquatic species periodically (at least once per month) in outlets such as local markets, in collaboration with Agriculture and Forest departments

50. The EMC recommends incorporating a fish ladder, anticipating potential improvements in water quality and the introduction of fish species. Ongoing assessments, including backwater effect details and downstream impact evaluations with ecological assessment, are underway. Comprehensive details of these activities will be reported in the upcoming SEMR (Jul-Dec 2023).

3.4 WATER QUALITY RESTORATION

51. Draft EIA prepared by WAPCOS (October 2016) was finalized with 3 additional reports namely (i) Cumulative Impacts Assessment (CIA), (ii) an Integrated Water Resources Management Plan (IWRMP) and (iii) a Water Quality Restoration Plan (WQRP) including a mitigation strategy. The supplementary EIA (Volume 4) to the main EIA report is prepared mainly with the objective of Water Quality Restoration (WQR). The main objectives of the WQRP are to determine the sources of acidity due to Rat-hole mining and to identify and design remedial alternatives based on feasibility, cost, and relative effectiveness. As per this WQRP, the Kharkar river is the upstream source of the Acid Mine Drainage (AMD) due to rat hole coal mining practices. The Overall objective of the WQRP is:

- ✓ Reduce and eventually eliminate the AMD and consequent surface water contamination, up and downstream of Kharkar and Kopili river.
- ✓ Remediate abandoned mine areas to isolate AMD-producing geologic material.
- ✓ Restore coal mine affected land to eventually support pre-mine land eco-systems including its

flora and fauna;

- ✓ Restore pre-mining land use including agriculture, horticulture and grazing.
- ✓ Restore riverine system to pre-AMD quality to support fisheries; and
- ✓ Guide eventual land use and local economy away from coal mining, to one that promotes sustainable development.

52. AMD problem in the Kopili river Basin: Acid mine drainage (AMD) forms when sulphide minerals have been exposed to oxidising conditions during mining and other excavation activities, such as highway construction. In the presence of oxygen and water, sulphide minerals oxidise to form sulphate-rich and often metal-laden soil. AMD are toxic to vegetation and can reduce the potability of water supplies.

53. Water Quality in the Kopili River Basin: As per the EIA report (April 2018) for the LKHEP scheme, the Water quality in River Kopili has been reported as acidic (pH 3.3 to 5.2) making it unfit for drinking or usage in construction. Further samples were collected during January 17, indicates that Kharkar River, a tributary of Kopili actually carries exceptionally low pH (2.5-3.3) water leading to acidic nature in River Kopili. The supplementary EIA (Vol4: WQRP) reported that the AMD from the rat hole mining in Meghalaya is the major reason for such low pH value in Kharkar River; measures of AMD show pH value in the range of 2.2 to 3.7. In October 2017, MoEF&CC subcommittee reported that the pH value from river Kopili in the range 6.76-6.86 and at Umrang Reservoir in the range of 4.54-4.62. This report of MoEF&CC sub-committee therefore does not report high acidic water in River Kopili.

54. Further water quality was measured at Dam site and its upstream and downstream parts by APGCL in 2018, 2019 and 2021 which has shown some improvement in pH value (5.9 to 6.25) while the data collected in March 22, has shown remarkable improvement in pH value showing almost 7 (neutral value) in all the sample collected sites upstream and downstream. This was reported in the SEMR validation report Jan-June 2022.

55. Water quality monitoring carried out in March 2023 from various locations like (i) 3 km Downstream of dam site from river Kopili (pH-4.34); (ii) submergence area of dam site from river Kopili; (iii) 1 km upstream of dam site from river Kopili (pH-4.4); (iv) 8 km downstream of dam site from river Kopili (pH-4) – Shows acidic nature and (v) RO water; (vi) APGCL –inspection bungalow; (vii) PMC Pond and (viii) Lanku Nala (pH-7.75) water quality report is showing good pH. Water Quality test report is attached in **Annexure-XV**.

56. During the reporting period, the EMC team visited the Meghalaya Pollution Control Board to gather information on measures taken to reduce the pH levels in highly acidic rivers, including Kyrhukhla, Lunar, and the Mookympad side stream. A brief report is enclosed in **Annexure-XVI**. The objective is to raise pH levels to CPCB standards using green Micro Algae consortia technology. Treatment will span 24 months, covering 10 km of Kyrhuhkhla and 13.3 km of Lunar River. During the discussion with the MPCB team, it also came out that a river named as Umiurem which traverse through Meghalaya and then meets river Khaker and which ultimately meets river Kopili. River Umiurem is affected by AMD and hence has high acidic problem. The river Umiuren originate at Jaintia hiill and carry the water mixed with AMD from nearby locations like Sakynphor (pH is reported as 3.3 as per EIA report).

The route of Umiurem-Kharkor-Kopili as marked in Blue (reference: District Planning Map series)

Following their visit to the Meghalaya Pollution Control Board, the team met with PCCF (Social Forestry) and discussed with CCF (Social Forestry). The CCF informed them about a pilot project by the "Rain Forest Institute" Jorhat aimed at afforestation for coal mine remediation in Soo Kilo, Meghalaya. Based on this, the social forestry division initiated afforestation activities covering 416 Ha, primarily in coal mine areas of East and West Khasi Hills and Jaintia Hills. Out of this, 49.5 Ha is in Jaintia Hills, known for coal mines and AMD. The project is funded through the Meghalaya Environmental Protection Fund (MEPF), with Rs 5.85 Cr. allocated for afforestation during 2022-23. Results of these efforts will be seen in the coming years.

57. During site visit, EMC has also recorded few spot pH measurements on 04.03.2023 showing pH range varies from 4 at Khandong Dam Site-river Kopili ,4.6 at Up-stream at River Kopili (at Kopili Village) & at the inlet of water treatment plant for the construction water installed by CP-2 contractor,6.7 at Miyungma Daoga Waterfal and 8.6 at Umrangso HEP Discharge channel.

58. Water quality report of overhead tank of the Khandong dam office (just at the dam site) has shown pH value of 4.0. Traces of Pyrites has been observed at the downstream of Khandong Dam with reddish iron colour. During the discussions with the locals the team was informed that the river used to carry lot of fish species which has started declining suddenly and from the last 10 years there is hardly any fish available in the river.

59. During the current reporting period (Jan-June 23), several compliances have been observed, specifically the implementation of management measures outlined in the WQRP for LKHEP, along with enhanced liquid waste management practices compared to the previous reporting period. In the context of safeguarding the dam from the acidic water of the river Kopili, it is emphasized that coordinated efforts

are essential at the government level in Meghalaya. This involves adhering to the Supreme Court's directive to close down rat-hole mines, complying with NGT orders, afforestation in abandoned coal mines as a remedial measure, and implementing phytoremediation in the Acid Mine Drainage (AMD). At the project level, various safeguard measures, such as utilizing SRC cement for protecting water-retaining civil structures, applying acid protection paints in H&M structures and E&M equipment, and implementing other protective measures, have been undertaken during this reporting period:

- ✓ To safeguard the civil structures from the acidic water of river Kopili, protection of water retaining structures has been proposed with Sulphate Resistant Cement (SRC) with suitable admixtures.
- ✓ A laboratory is also established for the concrete cube test for both the Ordinary Portland Cement (OPC) as well as Sulphate Resistant Cement (SRC). In the laboratory, the SRC cubes are being tested with high acid water (with pH range between 3-3.5) to check the durability of these cubes and assessing the future sustainability of the water retaining structures which will be open to Kopili water. The laboratory team carried out the Water Permeability Test of concrete cubes as per IS-3085-1965, for 28 and 56 days with 7 bar pressure to check how much water can penetrate in the cubes. The weight loss of cubes without and with additives are recorded and maintained. With additive the loss is just 0.076% (after 28 days) and 0.059% (after 56 days). Such results are to be maintained regularly.
- ✓ For protection of Electro Mechanical structures which are proposed to be exposed to acid water of river Kopili, the CP-3 contractor (M/s Andriz) will use special paints such as Interline 10642.
- ✓ During this period, it is also observed that sedimentation tank has been constructed and has started working in the batching plant (dam site). A detailed water use budget has been requested and will be reported in the subsequent monthly reports.
- ✓ A water treatment plant has been established with a capacity of 6 Lakh Liters per day for usage of water from river Kopili. The pH value of the intake water from river Kopili is 4.6 while the pH of treated water ranges between 7-7.25. The Plant is therefore running well and providing desired results.
- ✓ A RO plant is also established near the L&T office. Water is taken from Longku Nala through tankers which thereafter treated in this plant. Plant is running with meeting the desired results for safe drinking water.
- ✓ CTE and CTO NOC is received for the both WTP and RO plant.
- ✓ Additionally, it was discussed and mutually agreed that solutions employed in Meghalaya or other waste treatment plants might be necessary to neutralize the acidic nature of surface water drainage. In response, EMC will submit a Water Quality note outlining the treatment plan for acidic seepage water.
- ✓ Sufficient budget is allocated under water quality restoration plan (WQRP).

60. For liquid waste management following measures are being taken up in this reporting period (Jan-June 2023)

- ✓ CP-2 contractor has already been instructed to construct 100 KLD STP. However, instead of an STP, the grey water from the kitchen and wash areas of labour colony are send to low lying area with a bed of gravels on which natural vegetation has been found (WQ report is enclosed in **Annexure XV**). Also for the treatment of black water septic tank is provided but it is not clear what is quality of supernatant. Contractor is instructed to submit the water quality data.
- ✓ Wastewater from all kitchens, bathing areas, washing areas were diverted to the settling tanks prior to releasing in the environment. Still there are instances for direct release of wastewater. CP2 contractor has ordered DRDO approved biodigester septic tanks for treatment of wastewater before release into the environment. Monitoring of water quality after treatment and that of the receiving

water body shall be monitored regularly from the next reporting period July to Dec, 2023 SEMR."

- ✓ For Water pollution control sufficient budget is allocated in the EMP to fund such pollution control measures like STP for the CP-2.
- ✓ The procurement of various facilities such as 4 portable bio toilets, 2 portable prefab toilets, 2 DRDO bio tanks of 4000 liters each, and 2 prefab container toilets has been successfully completed under the Environmental Management Plan (EMP) budget. The effluent quality may need to be checked and to be reported in the next SEMR/MPR of contractors.

- ✓ The slurry from the sedimentation tank is discharged in the downstream nala and have choaked some portion and a solid concrete bed on the nala has been observed. This has been agreed to be cleared on timely manner by CP-2 contractor.

3.5 INSTITUTIONAL ARRANGEMENTS & CAPACITY BUILDING:

61. Overall, no change in the institutional arrangements of APGCL was reported during the reporting period. It is observed that regular EHS trainings and fire safety mock drills are being conducted by the CP-2, and regular EHS trainings and toolbox talks are being held by the CP-4. However, it is observed that:

- ✓ The appointment of experienced H&S experts under PMU, a Senior Environment expert under PMC is **still pending;**
- ✓ CP-1 is yet to deploy the Environmental and EHS expert at site
- ✓ CP-2 contractor has appointed both the Environmental and EHS experts at site and submits regular monthly and EHS report to APGCL.
- ✓ CP-3 has appointed EHS expert but the appointment of Environmental Expert is still pending in the reporting period.
- ✓ The CP-4 contractor has appointed one Environmental Expert, but he has resigned during the reporting period, a replacement needs to be done at the earliest. There was no EHS expert available during the reporting period.
- ✓ None of the contractors have provided training on the Prevention of Sexual Harassment (POSH) of Women at Workplace at the project site, as mandated by the Prevention, Prohibition, and Redressal Act of 2013 during the reporting period.
- ✓ However, in this reporting period CP-2 has organized HIV/AIDS camp during January 2023. The same needs to be organized at regular intervals.
- ✓ Two fatal accidents have already happened in the last reporting period (Jul-Dec 22) under CP-2, and one more happened in the period Jan-June 23. The root cause analysis for these accidents are not available at this moment and not annexed in SEMR. It is not clear how much compensation has been paid to the kin of the deceased.
- ✓ Since work has started in all the contract packages now, it is suggested to take up a independent OHSA (Occupational Health and Safety Audit) for all the contract packages to ensure that these work/non-work related accidents can be avoided on time and minimize the reputational risks of all concerned.
- ✓ All staff and workers working at the site are required to undergo social awareness training on local customs, culture, and heritage.

- ✓ All staff and workers working at the site are required to undergo wildlife awareness training covering the protocols to be followed in the event of an encounter with a wild animal.
- ✓ The EHS training module for all package contractors must include incidents of snake and insect bites and train the required staff on how to tackle such medical emergencies.
- ✓ In addition to the above, the CP-1 contractor is required to undertake mock drills and training in EHS- related trainings for construction safety, life and fire safety, electrical safety, etc.
- ✓ As part of the project, EMC shall also provide necessary on-the-job training and will organise half-day to one-day workshops on various subjects like dam safety, biodiversity, environmental aspects including occupational health and safety, sustainable development, biodiversity and wildlife management, water quality restoration, etc. A workshop on Dam Safety is already planned in the month of July 2023.

3.6 DAM SAFETY MEASURES:

62. The International Dam Safety Expert visited in December 2022 and provided an initial set of observations, especially concerning the environmental flow release. In fact, in the Consultant's understanding, the proposed manual slide valve and hooded cone valve could complicate the ease of operation (which must be well coordinated with the auxiliary powerhouse operation as per the assumed Contractor's rationale). Therefore, an automatic regulation valve (e.g., a needle-type control valve) and an ultrasonic flowmeter are recommended.

63. The document concerning dam stability, namely Dam General Arrangement and Stability Analysis (Non-overflow and Overflow Blocks), was received and analysed. The design criteria and calculations seem to be adequate, but to complete the analysis, some additional elements have been demanded by the external expert, such as construction plans and base studies (characterization of seismic action, foundation resistance parameters), which were not received in the current period. It has been planned to check them during the next site visit scheduled in July 23.

64. Other documents concerning dam safety have still been asked for, but were not yet provided: Dam monitoring system; dam break analysis & Emergency Action Plan (EAP), risk assessment.

65. Training and capacity building have been proposed under the dam safety organization once it is formed under the Dam Safety Act 2021. The organization was programmed to organize the first training and capacity-building by the end of this semester, but will take place in July 2023.

66. The agenda for the Workshop on Dam Safety has been prepared, considering two parts: Part 1: Introduction to Dam Safety & Its Need and Part 2 : Integration of Dam Safety, inspection, monitoring and maintenance.

3.7 SOLID & LIQUID WASTE MANAGEMENT

67. As required by the EC condition, a Solid Waste Management Plan and a biomedical waste management plan were still under preparation.

68. There was no evidence of a solid waste management system on the project site of the package 2 contractor. It was learned that CP-2 is coordinating with the Umrangsu Municipal Board (UMB) for the disposal of the waste generated at the designated landfill site of UMB. Communications in this regard have been initiated in this reporting period (July–Dec 2022). In the current reporting period approval has been received from Umrngshu municipality on 23.3.2023 (**refer Annexure VI)**. CP-2 contractor will only segregate the waste on their premises and will transfer the waste to the designated landfill site at UMB. A few observations made during the validation visits are given below:

- ✓ There was no categorization or segregation of waste, either.
- ✓ Moreover, biomedical waste from the first-aid dispensary unit was also not separated and dumped alongside other waste in the same spot.

69. After reviewing the EMP and communicating with the site staff, the External Monitoring Consultant suggested EA to:
    - ✓ Solid waste should be scientifically treated to avoid leachate.
    - ✓ An area designed for temporary storage of solid waste must have a shed to protect it from rain.
    - ✓ To prevent scavengers from dispersing waste, structures for the management of food waste should begated.
    - ✓ Proper quantification, categorization, segregation, handling, and disposal of waste are required to befollowed.
    - ✓ Sewage water management should be improved. There should be primary and secondary treatmentof sewage.

3.8 MUCK MANAGEMENT MEASURES:

70. As per the EIA 2018, it was projected that 0.985 million m3 of the total 1.407 million m3 of muck that needs to be handled will be disposed of at the two designated disposal sites located within the forest area. However, as per the Forest Advisory Committee's (MoEF&CC) suggestion, the muck disposal site has been shifted from forest land to revenue land. Therefore, according to the updated muck estimate provided in the EIA addendum, overall, 1.66 million m3 of muck will be generated from the project, of which 1.28 million m3. will be disposed of at the four designated disposal sites, all of which are situated in the revenue land more than 500 metres from the river. The disposed muck needs to be piled at an angle of repose at the disposal sites, followed by Phyto-remedial measures for materials stabilization as suggested in the EIA, such as plantation, slope turfing, provision of retaining walls and fencing, and further re-vegetation through an "Integrated Biological and Biotechnological Approach", Afforestation with local plant species may be adapted. The cost for remediation of muck disposal sites includes slope turfing, ground preparation, manure application, providing 5 cm of soil cover, building a retaining wall, transportation and carriage, fencing, maintenance, and irrigation. Funding has already been allocated for the stabilization of muck disposal sites.

71. It is mentioned in the SEMR (July–December 2022) that the muck disposal plan is approved. Slope compaction and tree plantation towards prevention of soil erosion at the disposal site have yet to start. This is crucial and should be initiated at the earliest possible time.

72. Muck generated from the tunnel was majorly crushed and reused as aggregates for the construction purpose; rejected concrete test blocks were being reused for temporary non-structural construction purposes; muck dumping sites are managed as per the provisions given in the approved EIA i.e. levelling, compaction, stabilization measures for top and slope at the edges, etc.; that muck dumped on road side in the forest land, camp site etc. are moved to the designated dumping sites;

73. CP-2 has also submitted a muck management plan. According to that plan, the four permanent disposal sites have been identified with total holding capacity of 27.05 lac m3, and one temporary storage D-5 with holding capacity of 13.5 lac m3. The site wise holding capacity and dumping proposal is given below:

Dumping Sites	Location	Area (Ha)	Capacity (cum)	Dumping Proposal (cum)	Shortfall (cum)
Permanent Dumping Sites					-
D-1	Near Permanent Colony TR5	10.4	17,00,000	5,00,000	-
D-2	Near Colony TR5	3.7	2,90,000		-
D-3	Near PR-7 Dumping Yard-1	4.9	3,07,000	1,55,000	-
D-4	Near PR-7 towards magazine area	6.1	4,08,000		-
Total			**27,05,000**	**6,55,000**	-
Temporary Storage Sites					-
D-5	Temporary storage Facility [33] Near Crusher	12	9,00,000	5,35,578	-
	Temporary storage	2	1,00,000	34,380	-
	Temporary storage	1	1,00,000	14,000	-
	Temporary storage	2.37	2,50,000	1,39,270	-
Total			**13,50,000**	**7,23,228**	

Source: Contractor data collection

3.9 INTEGRATED WATER RESOURCE MANAGEMENT PLAN:

74. APGCL has awarded the downstream impact assessment to M/s RMSI in the month of October 2022. As per the contract, RMSI is required to prepare a Resource Management System in the Kopili River Catchment Area Community and a Resilience and Disaster preparedness plan for the project. During the reporting period they have submitted the inception report in April 23 after initiating site visits in Nov 22 and Jan 23. The team of RMSI met with stakeholders and line departments to understand the project area and discuss data acquisition, particularly focusing on gathering information from the State Water Resource Department (WRD), Assam State Disaster Management Authority (ASDMA), and other relevant agencies for resource management and disaster resilience along the Kopili River.

75. The scope of the assessment includes:

- ✓ To collect real-time data on water inflows and outflows from the hydropower dams on the Kopili River and other relevant tributaries of the Kopili River, as well as to support resource management in the autonomous district councils;
- ✓ Correlate the real-time water inflow data with rainfall data;
- ✓ Undertaking a mapping of the two autonomous district councils to cover village data (including ground water), mineral resources, forest cover, agriculture assets, disaster-prone areas (flooding areas and

landslides), etc.;

- ✓ To provide data and help APGCL, the state government, the autonomous district council, the district authorities, and other state agencies such as the Assam State Disaster Management Authority (ASDMA), the state Water Resources Department (WRD), and the Flood and River Erosion Management Agency of Assam (FREMAA) so that they can make informed decisions on the likely impacts on communities and physical infrastructure and take necessary measures to mitigate the impacts;
- ✓ Undertake downstream assessment of the existing 110 km of river embankments;
- ✓ Undertake erosion protection and the needs assessment of additional embankments of 80 km.
- ✓ to protect the downstream districts of Nagaon, Hojai, and Morigaon;
- ✓ Assist the district authorities of Hojai, Nagaon, and Morigaon, the WRD, ASDMA, and FREMAA, to address disasters through better prediction of flooding, improved hydrology modelling, and better disaster risk maps;
- ✓ Prepare a wetland development plan and undertake restoration of wetlands to hold flood waters to help manage the floods.
- ✓ Identify five villages, one in each district, and undertake a needs assessment;
- ✓ Design and implement a participatory village resilience and disaster risk reduction plan to increase resilience and disaster preparedness;
- ✓ Implement the village disaster risk reduction plan in consultation with village communities.

76. During the reporting period, RMSI tasked the survey team with conducting a comprehensive river cross-section survey of the Kopili river and its five major tributaries. Alongside this, the team also conducted a parallel survey of the embankments lining these rivers.
77. On April 19, 2023, RMSI facilitated the signing of an MoU between APGCL and IMD Guwahati to install and monitor ARG/AWS in the basin. Initially, the MoU covers the installation of 09 ARG and 01 AWS at proposed sites, with real-time data shared through IMD. The number of installations can be increased if APGCL and IMD agree mutually and IMD can support the requirement.
78. As part of the Resource Management System development, RMSI has commenced the design and development phase. The application's landing page will feature a dashboard requiring user authentication and authorization for access. Upon successful login, users will be presented with district-wise information on the dashboard.
79. RMSI has completed the identification of one village each in five districts (Morigaon, Nagaon, Karbi Anglong, Dima Hasao, and Hojai) for conducting a need assessment and preparing a community resilience plan. These villages were selected from a shortlist provided by ASDMA and confirmed through consultations with villagers during site visits, as well as discussions with District Project Officers (DPOs) and Field Officers (FOs) of the District Disaster Management Authority (DDMA). These village plans, considered pilot projects, can be further refined and expanded to other villages in the districts if desired by the district councils, as per the terms of reference (TOR)

3.10 MAINTAINING THE REQUIRED ENVIRONMENTAL FLOW

80. The river flow is not completely cut off. According to the PMC and package 2 contractor, the imperative to sustain river flow for environmental purposes was taken into account in dam design. As intimated by

APGCL, RMSI, under the Japan Fund Poverty Reduction (JFPR) grant, will initiate the downstream study under integrated water resource management (IWRM). Concerning the e-flow circuit, main conclusions are summarized under Point 53 (item 3.6).

3.11 OCCUPATIONAL HEALTH AND SAFETY MEASURES:

81. Many good practices are also observed, including the professional safety app (by L&T) and IB4U. There is VR-based safety training, which helps the workers understand the safety briefing at their convenience. All these details are nicely captured in the SEMR.
82. In the SEMR (July-Dec 2022) two fatal casualties were reported dated 15.07.2022 and 05.12.2022 which has been mentioned as a non-work-related incident. In the period Jan-June 2023, one more incident was reported in June 2023. The incident report should also include a Root Cause Analysis and Corrective Action measures for the incident with proof. APGCL has agreed to include these aspects in the SEMR along with the orders and guidelines passed by APGCL to the contractor for the reporting of Fatal/Near-miss accidents.

83. The following few observations require some attention:
    - ✓ In the subsequent EMRs it is suggested to keep the status of (i) Dangerous occurrences, (ii) non-work-related incidents, and (iii) First aid cases reported same at various places. In the current EMR this is now rectified.
    - ✓ Compliance status with respect to incidence reporting need to be added in the subsequent SEMRs.
    - ✓ For the incidence report, the compliance status with respect to the following measures must be addedto the subsequent SEMRs:
        - Root cause analysis of any incidence for identifying the actual reason towards any incident;
        - Mention the corrective active actions actually taken in avoiding and minimizing such incidents in future may be included.
        - Enhancement and revision of Toolbox Talk (TBT) as may be needed;
        - Increasing the frequency of OHS training to the staff and labours;
        - Refresher training to staff and labours as well as well as to any new labour gang/staff;
        - Increase in number of safety supervisor
        - Paring of experienced and new labour for carrying of dangerous works
        - **An OHSA audit may be initiated by APGCL for all the contract packages along with 4 site specific training and one National level workshop.**
        - APGCL needs to introduce safety culture in the organization and a fortnightly training online/offline shall be arranged to enhance the safety culture and to promote some incentives/prizes also may be introduced.
        -

3.12 LABOUR INFLUX MANAGEMENT

84. Labour Influx Management Plan is under preparation for CP-1, CP-3 and CP-4. CP-2 has submitted the labour influx management plan to APGCL.

3.13 ENVIRONMENTAL MONITORING:

85. As informed by CP-2, quantitative Environmental Monitoring for Air, Water (Surface and Ground), Soil, and Noise quality is being conducted every quarter by M/s. En-vision Enviro Technologies Northeast During the assessment period, quarterly environmental monitoring was conducted in the current reporting period **(refer Annexure XV)**. M/s R.L. Poddar was awarded the contract for the blasting operations, and the blasting activities started in July 2021. However, vibration monitoring has been initiated in March 23 and the copy of the same is enclosed in Annexure 25 of SEMR.

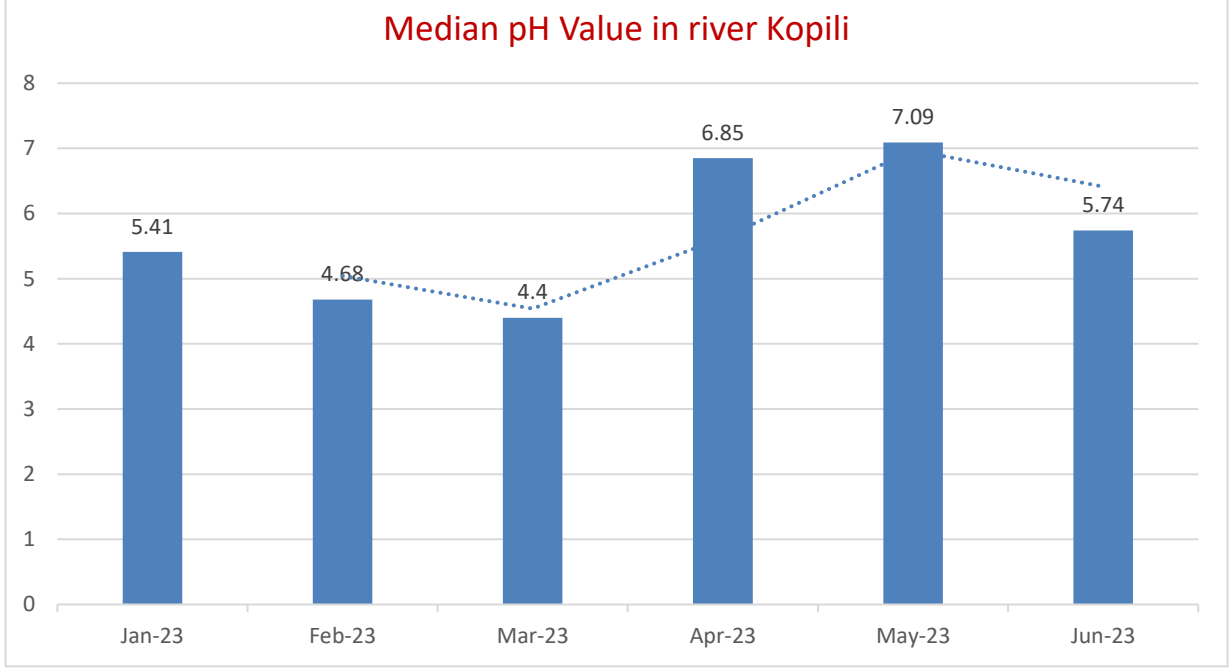


Figure 1.1: Median pH value in river Kopili during the reporting period (Jan-June 2023); Source: SEMR, APGCL

3.14 GRIEVANCES REDRESS MECHANISM

86. A Grievance Redress Mechanism (GRM) has been established for the project to handle complaints about environmental and social issues and its mandate is to resolve the grievances in a timely manner.

87. A three-tier grievance redress mechanism has already been notified for handling grievances. The first tier is the grassroots level mechanism. Grievances of the APs are first dealt with by gaon buras in consultation with the field officials, and the contractors of the project. Complaints that cannot be addressed at the level of gaon buras are forwarded to the Project-level grievance redress committee (GRC) which is the second tier. The third tier is the appellate GRC at the state level. APGCL deal with the complaints and grievances as the appellate GRC. There is no bar to take grievances and complaints to national courts for arbitration.

88. GRM is open to all (communities and workers). Moreover, the workers' grievances are additionally

addressed by the contractor through their own system. Site Register is maintained in the contractor's camp and in APGCL office. All the complaints are recorded. A format has been developed by Social Expert to record grievances. Grievance Box was placed at APGCL site office. GRM training given by APGCL Social Expert and R&R NGO to all the affected villages. All the complaints lodged by the workers/labour are addressed by the admin department of the contractor. Registers are maintained at site.

89. A grievance redressal committee (GRC)is also in place, and its mandate is to resolve the grievances in a timely manner. As of June 23, only social grievances pertaining to land and compensation-related grievances were reported and recorded for the project in a grievance register maintained at the project site; no grievances pertaining to environmental parameters and EHS aspects.

90. After reviewing the GRM records and communicating with the GRC members, EMC suggests:
    - ✓ Ensure the strengthening of GRM at site level for its effective implementation.
    - ✓ Ensure monthly consultation with the local community to record community concerns pertaining to environmental as well as EHS issues, if any. The outcome of the meetings should be recorded in the Monthly Environment Report (MER).
    - ✓ GRC meetings should be held every quarter, involving local representatives. Suggestions from the meetings should be recorded in the SEMR.
    - ✓ Contact details of GRC representatives are yet to be displayed and the information of GRC to be disseminated to the upstream and downstream villages same need to be done and reported in the next SEMR.
    - ✓ In the SEMR, it has been mentioned that two GRC meetings are held on 24.1.23 and one on 06.06.23. However, except for the attendance sheet no minutes are shared. Though it has been mentioned that no such grievances have been registered, a minutes of meeting helps in support of such claim. Also, more frequent GRC meetings will help in delivering the project output in a more confident way.

3.15 CONSULTATION AND INFORMATION DISCLOSURE

91. APGCL, through SESC and PMC, is regularly conducting consultations that include informal and formal discussions and meetings with affected persons (APs), local representatives, and concerned committees. Residents in the area have been informed about the timing of blasting activities and have been given general instructions to avoid entering the project construction site.

92. As understood, an updated downstream impact assessment has been awarded to M/s RMSI. The downstream impact assessment, along with a project-specific disaster management plan that also includes a project site emergency preparedness and evacuation plan, is under preparation. EMC suggests that the same should be communicated to relevant stakeholders, including local residents and communities residing in the downstream areas.

3.16 OTHER ANTICIPATED IMPACT

93. There is a need for immediate interventions (particularly on the right bank of the dam axis) because of significant slope instability and deep rain cuts. There are several locations with loose rocks and boulders on steep slopes that require immediate attention to prevent the risk of subsidence, landslides, and rock

falls and to ensure the safety of people moving around on the roads and the workers located below. As agreed during the ADB mission (5–9 December 2022 and 20-25th March 2023), slope protection measures need to be initiated at the earliest.

94. At the package 4 contractor's, the construction workers are provided with very poor accommodation in the labour camp. There were no beds, mattresses, or mosquito nets, and there was no kitchen, bathing, or washing area. There is no provision for first aid at the construction site or labour camp. Firefighting arrangements were also not observed at the construction site and labour camp.

95. A few workers in the community kitchen provided by the package 4 contractor were observed to have been using firewood for cooking.

96. CP-4 contractor needs to improve its environmental readiness and reporting arrangement including availability of environment and EHS staff at site. The contractor will be solely responsible for any kind of mishap/incident at the site.

97. These aspects will be checked by EMC on a regular basis and will be reported in the next deliverables, like monthly or quarterly reports, to see compliance.

3.17 CORRECTIVE ACTION IN COMPLIANCE TO ADB MISSION (20-25th March 2023) :

98. The corrective actions taken in compliance with ADB mission observations are captured in Table 8 of SEMR (Jan–March 2023). EMC will also monitor these aspects in the subsequent monthly and quarterly visits and will be included in the next SEMR Validation report (Jul-Dec 23) and quarterly report (Jan-March 2024) along with wrap up meeting with APGCL/ADB after each site visits.The following points requires attention and status needs to be updated in the next SEMR (Jul-Dec 2023):

- ✓ All the EHS and Environmental experts to be appointed in PMU, PMC and at contractor's end. The same is being complied with and the actual status is given in section 3.5 of this report.
- ✓ EC amendment application will be made through PARIVESH Portal by August 2023. The status will be captured in the next SEMR.
- ✓ 1st EIA addendum is expected to be submitted by August 2023; accordingly, the EMP and CEMP will be updated.
- ✓ The annual bid count is proposed to be initiated from Nov-Dec 23.
- ✓ Increase of stack height is being complied for and the updated status is to be reported for all the contractors in the next SEMR.
- ✓ GRC meetings need to be more regular and minutes of meeting to be uploaded in the coming SEMRs. No environmental-related complaints have been recorded so far.
- ✓ Improvement of labor camp along with proper sanitation facility is needed for CP-1, CP-3 and CP-4. The status will be updated in the next SEMR.
- ✓ Status of updated CEMP for CP-1 contractor will be updated in the next SEMR
- ✓ EA to appoint suitable expert/agency to carryout the backwater and downstream impact assessment along with that of ecological assessment and modelling-the same has been taken up by EA and partially complied…the experts/agency for ecological assessment and modeling is in process. Status

will be updated in the next SEMR (Jul-Dec 23).

- ✓ Health and Safety measures are to be given utmost priority including avoiding of non-work related accidents are being complied but requires improvements to avoid any kind of such fatal incidents in future. This will be monitored regularly by EMC in subsequent monthly and quarterly reports.
- ✓ The pending CEMPs have been submitted by CP-1, 3 and 4 while the labour influx management plan and solid waste management plan to be submitted by them. To be updated in the next SEMR.
- ✓ CP-4 has been instructed to improve the labour camps and improve the safety culture including proper monitoring and issuance of height pass to the workers working on heights. The same is required to be monitored closely.
- ✓ All the contractors need to update the CEMP based on the EIA addendum and revised EMP.

4.0 CONCLUSION AND RECOMMENDATION:

99. Overall, the SEMR version is quite an improved version compared to previous versions. It has truly addressed the statutory compliance status, ADB loan covenants and corrective measures proposed in the previous ADB mission.

100. Some of the critical things that require important attention are given below:

- ✓ Emergency Preparedness plan for the Downstream is being prepared by the JFPR consultant for the operation phase. Dam Break analysis although carried out during the EIA requires to be updated by APGCL.
- ✓ CP-2 has prepared emergency preparedness plan for accidental failure of coffer dam upto their project premises. However this does not cover the emergency and evaluation plan for the downstream communities. The same is need to be prepared by APGCL after discussion with ASDMA.
- ✓ Construction of a treatment plant for the treatment of black and grey water generated from CP-2 contractors labour camps, kitchens, and other areas. The bio-digester septic tank may not be a feasible solution until its results are checked and monitored. A STP of 100 KLD capacity, as agreed earlier, may be established.
- ✓ Stabilization pond has been checked and it is basically a natural downland where some peddled are spread in the bed on which natural vegetation are growing. The results of the treated water need to be presented in the next SEMR to see the effectiveness.
- ✓ OHSA measures taken by the CP-2 contractor is found to be ok though there is a need for improvement of safety training and regular toolbox talks regarding the various potentials of incidents during safety training. However, the accident reporting must be prompt to the authority (preferably within 24-48 hours). Any fatal accident requires reporting within 24 hours along with a root cause analysis and supporting document like FIR, Postmortem report etc. One accident also occurred in the current reporting period in the month of June 23.
- ✓ The next versions of SEMR (i.e., July-Dec 23) need to elaborate on the CATP, other GAP plantations, Pasture development, check dam construction, fish management plan, Integrated Water Resource Management Plan (IWRMP), climate risk and adaptation in the dam design, and environmental flow calculation.
- ✓ Similarly, it is recommended that CP-1 and CP-3 also implement a robust record-keeping system for tracking muck generation, reuse, and disposal on a monthly basis.

- ✓ It is suggested to maintain data logs of waste / treated water, muck, waste cement concrete, cement slurry generated and reused and submit as part of monthly environment reports that should get reflected in the next Environmental Monitoring Reports (EMR).
- ✓ The slurry from the sedimentation tank is disposed in the downstream nala and have choaked the same by making a hard bed and reducing the actual height of culvert adjacent to the sedimentation tank this requires to be cleared on timely manner.
- ✓ The EC amendment is very important, along with the amendment to the EIA. It is learned that actions on both of these amendments are in progress and expected to be completed in August 2023 and status will be updated in the next SEMR (July-Dec 2022).
- ✓ ADB has specifically asked to stop work without the EC amendment for components where changes have been envisaged as per the MOC, expeditious obtaining of the EC amendment is thus critical for the project.
- ✓ No unauthorized abstraction shall be allowed; all contractors, where required, should obtain permissions from the Central Ground Water Board and Gaon-burah for the abstraction of groundwater and surface water.
- ✓ CTE for Hydropower plant has been received in this reporting period.
- ✓ A confirmation has been received in this reporting period from Dima Hasao autonomous council on the archaeological status of Longku caves and confirmed that the caves are not listed with the Archaeological Department of Department of the council.
- ✓ CTE and CTO has been obtained by CP-2 contractor for the establishment of water treatment plant at site.
- ✓ CP-2 has received NOC from Water Resource Department for the use of river water on 03.5.23 after a joint visit was accorded by WRD on 16.3.23.
- ✓ Environmental clearance received for the 4.6 Ha quarry near kala nala.
- ✓ Labour licenses has been received by CP-1, CP-3 and CP-4 in this reporting period. CP-2 has already received the same.
- ✓ Tree cutting NOCs are yet to be taken for CP-4 and CP-1 from the Forest Department.
- ✓ As applicable, contractors are required to submit an environmental statement as Form V to the State Pollution Control Board for every financial year.
- ✓ Excavated soil should be graded according to soil type and stored separately.
- ✓ Ensure that soils exposed on slopes are immediately vegetated or temporarily covered with geotextile and vegetation to help stabilize them and prevent sediment-laden surface water runoff.
- ✓ The inflow and outflow from the sedimentation tank of batching plan need to be monitored and a log need to be maintained. The cleaning of sedimentation tank shall be at least twice in a week to get effective results. Also, the slurry generated from the sedimentation tank shall be disposed in some other place rather than in the downstream part as that will choak the natural stream.
- ✓ Being massive construction activities involved in the project, a Qualified and well-experienced EHS experts need to be appointed under the PMU of APGCL who can guide the EHS experts of PMC and other EHS experts of contractors and shall be able to arrange regular training at least once in a month.
- ✓ All contractors are required to prepare and implement a waste management plan that addresses muck management as well.
- ✓ All sanitary and toilet facilities should maintain the availability of adequate water, adequate lighting, and proper cleaning with an adequate number of bathing and urinal units. They must be kept in

working condition and cleaned frequently.

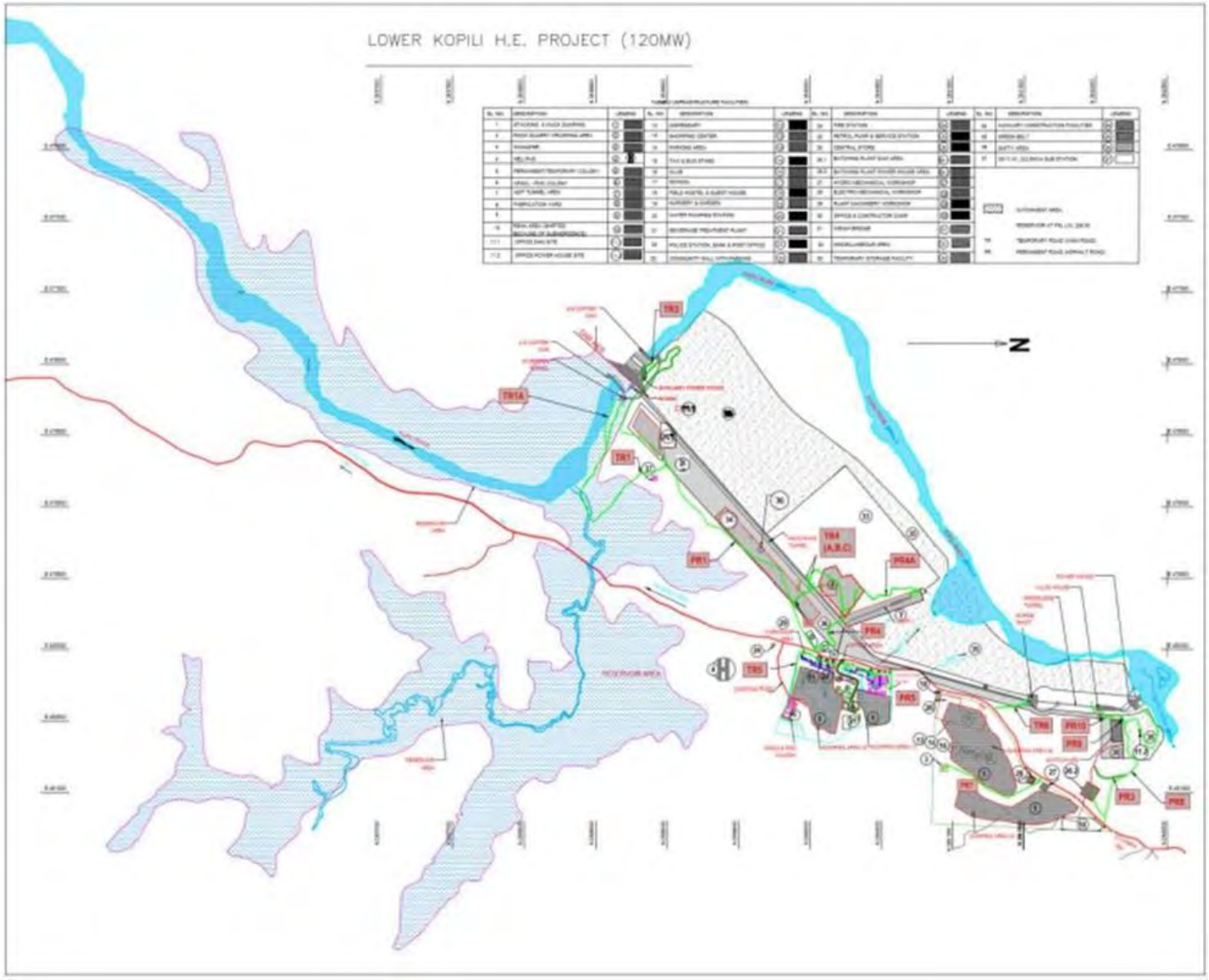
- ✓ Proper drainage systems need to be provided with de-silting chambers all around the powerhouse, office, substation, and colony.
- ✓ An annual bird count survey is to be initiated by next Nov-Dec 2023. The details of such initiation will be reported in the next SEMR.
- ✓ No untreated discharge from the camp or plant site should be discharged to any of the adjacent water bodies. Release of grey water from the labour Colony and all Community Kitchens to the natural water channel to be treated before release.
- ✓ Adopt appropriate dust control measures at all the construction sites, approach roads, etc.
- ✓ Care should be taken to ensure that road safety measures are worked out and implemented to ensure accident-free working stretches.
- ✓ Regular maintenance of vehicles and machinery needs to be conducted to ensure the lowest possible emissions.
- ✓ All the remaining vehicles (4 in number) registered in Bhutan must be registered with Indian numbers, and a PUC must be obtained.
- ✓ The rooms at the camp site for CP-1, CP-4 and CP-3 (under construction) should be provided with proper illumination, a smoke detector, and proper insulation of the electrical system. Labourers at CP-1, CP-3, and CP-4 should be provided with clean water, adequate toilet facilities with respect to the number of labourers, and clean bedding facilities with proper space between two beds.
- ✓ Adequate supply of potable water both on construction sites and in labour camps. The water quality must be monitored regularly. Drinking water should be tested for IS:10500-2012 parameters for contract packages CP-1, CP-3 and CP-4. The details related to be this may be reported in the next EMRs.
- ✓ Labourers and other project site officials must also be provided with medicated mosquito nets for protection against malaria, dengue, and other vector-borne diseases.
- ✓ The use of firewood for cooking should be stopped with immediate effect, and cooking gas should be provided in common kitchens.
- ✓ Adequate provisions for emergency fire services, including fire breaks and firefighting equipment supplies, should be made for all construction works and the labour camps.
- ✓ There should be necessary provision for first aid in an easily accessible location at all construction sites and labour camps, and the workers should be informed accordingly. An emergency project clinic must be coordinated.
- ✓ Timely training for First aiders and other site staff should be provided, and all logs and records should be maintained properly.
- ✓ Emergency contact information for First Aiders must be accessible to all and updated as needed.
- ✓ A project awareness programme for HIV/AIDS, wildlife protection, wildlife-human conflict, general EHS requirements, community health safety, and grievance redressal needs to be planned and scheduled every quarter.
- ✓ All contractors are required to submit a Monthly Environment Report with monthly updates on the implementation status of environmental safeguard compliance and the implementation status of EMP provisions.
- ✓ Every month, a joint site inspection between the PMC and contractor's (all packages as relevant) representatives is to be made, after which the best solutions to address the inspection's results are to be decided and submitted as a Monthly Environmental Report along with a monthly EHS review report.

- ✓ All contractors are required to develop a legal register to keep track of statutory requirements applicable to the project, such as clearances, NOCs, permits, permissions, etc., for all project components.
- ✓ All contractors are required to prepare an incident or accident register record, and all incidents need to be reported in the monthly EHS report.
- ✓ Ensure monthly consultation with the local community to record community concerns pertaining to environmental as well as EHS issues, if any. The outcome of the meetings should be recorded in the Monthly Environment Report (MER).
- ✓ GRC meetings should be held every quarter, involving local representatives. Suggestions from the meetings should be recorded in the SEMR.
- ✓ All contractors are required to ensure that their staff and workers working at the site are trained on POSH at work.

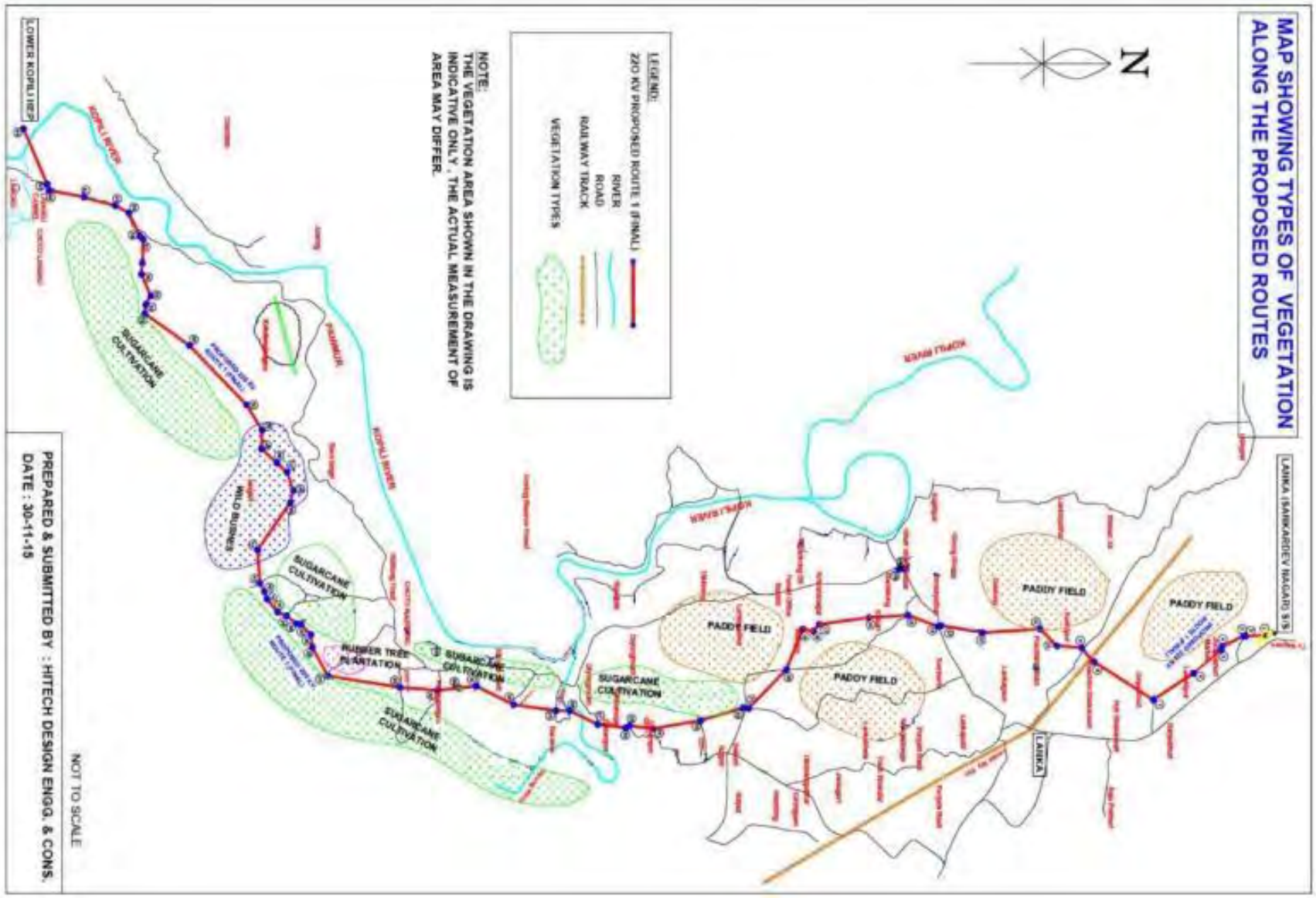
101. Subject to these observations, the project's environmental safeguard measures seem to have captured mostly and the suggested measures will be validated again in the next validation report for the period (Jul-Dec 2023).

Annexures

Project Layout



Layout of Transmission Lines



Annexure-II

CGM PP&I <mridul.saikia@apgcl.org> 15 July 2023 at 16:45
To: salivendula hari <salivendula.hari@feedbackinfra.com>, Saumyasib Mukhopadhyay <saumyasib1975@gmail.com>
Cc: Bidyut Bikash Das <bidyut.das@feedbackinfra.com>, GM PP&I <akshay.talukdar@apgcl.org>

Sub : Information on SEMR verification

Ref : Email from Mr. Jhamak Karki, International Biodiversity Expert of External Monitor on 10.07.2023 and copy to Mr. Saumyasib Mukhopadhyay.

Dear Sir,
In response to the quarries raised by Mr. Jhamak Karki, International Biodiversity Expert of External Monitor, the following response has been prepared.

Quarry No 1. The SEMR June-July 2023 does not mention the construction of those five nurseries started by Dec.2022? in Halflong and Dima Hasao.
Was it true, which means it started only after Jan.2023?.

Response from APGCL :
As informed by the Forest Department, Nurseries for CA will start within the first part of 2023 and it was mentioned in the page no 60 and 61 of the SEMR.

Quarry No 2. Page 89 0f SEMR (July-Dec.'23) in the last column says " (e) As per tree cutting permission has been accorded for 45349 trees in Karbi Anglong and 20846 trees in Dima Hasao as per Forest Clearance. Till date CP-2 has 241 number of trees". The last sentence ..has 242 trees.." not clear-is it means the permission to cut those 241 trees was provided to CP-2 or ??

Response from APGCL :
Forest clearance permission was accorded for the cutting of 45349 trees in Karbi Anglong and 20846 trees in Dima Hasao in the diverted Forest land and for which related expenses were submitted to CAMPA and the respective Forest Divisions by APGCL.
So far 241 number of trees were felled by the Forest Department in the Forest land and revenue land for the activities related to the project under CP2.

Quarry No 3. What were the names/locations of those five nurseries constructed for the afforestation purpose (In Panimur range, In Garampani Range, in Hamren range, ..., Dima Hasao district In Hamren range,

Response from APGCL :
The 5 nurseries are located in the following Reserved Forests under Dima Hasao Forest Division (West).

1. ***Wayungdisa RF***
2. ***Tertelangso RF***
3. ***Bagha Dima RF***
4. ***Choto Longkhu RF***
5. ***Bagha Dima One RF***

With Regards,
Shri Mridul Saikia
Project Director (PMU)
APGCL

Annexure-III

Letter to MOEF&CC for Change in Project Component

ASSAM POWER GENERATION CORPORATION LIMITED
Registered Office: Bijulee Bhawan, 3rd floor, Paltanbazar, Guwahati-781 001, Assam
Shri. Mridul Saikia
Chief General Manager (PP&I),
Project Director (PMU)
E-mail: mridul.saikia@apgcl.org

No: APGCL/CGM (H)/W/2007/140/Pt-VI/54 Dated: 28/11/2022

To,

The Director
IA-I Division
Ministry of Environment, Forest & Climate Change
Government of India
Indira Paryavaran Bhawan
3rd Floor, Vayu Wing, Jor Bagh Road
New Delhi-110003

Sub: Environmental Clearance for Lower Kopili HEP (120 MW) in Karbi Anglong & Dima Hasao, Assam by M/s Assam Power Generation Corporation Ltd. accorded by MoEF&CC vide Reference No. No. J- 12011/26/2012-IA-I dated 4th September, 2019 – reg. appraisal w.r.t. minor change of few components.

Sir,

With reference to the subject cited above, it is for your kind information that some of the components of the project has been shifted from the forest land to the Revenue Land as per the recommendation of Forest Advisory Committee dated 26.10.2018 and 11.01.2019, for which, the muck disposal site and miscellaneous areas has been shifted to revenue land, keeping 198.746 Ha as green belt within the diverted forest land. Subsequently Forest Clearance and Environment Clearance was accorded.

During the detail designing and execution of the EPC contract minor adjustments were made with the approval from Central Electricity Authority, Central Water Commission, Geological Survey of India, Central Soil and Materials Research Station, GOI keeping the power generation capacity of 120 MW, location of the Dam axis, FRL of 226m, alignment of HRT remaining same as mentioned in the EC. But the height of the dam was reduced from 70.13m to 66.5m without changing the submergence area of 620 Ha as the FRL (226m) will remain same. The reduced height will certainly reduce the requirement of minor minerals for construction and APGCL will also support plantation for 1 : 3 through CA, CAT Plan, S&M conservation plan, Green belt development etc to achieve 'no net loss of biodiversity'.

The salient features as approved by the CEA, CWC, GSI, etc are attached for your ready reference.

This is for your kind appraisal. Your kind cooperation in the matter is highly solicited.

Encl: As above

Yours Sincerely,

Project Director (PMU),
APGCL

Copy to:

1. The Managing Director, APGCL, Bijulee Bhawan, Paltan Bazar, Ghy-01, for kind information
2. The Inspector General of Forests, Ministry of Environment, Forest and Climate Change, Integrated Regional Office, Guwahati, 4th Floor, HOUSEFED Building, G.S. Road Rukminigaon, Guwahati – 781022, for favour of kind information
3. Relevant file

CTO for Batching Plant at Dam Site

Pollution Control Board:: Assam
Bamunimaidam; Guwahati-21
(Department of Environment & Forests :: Government of Assam)
Phone: 0361-2652774 & 2550258; Fax: 0361-2550259
Website: www.pcbassam.org

No. WB/SLC/T-1191/21/22/31 Dated Guwahati, the 31st Oct, 2022

"CONSENT TO OPERATE"

'CONSENT TO OPERATE' (CTO) under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981, as amended and Rules Framed thereunder, is granted to:

i)	Name of the unit	**M/s Larsen & Toubro Ltd. (Batching Plant)**
ii)	Name of the Occupier / Applicant and Designation	Sri Santanu Majumder, Project Manager
iii)	Address of the unit	Lower Kopili Hydro Electric Power Project, Vill - Langku, P.O. Umrangso, Dist. Dima Hasao, Assam-788931
iv)	Cost of the project	Rs. 744.69 Lakhs.
v)	Details of the project & category	Batching Plant (Green Category)

Sl. No.	Product	Capacity
1	Cement Concrete	20,000 m^3/ month

vi) D.G. Set 2 x 15 KVA + 2 x 500 KVA

General Conditions:

1. The Consent to Operate (CTO) has been accorded based on the particulars furnished by the applicant vide **Application ID: 1410031** and subject to addition of further or more conditions, if so warranted by subsequent developments. The Consent will automatically become invalid, if any change or alteration or deviation made in actual practice.
2. The CTO is valid till **31.03.2025**.
3. The CTO may be modified, suspended in whole or in part or withdrawn by the Board during its term for cause including, but not limited to the following :-
   a) Violation of any Terms and Conditions of this CTO;
   b) Obtaining the CTO by misrepresentation or failure to disclose fully all relevant facts;
   c) If any genuine complaint received.
4. The unit shall obtain prior 'Consent to Establish' from the Board for any further expansion, alteration, and modification of the project.
5. **The project proponent shall develop a greenbelt/plantation area with native trees covering atleast 33% of the total plot area.**
6. **The project authority should install a Display Board as per the Boards notification No. PCBA/LGL-95/2021/Notification/01 did.11.11.2021 (Annexure-A).**
7. **Proper housekeeping shall be maintained. Burning of any waste inside the unit premises is strictly prohibited.**
8. The unit shall apply for renewal of CTO atleast 90 days before expiry. The Board has decided to renew the CTO for validity of 5 (five) years after payment of due fees, for the entire period.
9. As per the provisions of the Water (Prevention and Control of Pollution) Act, 1974 as amended and the Air (Prevention and Control of Pollution) Act, 1981, as amended, any Officer, empowered by the Board on its behalf shall have without interruption, the right at any reasonable time to enter the unit for inspection, collection of sample for analysis and may call for any information as deemed necessary. Denial of this right will cause withdrawal of the Consent Order.

Contd...p/2

Specific Conditions:

A) Air Aspects:

1. **The unit shall install the screening machine, with proper enclosure and dust extraction and treatment mechanism.**
2. The following air pollution control measures shall be implemented by the project authority to control source emission and fugitive emission:
   a) Dust containment cum suppression system at Raw Material Feed Hopper, all material transfer & dropping points.
   b) Construction of the metallic roads within the premises.
   c) Regular cleaning and wetting of ground within the premises.
3. The unit shall comply with the **standards and guidelines for control of noise pollution from stationary Diesel Generator (DG) set** as attached in **Appendix-B**.
4. The unit shall comply with the Noise Level Standard notified by **MoEF&CC, Govt. of India, vide GSR.7; dtd: 22/12/1998**, as mentioned herein under:

Limit in dB (A) Leq	
Day Time (h:00AM-10:00PM)	Night Time (10:00PM-6:00AM)
75	70

5. The Ambient Air Quality within the Plant premises shall be maintained within the National Ambient Air Quality Standards as notified by **MoEF&CC, Govt. of India, vide G.S.R.826(E) dtd.18.11.2009**, especially w.r.t. $PM_{2.5}$ & PM_{10} as mentioned herein under:

Sl. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air	
			Industrial, Residential, Rural & Other Area	Ecologically Sensitive Area (notified by Central Government)
1.	Particulate Matter (size less than 10μg) or PM_{10} (μg/m³)	Annual*	60	60
		24 hours**	100	100
2.	Particulate Matter (size less than 2.5μg) or $PM_{2.5}$ (μg/m³)	Annual*	40	40
		24 hours**	60	60

B) Water Aspects:

1. Source of Water : Surface water
2. Water consumption : 200.0 KLD
3. Storm Water Aspect:
   a) Storm water shall not be allowed to mix with effluent and/or flow washings.
   b) Storm water within the battery limits of the unit shall be channelized through separate drain/pipe passing through an Oil & Grease Trap cum Sedimentation Tank.
   c) Storm water discharge shall meet with general effluent discharge parameters standard, notified by **MoEF & CC, GOI vide G.S.R.422 (E); dated 31.12.1993 (Appendix – C)**.
4. Rain water harvesting facility shall be installed and maintained.

C) Solid Waste Aspects:

1. Adequate facility should be created for collection, storage, transportation, treatment & disposal of non-hazardous industrial solid waste generated from the industry.
2. Adequate system should be adopted on reduction of waste generation and enhancement of re-utilization & recycling of waste materials.
3. The unit shall strictly comply with all the provisions of the **Solid Waste Management Rules, 2016.**

Contd...p/3

D) Plastic Waste Aspects:

1. Plastic waste generated in the unit shall be disposed of scientifically as per the provisions of the **Plastic Waste Management Rules, 2016**.
2. The unit shall submit a report on generation and disposal of Plastic Wastes within June every year.

E) E-Waste Aspects:

1. Electronic wastes generated in the unit shall be disposed of as per the provisions of **E-Waste Management Rules, 2016.**
2. The unit shall submit the Annual Report in the Form-III within 30th June every year.

F) Hazardous Waste Aspects:

1. **Authorization under Hazardous & Other Wastes (Management & Trans-boundary Movement) Rules, 2016 shall be obtained from the Board.**
2. The project authorities shall comply with the provisions of the said Rules.
3. Adequate facility shall be provided for collection and storage of used/spent oil, which shall be sent to registered recyclers for recycling.
4. The unit shall dispose of any other Hazardous Waste generated by the unit as per the provisions of the Rules.
5. The unit shall identify and quantify all streams of Hazardous Waste generation as per Schedule-I and maintain proper record in Form-III of the said Rules.
6. The unit shall submit annual return in Form-IV under the said rules on or before 30th June every year.

The unit shall submit compliance report of the mandated conditions by April, 15, every year to Member Secretary, PCBA as well as to Regional Office, Silchar. The Board will have the liberty to withdraw the CTO, if adequate pollution control and safety measures are not implemented by the unit.

(Shantanu Kr. Dutta)
Member Secretary

Memo No. WB/SLC/T-1191/21-22/31 -A Dated Guwahati, the 28th Oct, 2022

Copy to:

1. M/s Larsen & Toubro Ltd. (Batching Plant), Lower Kopili Hydro Electric Power Project, Vill: Longku, P.O. Umrangso, Dist. Dima Hasao, Assam-788931 – for information & compliance of conditions.

(Shantanu Kr. Dutta)
Member Secretary

Annexure V

Consent from Gaon-burah for sourcing water for construction from Longku nala under CP-2

Date: 10/12/22

G.B.Of SOKPURO boro Basti
P/O.Langku,P/S-Umrong
Dima Hasao (Assam)

To

L&T Lower Kopili Project

Sub: NOC for drawing of water from Longku Nalla

Dear Sir,

I Nayeb Basumatory, Gaon Burah of village of Supuru (Longku) has no objection on drawing water by L&T from Longku Nalla for LKHEP Project work.

Yours Sincerely

G.B.Of SOKPURO boro Basti
P/O.Langku,P/S-Umrong
Dima Hasao (Assam)

Witness:

1. PBB

2.

Annexure-VI

Agreement with the Umrangsu Municipality Board received on 23.3.23 for disposal of Waste after segregation.

OFFICE OF THE
UMRONGSO MUNICIPAL BOARD
UMRONGSO, DIMA HASAO. ASSAM. PIN-788931

No.UMB/VII-1/2022-23/ 326 Date:- 23/03/2023

To,
Santanu Majumdar
Project Manager
120 MW-Lower Kopili HEP

Sub:- Disposal of Solid Waste.

Ref:- LKHEP-PKG2/LNT/153/GL/264 Dated:-13rd Feb. 2023

Sir,

In inviting reference to the subject and reference No. cited above, I am to inform you that our department has Landfill site/Dumping Ground at Umrongdisa (Kamla Bagan). Hence, you can proceed for Shifting of Solid Waste at the above mentioned Landfill Site.

This is for kind information.

Your's faithfully

DSC

Chairman
Umrongso Municipal Board
Umrongso, Dima Hasao

Memo No.UMB/VII-1/2022-23/ Date:- 23/03/2023

Copy to:-

1. The City Project Manager, Swachh Bharat Mission, Umrongso Municipal Board for information.
2. Concern File.

Chairman
Umrongso Municipal Board
Umrongso, Dima Hasao

Annexure VII

Letter by WRD for join inspection with Executive Engineer Karbi Anglong

O/o the Chief Engineer
Water Resources Department
Assam Water Center
Basistha, Guwahati-29
(cewrd.assam@yahoo.co.in)

অসম চৰকাৰ
GOVERNMENT OF ASSAM

মুখ্যঅভিযন্তাৰকাৰ্যালয়
জলসম্পদবিভাগ
অসমজলকেন্দ্ৰ
বশিষ্ঠ, গুৱাহাটী-২৯

No.: -WR(ED)Tech/7965/2023/ 6 Date:- 16/3/2023

To,

Santanu Majumder,
The Project Maneger,
120MW-Lower Kopili HEP(Package-2)

Sub: - Seeking permission for extraction water from Kopili river for construction of 120 MW Lower Kopili Hydroelectric Project (Package-2)at longku, Dima Hasao District,Assam.

Ref: *No.LKHEP-PKG2/LNT/155/GL/253 Dated10 th Feb'23*

Sir,

In inviting a reference to the above, I am directed to request you to visit the proposed location with the Executive Engineer, West Karbi Anglong and District Administration.The inspection report needs to be submitted for further action from this end

Director Design
Water Resources Department
Basistha, Ghy-29

Memo No: WR(ED)Tech/7965/2023/ 6 (A) **Date:-** 16/3/2023

Copy to

1. The Executiv Engineer ,West Karbi Anglong W.R. Division, you are requested to make it convenient to conduct a joint field visit at the proposed location for extractuion of water for the LKHP (package-2),and submit a report.

Director Design
Water Resources Department
Basistha, Ghy-29

NOC from WRD on the approval of extraction of water from river Kopili

GOVT. OF ASSAM
OFFICE OF THE EXECUTIVE ENGINEER: WEST KARBI ANGLONG WATER RESOURCES DIVISION
DONGKAMOKAM

No. EE/WRD/DNK/Misc/2022-23/11 **Dated:-03-05-2023**

To,
L&T Construction,
120 MW Lower Kopili Hydro Electric Project
Longku, Dima Hasao District, Assam

Sub: NOC for extraction of water from Kopili river for construction of 120 MW Lower Kopili Hydro Electric Project (package-2) at Longku, Dima Hasao District, Assam

With reference to the subject above, NOC for extraction of water from Kopili river for construction of 120 MW Lower Kopili Hydro Electric Project (package-2) at Longku, Dima Hasao District, Assam is issued to L&T Construction,120 MW Lower Kopili Hydro Electric Project Longku, Dima Hasao District, Assam under the following terms and conditions-

i) Drawing of water from river Kopili is allowed for an amount of about 600 Cum/day
ii) The existing water must not be blocked at any cost due to extraction work.
iii) No damages should be made to the departmental structure, private and public properties at any cost.
iv) Cost of restoration of any damage to departmental structures should be borne by the implementing authority.
v) It should ensured that minimum water flow remains in the river at all time considering the ecological point of view.

03/05/2023
Executive Engineer
West Karbi Anglong W.R. Division
Dongkamokam

Memo **No. EE/WRD/DNK/Misc/2022-23/11** **Dated:-03-05-2023**

Copy to:-
1. The Chief Engineer Water Resources Department, Assam Water Center, Basistha, Guwahati-29 for favour of kind information
2. The Addl.Chief Engineer Diphu Water Resources Zone,Diphu.for favour of kind information.
3. Office file.

Executive Engineer
West Karbi Anglong W.R. Division
Dongkamokam

Annexure VIII

CTO for RO Plant

Pollution Control Board:: Assam
Bamunimaidam; Guwahati-21
Department of Environment & Forests :: Government of Assam)
Phone: 0361-2652774 & 2550258; Fax: 0361-2550259
Website: www.pcbassam.org

No. WB/SLC/T-1269/22-23/9 Dated Guwahati, the 26th Apr , 2023

"CONSENT TO OPERATE"

"CONSENT TO OPERATE" (CTO) under Section 25 of the Water (Prevention & Control of Pollution) Act, 1974, as amended and Rules Framed thereunder are granted to:

i)	Name of Industry	:	M/s Larsen and Turbo Ltd.
ii)	Name of the Occupier / Applicant and Designation	:	Shri Santanu Majumdar, Project Manager.
iii)	Address of the unit	:	120 MW Lower Kopili Hydro Electric Project, Vill: Longku,P.O.: Umrangso, Dist: Dima Hasao, Assam, PIN:788931.
iv)	Cost of the project	:	Rs. 3.56 Lakhs.
v)	Details of the Project	:	Water Treatment Plant (15 KLD) (Green Category)

TERMS AND CONDITIONS

1. This CTO has been granted based on the information & particulars furnished by the applicant vide **Application ID: 1913145**and subject to addition of further more conditions if so warranted by subsequent developments. The CTO will automatically become invalid if there is any changes, modification, alteration, expansion or deviation made in actual practice.
2. The CTO is valid till **31.03.2024**.
3. The CTO may be modified, suspended in whole or in part or withdrawn by the Board during its term for cause including, but not limited to the following:-

a) Violation of any Terms and Conditions of this CTO;
b) Obtaining the CTO by misrepresentation or failure to disclose fully all relevant facts;
c) If any genuine complaint received.

4. As per the provisions of the Water (Prevention and Control of Pollution) Act, 1974 as amended and the Air (Prevention and Control of Pollution) Act, 1981 as amended, any Officer empowered by the Board on its behalf shall have without interruption, the right at any reasonable time to enter the unit for inspection, collection of sample for analysis and may call for any information as deemed necessary. Denial of this right will cause withdrawal of the Consent Order.
5. The project proponent shall develop a greenbelt/plantation area with native trees.
6. **The project authority should install a Display Board as per the Boards notification No. PCBA/LGL-95/2021/Notification/01 dtd.11.11.2021 (Annexure-A).**

a. Contd...p/2

7. **Proper housekeeping shall be maintained. Burning of any Solid waste inside the unit premises is strictly prohibited.**
8. Permission of the Central Ground Water Authority shall be obtained for extraction of Ground Water, if applicable.
9. The unit shall apply for renewal of CTO atleast 90 days before expiry. The Board has decided to renew CTO for five (5) years, if the project proponent submits application with due payment of CTO fees.

Specific Conditions:

A) Water Aspects:

1. The unit shall meet the specific discharge standard, as mentioned herein under for any discharge from the water treatment plant including RO rejects:

Sl. No.	Parameters	Tolerance Limit
i)	pH	6.0 to 8.5
ii)	Total Suspended Solids	20 mg/l (max.)
iii)	Bio-chemical Oxygen Demand	30 mg/l (max.)
iv)	Chemical Oxygen Demand	250 mg/l (max.)
v)	Oil & Grease	5.0 mg/l (max.)
vi)	Other parameters	As per schedule-VI inserted by Rule 2(d) of the Environment (Protection) Second Amendment Rules, 1993 notified vide G.S.R.422(E) dated 19.05.1993

2. Water consumption & effluent generation:
   a) Raw water consumption – 25 KLD
   b) R.O. reject water – 10 KLD
3. Storm water for a unit (having plot size atleast 200 sq. meters) shall not be allowed to mix with effluent and/or floor washings.
4. Storm water within the battery limits of a unit shall be channelized through separate drain/pipe passing through a HDPE lined pit having holding capacity of 10 minutes (hourly average) of rainfall.
5. Rain water harvesting facility shall be installed and maintained.
6. Quality of R.O. reject shall be tested and if possible use of such water including selling or free distribution to nearby people/agencies shall be explored.

B) Solid Waste Aspects:

1. Adequate facility should be created for collection, storage, transportation, treatment & disposal of non-hazardous industrial solid waste generated from the Industry.
2. Adequate system should be adopted on reduction of waste generation and enhancement of re-utilization & recycling of waste materials.
3. The unit shall strictly comply with all the provisions of the **Solid Waste Management Rules, 2016.**

C) Plastic Waste Aspects:

1. Plastic Waste generated in the unit shall be disposed of in accordance of the provisions under the **Plastic Waste Management Rules, 2016.**

Contd...p/3

D) **Hazardous Waste Aspects:**

1. The project authorities shall comply with the provisions of the Hazardous & Other Waste (Management and Trans Boundary Movement) Rules, 2016.
2. The containers containing chemical should be stored and disposed as per the Hazardous and Other Waste (Management & Trans-boundary Movement) Rules, 2016.
3. Appropriate facility shall be created for handling, storage, treatment & disposal of any Hazardous waste generated by the industry in accordance to the provisions of the HOW Rule including Notification, Guidelines issued there under.
4. The unit should submit the annual return under the said Rule, in Form-IV, within 30th June every year.

E) **E-Waste Aspects:**

1. Electronic wastes generated in the unit shall be disposed of as per the provisions of E-Waste Management Rules, 2016.
2. The unit shall submit the Annual Report in the Form III within 30th June every year.

The unit shall submit compliance report of the mandated conditions by April, 15, every year to Member Secretary, PCBA as well as to Regional Office, Silchar. The Board will have the liberty to withdraw the CTO if adequate pollution control and safety measures are not taken.

(Shantanu Kr. Dutta)
Member Secretary

Memo No. WB/SI.C/T-1269/22-23/9-A Dated Guwahati, the 26th Apr, 2023

Copy to:

1. M/S. Larsen and Turbo Ltd., 120 MW Lower Kopili Hydro Electric Project, Vill: Longku,P.O.: Umrangso, Dist: Dima Hasao, Assam, PIN:788931 for information & compliance of CTO conditions.

(Shantanu Kr. Dutta)
Member Secretary

Annexure IX

CTO for the Water Treatment plant for construction water under CP-2

Pollution Control Board:: Assam
Bamunimaidam; Guwahati-21
Department of Environment & Forests :: Government of Assam)
Phone: 0361-2652774 & 2550258; Fax: 0361-2550259
Website: www.pcbassam.org

No. WB/SLC/T-1271/22-23/12 Dated Guwahati, the 26th April, 2023

"CONSENT TO OPERATE"

"CONSENT TO OPERATE" (CTO) under Section 25 of the Water (Prevention & Control of Pollution) Act, 1974, as amended and Rules Framed thereunder are granted to:

i)	Name of Industry	:	M/s Larsen and Turbo Ltd.
ii)	Name of the Occupier / Applicant and Designation	:	Shri Santanu Majumdar, Project Manager.
iii)	Address of the unit		120 MW Lower Kopili Hydro Electric Project, Vill: Longku,P.O.: Umrangso, Dist: Dima Hasao, Assam, PIN:788931
iv)	Cost of the project		Rs. 55.72 Lakhs
v)	Details of the Project		Water Treatment Plant (600 KLD) (Green Category)
vii)	Name of treatment units		As per flow chart in Annexure-A

TERMS AND CONDITIONS

1. This CTO has been granted based on the information & particulars furnished by the applicant vide **Application ID: 1894033** and subject to addition of further more conditions if so warranted by subsequent developments. The CTO will automatically become invalid if there is any changes, modification, alteration, expansion or deviation made in actual practice.
2. The CTO is valid till **31.03.2024**.
3. The CTO may be modified, suspended in whole or in part or withdrawn by the Board during its term for cause including, but not limited to the following:-

a) Violation of any Terms and Conditions of this CTO;
b) Obtaining the CTO by misrepresentation or failure to disclose fully all relevant facts;
c) If any genuine complaint received.

4. As per the provisions of the Water (Prevention and Control of Pollution) Act, 1974 as amended and the Air (Prevention and Control of Pollution) Act, 1981 as amended, any Officer empowered by the Board on its behalf shall have without interruption, the right at any reasonable time to enter the unit for inspection, collection of sample for analysis and may call for any information as deemed necessary. Denial of this right will cause withdrawal of the Consent Order.
5. The project proponent shall develop a greenbelt/plantation area with native trees.
6. **The project authority should install a Display Board as per the Boards notification No. PCBA/LGL-95/2021/Notification/01 dtd.11.11.2021 (Annexure-B).**
7. Proper housekeeping shall be maintained. Burning of any Solid waste inside the unit premises is strictly prohibited.

Contd...p/2

8. Permission of the Central Ground Water Authority shall be obtained for extraction of Ground Water, if applicable.
9. The unit shall apply for renewal of CTO atleast 90 days before expiry. The Board has decided to renew CTO for five (5) years, if the project proponent submits application with due payment of CTO fees.

Specific Conditions:

A) Water Aspects:

1. The unit shall meet the specific discharge standard, as mentioned herein under for any discharge from the water treatment plant including RO rejects:

Sl. No.	Parameters	Tolerance Limit
i)	pH	6.0 to 8.5
ii)	Total Suspended Solids	20 mg/l (max.)
iii)	Bio-chemical Oxygen Demand	30 mg/l (max.)
iv)	Chemical Oxygen Demand	250 mg/l (max.)
v)	Oil & Grease	5.0 mg/l (max.)
vi)	Other parameters	As per schedule-VI inserted by Rule 2(d) of the Environment (Protection) Second Amendment Rules, 1993 notified vide G.S.R.422(E) dated 19.05.1993

2. Water consumption & effluent generation:
   a) Raw water consumption — 600 KLD
   b) Effluent Generation — 35 KLD (Back wash water)
3. Storm water within the battery limits of a unit shall be channelized through separate drain/pipe passing through a HDPE lined pit having holding capacity of 10 minutes (hourly average) of rainfall.
4. Rain water harvesting facility shall be installed and maintained.

B) Solid Waste Aspects:

1. Adequate facility should be created for collection, storage, transportation, treatment & disposal of non-hazardous industrial solid waste generated from the industry.
2. Adequate system should be adopted on reduction of waste generation and enhancement of re-utilization & recycling of waste materials.
3. The unit shall strictly comply with all the provisions of the Solid Waste Management Rules, 2016.

C) Plastic Waste Aspects:

1. Plastic Waste generated in the unit shall be disposed of in accordance of the provisions under the Plastic Waste Management Rules, 2016.

D) Hazardous Waste Aspects:

1. The unit shall obtain Authorization under the Hazardous and Other Wastes (Management & Trans-boundary Movement) Rules, 2016.
2. The containers containing chemical should be stored and disposed as per the Hazardous and Other Waste (Management & Trans-boundary Movement) Rules, 2016.

Contd...p/3

3. Appropriate facility shall be created for handling, storage, treatment & disposal of any Hazardous waste generated by the industry in accordance to the provisions of the HOW Rule including Notification, Guidelines issued there under.
4. The unit should submit the annual return under the said Rule, in Form-IV, within 30th June every year.

E) E-Waste Aspects:

1. Electronic wastes generated in the unit shall be disposed of as per the provisions of E-Waste Management Rules, 2016.
2. The unit shall submit the Annual Report in the Form-III within 30th June every year.

The unit shall submit compliance report of the mandated conditions by April, 15, every year to Member Secretary, PCBA as well as to Regional Office, Silchar. The Board will have the liberty to withdraw the CTO if adequate pollution control and safety measures are not taken.

(Shantanu Kr. Dutta)
Member Secretary

Memo No. WB/SLC/T-1271/22-23/12-A Dated Guwahati, the 26th April, 2023

Copy to:

M/S. Larsen and Toubro Ltd. C/O Santanu Majumdar, Project Manager, 120 MW Lower Kopili Hydro Electric Project, Vill: Longku,P.O.: Umrangso, Dist: Dima Hasao, Assam, PIN:788931 for information & compliance of CTO conditions.

(Shantanu Kr. Dutta)
Member Secretary

Annexure X

Environmental clearance for the 4.6 ha quarry near kala nala

ENVIRONMENTAL CLEARANCE

PARIVESH

(Pro-Active and Responsive Facilitation by Interactive, and Virtuous Environmental Single-Window Hub)

Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA), ASSAM)

To,

The -1
HI-TECH ROCK PRODUCTS & AGGREGATES LIMITED
Hi-Tech Rock Products & Aggregates Limited ,
Longku Gaon, P.O. Umrongso, District: Dima Hasao (Assam) -788931

Subject: Grant of Environmental Clearance (EC) to the proposed Project Activity under the provision of EIA Notification 2006-regarding

Sir/Madam,

This is in reference to your application for Environmental Clearance (EC) in respect of project submitted to the SEIAA vide proposal number SIA/AS/MIN/415959/2023 dated 27 Jan 2023. The particulars of the environmental clearance granted to the project are as below.

1.	**EC Identification No.**	**EC23B001AS114059**
2.	**File No.**	SEIAA. 3341/2023
3.	**Project Type**	New
4.	**Category**	B
5.	**Project/Activity including Schedule No.**	1(a) Mining of minerals
6.	**Name of Project**	Lower Kopili HEP Stone Quarry
7.	**Name of Company/Organization**	HI-TECH ROCK PRODUCTS & AGGREGATES LIMITED
8.	**Location of Project**	ASSAM
9.	**TOR Date**	N/A

The project details along with terms and conditions are appended herewith from page no 2 onwards.

Date: 28/03/2023

(e-signed)
Indreswar Kalita
Member Secretary
SEIAA - (ASSAM)

Note: A valid environmental clearance shall be one that has EC identification number & E-Sign generated from PARIVESH.Please quote identification number in all future correspondence.

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Annexure XI

Consent to Establish for the Hydro Power Plant

Pollution Control Board:: Assam
Bamunimaidam; Guwahati-21
(Department of Environment & Forests :: Government of Assam)
Phone: 0361-2652774 & 2550258; Fax: 0361-2550259
Website: www.pcbassam.org

No. WB/SLC/I-1267/22-23/7 Dated Guwahati, the 28th Feb, 2023

"CONSENT TO ESTABLISH"

"CONSENT TO ESTABLISH" (CTE) under Section 25 of the Water (Prevention & Control of Pollution) Act, 1974 and Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 as amended and Rules Framed there under is granted to:

i)	Name of Industry	:	M/s Lower Kopili Hydro Electric Project (120 MW) Assam Power Generation Corporation Ltd.
ii)	Name of the Occupier / Applicant and Designation	:	Sri Mridul Saikia, CGM (PP&I)
iii)	Address of the unit	:	Lanka-Umrangsu Road (NH-627), Longku, Dist. Dima Hasao, Assam, PIN-788832.
iv)	Cost of the project	:	Rs. 149855 Lakhs.
v)	Details of the project and category	:	Hydro Electric Power Generation (120MW) (Red category)

TERMS AND CONDITIONS:

1. The Consent to Establish (CTE) has been accorded based on the particulars furnished by the applicant vide Application ID: **1726091** and subject to addition of further or more conditions if so warranted by subsequent developments. The CTE will automatically become invalid if there is any changes, modification, alteration, expansion or deviation is made in actual practice.
2. The "CTE" will be valid till the date of commissioning of the unit or seven (7) years whichever is earlier
3. The CTE may be modified, suspended in whole or in part or withdrawn by the Board during its term for cause including, but not limited to the following:-
   a) Violation of any Terms and Conditions of this CTE;
   b) Obtaining the CTE by misrepresentation or failure to disclose fully all relevant facts;
   c) If any genuine complaint received.
4. The unit shall obtain prior 'Consent to Establish' from the Board for any expansion, alteration, modification of the project.
5. The project authority shall obtain "Consent to Operate" from the Board before commissioning of the Plant.
6. The unit shall comply with all the stipulated conditions of Environmental Clearance accorded by MoEF&CC, vide No.J-12011/26/2012-IA-I; dtd: 04/10/2019
7. The project proponent shall develop a greenbelt/plantation area with native trees covering at least 33% of the total plot area.

Contd...p/2

8. Proper housekeeping shall be maintained. The unit shall not burn any wastes inside the premises
9. The project authority shall install a Display Board as per the Board's notification No. PCBA/LGL-95/2021/Notification/01 dtd.11.11.2021 (Appendix-A).
10. The unit shall comply with all the stipulated conditions of Environmental Clearance accorded by MoEF&CC, vide No.J-12011/26/2012-IA-I; dtd: 04/093/2019.
11. As per the provisions of the Water (Prevention and Control of Pollution) Act, 1974 as amended and the Air (Prevention and Control of Pollution) Act, 1981, as amended, any Officer empowered by the Board on its behalf shall have without interruption, the right at any reasonable time to enter the unit for inspection, collection of sample for analysis and may call for any information as deemed necessary. Denial of this right will cause withdrawal of the Consent To Establish.

Specific Conditions:

A) Air Aspects:

1. The unit shall comply with the **standards and guidelines for control of noise pollution from stationary Diesel Generator (DG) set** as attached in **Appendix-B**.
2. The industry shall comply with the Noise Level Standards, notified by MoEF&CC, Govt. of India, vide as per GSR. 7, dated: Dec.22, 1998, as mentioned herein under.

Limit in dB (A) Leq	
Day Time (6:00AM-10:00PM)	Night Time (10:00PM-6:00AM)
75	70

B) Water Aspects:

1. The unit shall ensure that water is not contaminated with oil (Used as lubricants) while passing through turbines

C) Solid Waste Aspects:

1. Adequate system should be adopted on reduction of waste generation and enhancement of re-utilization & recycling of waste material.
2. Solid waste generated in the unit shall be disposed of as per the provisions of Solid Waste Management Rules, 2016.
3. The unit shall not burn any wastes.

D) Plastic Waste Aspects:

1. Plastic Waste generated in the unit shall be disposed of in accordance of the provisions under Plastic Waste Management Rules, 2016.
2. The unit shall submit a report on generation & disposal of Plastic waste in June every year.

E) E-Waste Aspects:

1. Electronic wastes generated in the unit shall be disposed of as per the provisions of E-Waste Management Rules, 2016.
2. The unit shall submit the Annual Report in the Form-III within 30th June every year.

Contd...p/3

F) Hazardous Waste Aspects:

1. The unit shall obtain Authorization under the Hazardous and Other Waste (Management & Trans-boundary Movement) Rules, 2016 from the Board.
2. The empty containers containing chemical should be stored and disposed as per Rules.
3. Adequate facility shall be provided for collection and storage of used oil/spent oil, waste transformer oil etc. which shall be sent to registered recyclers for recycling.
4. Appropriate facility shall be created for handling, storage, treatment & disposal of any Hazardous waste generated by the industry in accordance to the provisions of the H&OW Rule including Notification, Guidelines issued there under.
5. The unit shall maintain a record regarding generation of hazardous wastes in Form-III of the Rules.
6. The unit should submit the annual return under the said Rule, in Form-IV, within 30th June every year.

The unit shall submit compliance report of the mandated conditions by April 15 of every year to Member Secretary, PCBA as well as to Regional Office, Silchar. The Board will have the liberty to withdraw the CTO if adequate pollution control and safety measures are not taken.

(Shantanu Kr. Dutta)
Member Secretary

Memo No. WB/SLCT-1263/22-23/7-A-[illegible]- Dated Guwahati, the 28th Feb, 2023

Copy to:

1. M/s Lower Kopili Hydro Electric Project (120 MW), Lanka-Umrangso Road (NH-627), Longku, Dist. Dima Hasao, Assam, PIN-788832, Dist: Dima Hasao, Assam – for information & compliance of conditions.

(Shantanu Kr. Dutta)
Member Secretary

Annexure XII

Confirmation from Dima Hasao Autonomous Council on the archaeological status of Longku caves

DIMA HASAO AUTONOMOUS COUNCIL HAFLONG:::
DIMA HASAO DISTRICT
LAND AND REVENUE DEPARTMENT

No.REV/S/34/APGCL/2023/ 53 Dated Haflong, the 20th February'2023.

To,

The Managing Director,
Assam Power Generation Corporation Ltd.
3rd Floor, Bijulee Bhawan, Paltan Bazar,
Guwahati, Assam-781001

Sub: Ascertaining the site near Longku nalla, Longku ,Dima Hasao regarding archaeological Importance-regarding

Ref:- 1.APGCL letter No.APGCL/CGM(H&C)/W/2007/140/Part-VII/81, Dtd. 25.01.2023.
2.Council's letter No. NCHAC/GAD/NOC/19/PT-I/2020-21/42, Dtd. 04.02.23.
3. Deptt. Letter No. CA/ARCH-2/Pt-IV/2021-22, Dtd. 20.02.23.

Sir,

In inviting a reference to the letter No. and subject cited above, I am to inform you that as per record the site near Longku nalla,Longku adjacent to National Highway 627 under Dima Hasao District where APGCL is implementing 120 MW Lower Kopili Hydro Electric Project is not listed with the Archaeological Department or Department of the Council.

Henceforth, in this regard, the authority of Dima Hasao Autonomous Council, Haflong has no objection for signage of the above mentioned location.

This is for favour of your kind information and necessary action.

DIMA HASAO AUTONOMOUS COUNCIL HAFLONG

Yours faithfully,

Secretary Revenue,
Dima Hasao Autonomous Council,
Haflong

Memo No.REV/S/34/APGCL/2023/ 53-A, Dated Haflong, the 20th February'2023.

Copy to:-

1. The Principal Secretary(N), Dima Hasao Autonomous Council, Haflong for favour of information .
2. The Deputy Secretary i/c Archaeology, Dima Hasao Autonomous Council, Haflong for information.
3. P.A to CEM ,Dima Hasao Autonomous Council, Haflong for kind information of the Hon'ble Chief Executive Member.
4. P.A to EM i/c Archaeology ,Dima Hasao Autonomous Council, Haflong for kind information of the Hon'ble Executive Member.
5. P.A to EM i/c Revenue ,Dima Hasao Autonomous Council, Haflong for kind information of the Hon'ble Executive Member.
6. Office Copy.

Issue No: 1131-36

Date: 20/02/2023

Secretary Revenue,
Dima Hasao Autonomous Council,
Haflong

Annexure XIII

Labour licence

Labour license for CP -1

FORM-VI
[See Rule-25(1)]

Office of the Commissionerate of Labour
LICENSE UNDER CONTRACT LABOUR (REGULATION & ABOLITION) ACT, 1970

UBIN :	**618/340057/AACCB0943N/3/2023**
UAIN :	**LCFORMIVCL/2023/03304**
License No. :	**CLL/2023/03304**
Date of Issue :	**15/03/2023**

1. Licence is hereby granted to **MS BVG INDIA LIMITED** under Section 12(1) of the Contract Labour (Regulation and Abolition) Act,1970 subject to the conditions specified in the Annexure.

2. The Licence is for doing the work of **CIVIL AND ELECTRICAL WORKS**, in the Establishment of **CHIEF GENERAL MANAGER PP AND I APGCL** ,C/O. **GOVERNMENT OF ASSAM** at **PALTAN BAZAR, , GUWAHATI, KAMRUP METRO - 781001, ASSAM** .

3. The Licence shall remain in force till **11/03/2024 .**

4. Maximum No of contract labour proposed to be employed in the establishment on any date : **20 nos.**

KIMTING SINGSON
Digitally signed by KIMTING SINGSON
Date: 2023.03.15 19:54:01 +05'30'

Signature of the Licensing Officer

Labour license for CP -3

STOP CHILD LABOUR

FORM-VI
[See Rule-25(1)]

Office of the Commissionerate of Labour
LICENSE UNDER CONTRACT LABOUR (REGULATION & ABOLITION) ACT, 1970

UBIN	:	**618/141822/NOPAN/2/2023**
UAIN	:	**LCFORMIVCL/2023/02772**
License No.	:	**CLL/2023/02772**
Date of Issue	:	**02/03/2023**

1. Licence is hereby granted to **Ms ANDRITZ HYDRO PRIVATE LIMITED** under Section 12(1) of the Contract Labour (Regulation and Abolition) Act,1970 subject to the conditions specified in the Annexure.

2. The Licence is for doing the work of **CONTRACT AND SUPPLY**, in the Establishment of **CHIEF GENERAL MANAGER PP and I APGCL** ,C/O. **APGCL ASSAM** at **PALTAN BAZAR, , GUWAHATI, KAMRUP METRO - 781001, ASSAM** .

3. The Licence shall remain in force till **26/02/2024 .**

4. Maximum No of contract labour proposed to be employed in the establishment on any date : **50 nos.**

KIMTING SINGSON

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Date: 2023.03.02 19:16:53 +05'30'

Signature of the Licensing Officer

Labour license for CP- 4

FORM-VI
[See Rule-25(1)]

Office of the Commissionerate of Labour
LICENSE UNDER CONTRACT LABOUR (REGULATION & ABOLITION) ACT, 1970

UAIN	:	LCFORMIVCL/2023/02048
License No.	:	CLL/2023/02048
Date of Issue	:	20/02/2023

1. Licence is hereby granted to **SALASAR TECHNO ENGINEERING LIMITED** under Section 12(1) of the Contract Labour (Regulation and Abolition) Act,1970 subject to the conditions specified in the Annexure.

2. The Licence is for doing the work of **ELECTRICAL WORKS**, in the Establishment of **CHIEF GENERAL MANAGER PP AND I APGCL ,C/O. GOVT** at **PALTANBAZAR, , GUWAHATI, KAMRUP METRO - 781001, ASSAM**.

3. The Licence shall remain in force till **12/02/2024 .**

4. Maximum No of contract labour proposed to be employed in the establishment on any date : **20 nos.**

KIMTING SINGSON
Digitally signed by KIMTING SINGSON
Date: 2023.02.20 18:24:03 +05'30'

Signature of the Licensing Officer

भारत सरकार
Government of India
वाणिज्य और उद्योग मंत्रालय
Ministry of Commerce & Industry
पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन (पेसो)
Petroleum & Explosives Safety Organisation (PESO)
घर क्रमांक- २१६, दूसरी मंजिल, IDBI बैंक के ऊपर, चांदमारी, गुवाहाटी, आसाम -७८१०२१
गुवाहाटी- 781021
House No. 216, 2nd Floor, above IDBI, Chandmari, Guwahati,
Assam - 781021

E-mail : **dycceguwahati@explosives.gov.in**
Phone/Fax No : **0361 - 2652783,2655144**

संख्या /No. : **P/EG/AS/14/1630 (P502141)** दिनांक /Dated : **18/01/2023**

सेवा में
/To,

M/s. Larsen & Toubro Limited,
Vill- Longku, P.O. Longku BO, P.S. Umrangso,
Longku,
Longku,
Taluka: Umrangso,
District: DIMA HASAO,
State: Assam
PIN: 788931

विषय /Sub : **Plot No, Nil, 120 MW-Lower Kopili HEP(Package-2), Vill- Longku, P.O. Lonhku BO, Longku, Umrangso, Taluka: Umrangso, District: DIMA HASAO, State: Assam, PIN: 788931** में स्थित विद्यमान पेट्रोलियम वर्ग **B** Consumer Pump की अनुज्ञप्ति संख्या **P/EG/AS/14/1630 (P502141)** - नवीकरण के संदर्भ में ।
Existing Petroleum Class **B** Consumer Pump at **Plot No, Nil, 120 MW-Lower Kopili HEP(Package-2), Vill- Longku, P.O. Lonhku BO, Longku, Umrangso, Taluka: Umrangso, District: DIMA HASAO, State: Assam, PIN: 788931** - Licence No. **P/EG/AS/14/1630 (P502141)** - Reg Renewal of Licence.

महोदय /Sir(s),

कृपया आपके उपर्युक्त विषय से संबंधित पत्र संख्या **OIN1279452** दिनांक **09/01/2023** का संदर्भ ग्रहण करें ।
Please refer to your letter No. **OIN1279452** dated **09/01/2023** on the subject.

अनुज्ञप्ति सं **P/EG/AS/14/1630 (P502141)** दिनांक **06/12/2021** दिनांक **31/12/2023** तक नवीनीकृत कर लौटाई जा रही है ।
Licence No. **P/EG/AS/14/1630 (P502141)** dated **06/12/2021** is returned herewith duly renewed upto **31/12/2023**.

कृपया पेट्रोलियम नियम,2002 के अधीन बनाए गए नियम 148 में दी गई प्रक्रिया का कडाई से पालन करें । अनुज्ञप्ति के नवीकरण हेतु समस्त दस्तावेजों को दिनांक **31/12/2023** या उससे पहले इस कार्यालय में प्रस्तुत करें ।
Please follow the procedure strictly as laid down in rule 148 of the Petroleum Rules, 2002 and submit complete documents for the Renewal of the licence so as to reach this office on or before **31/12/2023**.

कृपया पावती दें । Please acknowledge the receipt.

भवदीय /Yours faithfully,

((पू. एस. भांगे)
(UJWAL SHANKAR BHANGE))
विस्फोटक नियंत्रक
Controller of Explosives
कृते संयुक्त मुख्य विस्फोटक नियंत्रक
For Jt. Chief Controller of Explosives
गुवाहाटी/Assam

(अधिक जानकारी जैसे आवेदन की स्थिति, शुल्क तथा अन्य विवरण के लिए हमारी वेबसाइट : http://peso.gov.in देखें)
(For more information regarding status,fees and other details please visit our website: http://peso.gov.in)
Note:-This is system generated document does not require signature.

Environmental Monitoring Reports

Air Monitoring Results

en-vision

Recognized by Pollution Control Board, Assam

Technologies for better tomorrow

TESTREPORT

AMBIENT AIR ANALYSIS REPORT

Rep.No. AAAR_1503163_01_77 Date: 13/03/2022 TC-7669

Sample ID: EETNE/MAR/04/23 ULR NO.: TC766923000000004P

Issued to : M/s. Lower Kopili HEP Project, Lanku, Dist.- Dima Hasao, Assam.

Sample Drawn By : UTPAL BEZBARUAH

Sampling Plan & Procedure : EETNE/SOP/01

Analysis Duration : 21/02/23 TO 25/02/23, 22/02/23 TO 26/02/23, 23/02/23 TO 27/02/23 24/02/23 TO 28/02/23, 25/02/23 TO 01/03/23 26/02/23 TO 02/03/23, 27/02/23 TO 03/03/23, 28/02/23 TO 04/03/23

Sampling Instrument Used : AMBIENT AIR SAMPLER/RDS

Pollution Control Device, if any : NO

SL. NO.	DATE OF SAMPLING	LOCATION/ SOURCE (Latitude & Longitude)	WEATHER	PARAMETERS					
				PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	HC (mg/m^3)	CO (mg/m^3)	SO_2 ($\mu g/m^3$)
i)	21/02/23	Power Inlet / Dam Site Lat N 25°39'57.39" Long E 92°46'53.62"	Clear	34.2	18.6	14.5	BDL	BDL	10.1
ii)	22/02/23	Crusher Site Lat N 25°40'37.79" Long E 92°47'43.13"		45.2	29.5	17.7	0.02	0.03	12.2
iii)	23/02/23	HRT Adit Lat N 25°40'47.89" Long E 92°48'9.67"		37.4	19.2	12.2	BDL	BDL	9.2
iv)	24/02/23	Primary Hospital Near APGCL Camp Lat N 25°39'59.93" Long E 92°47'45.52""		33.1	22.1	11.7	BDL	BDL	8.1
v)	25/02/23	Batching plant Lat N 25°41'45.31" Long E 92°48'39.79"		34.7	20.7	15.9	BDL	BDL	11.0
vi)	26/02/23	Surge Shaft Site Lat N 25°41'29.28" Long E 92°48'16.47"		35.2	20.1	13.2	BDL	BDL	9.5
vii)	27/02/23	Labour & Staff Camp Lat N 25°40'54.97" Long E 92°48'9.67"		34.3	20.3	12.4	BDL	BDL	8.2
viii)	28/02/23	Power house Lat N 25°41'54.02" Long E 92°46'53.62"		34.2	21.6	9.8	BDL	BDL	8.1

Remarks: - Sampling were done within the annual based.

NATIONAL AMBIENT AIR QUALITY STANDARDS:

Sl. No.	Pollutant	Test Method	Time Weighted Average	Concentration in Ambient Air Industrial, Residential, Rural and Other Area
1	Particulate Matter (PM_{10}), $\mu g/m^3$	IS:5182 Part-XXIII/ CPCB	Annual	60
			24 hours	100
2	Particulate Matter ($PM_{2.5}$), $\mu g/m^3$	EETNE/SOP/01/2017	Annual	40
			24 hours	60
3	Nitrogen Dioxide (NO_2), $\mu g/m^3$	IS:5182 Part-VI/ CPCB	Annual	40
			24 hours	80
4	Carbon Monoxide (CO), mg/m^3		8 Hours	2.0
5	Sulphur Dioxide (SO_2), $\mu g/m^3$	IS:5182 Part-II/ CPCB	Annual	50
			24 hours	80

For Envision Enviro Technologies North East, Guwahati

Utpal Bezbaruah
(Environmental Chemist)

Dr. Pranita Chakraborty
Authorized by (Quality Manager)

Note: i) Tests undertaken twice a week in each location.
ii) The results relate only to the parameters tested.
iii) The test report shall not be reproduced except in full, without written approval of laboratory.

Page 1 of 1

Noise Monitoring Results

en-vision
Enviro Technologies North East

TC-7669

Recognized by Pollution Control Board, Assam

TEST REPORT

AMBIENT NOISE LEVEL MEASUREMENT REPORT
Rep.No. ANLMR_1503163_06A_78 Date: 13/03/2023
Sample ID: EETNE/MAR/04/23 ULR NO.: TC766923000000004P

Issued to : M/s. Lower Kopili HEP Project, Lanku, Dist.- Dima Hasao, Assam.

SL. NO.	DATE OF SAMPLING	LOCATION /SOURCE (Latitude and Longitude)	NOISE LEVEL in dB(A)Leq	
			Day (6:00 am to 10:00 pm)	Night (10:00 pm to 6:00 am)
i)	22/02/23	Power Inlet / Dam Site Lat N 25°39'57.39" Long E 92°46'53.62"	48.2	37.2
ii)	23/02/23	Crusher Site Lat N 25°40'37.79" Long E 92°47'43.13"	56.3	45.6
iii)	24/02/23	HRT Adit Lat N 25°40'47.89" Long E 92°48'9.67"	53.7	41.3
iv)	25/02/23	Primary Hospital Near APGCL Camp Lat N 25°39'59.93" Long E 92°47'45.52"	57.2	41.7
v)	26/02/23	Batching plant Lat N 25°41'45.31" Long E 92°48'39.79"	52.3	47.2
vi)	27/02/23	Surge Shaft Site Lat N 25°41'29.28" Long E 92°48'16.47"	50.2	38.4
vii)	28/02/23	Labour & Staff Camp Lat N 25°40'54.97" Long E 92°48'9.67"	54.9	46.7
viii)	01/03/23	Power house Lat N 25°41'54.02" Long E 92°46'53.62"	55.7	43.8

Remarks: Noise level is carried out during 75% of the Day Time & Night Time.
Method of analysis : . IS 9989 : 1981 RA : 2014
Sampling Instrument Used : SLM100 SLNO484-I-22, SLM 100 (213 DTC-2013)

Ambient Noise Standards:

Area Code	Category of area	Limits in dB(A) Leq	
		Day (6:00 am to 10:00 pm)	Night (10:00 pm to 6:00 am)
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Utpal Bezbaruah
(Environmental Chemist)

For Envision Enviro Technologies North East, Guwahati
Dr. Pranita Chakraborty
Authorized by (Quality Manager)

Note: i) The results relate only to the parameters tested.
ii) The test report shall not be reproduced except in full, without written approval of laboratory.
iii) Monitoring is performed twice a week in each location.

Ground Water and Surface Water Quality Monitoring Results

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TC-7669

TEST REPORT:
Report No: 230206_1503163_0
Sample ID No:EETNE/Jan/03/23/D
Test Starting Date: 24/01/23

Date of Report: 06/02/23
Date of sample receipt: 24/01/23
Test completion Date: 06/02/23

Name & Address of Client	**M/s. Lower Kopili Project. Near Lanka, Dist: Dima Hasao.**	
Sample Description	**Type: Ground Water**	**Source: Crusher Borewell**
Sample collected by	**M/s. Lower Kopili Project**	

Sl No.	Parameters	Unit	Result	Reference Method	IS 10500:2012 Acceptable Limit
1	p^H	---	7.11	APHA 23rd Edition,4500 H^+,Page:4-95	6.5-8.5
2	Turbidity	NTU	8.0	APHA 23rd Edition,2130,Page:2-13	1
3	TDS	mg/L	115	APHA 23rd Edition,2540 C ,Page :2-69	500
4	Dissolved Oxygen	mg/L	7.3	APHA 23rd Edition,4500-O C,Page:4-146	100
7	Total hardness	mg/L	73.2	APHA 23rd Edition,2340 B,Page:2-48	200
8	Calcium	mg/L	35.7	APHA 23rd Edition,3500-Ca B,Page:3-69	75
9	Magnesium	mg/L	18.3	APHA 23rd Edition,3500-Mg B,Page:3-86	30
10	Total Alkalinity	mg/L	231	APHA 23rd Edition,2320,Page:2-37	200
11	Sulphate	mg/L	14.6	APHA 23rd Edition,4500-SO_4^{2-}E,Page:4-199	200
12	Nitrates	mg/L	2.8	APHA 23rd Edition,4500-NO_3^-B,Page:4-127	45

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Sample ID No: EETNE/Jan/03/23/D
Test Starting Date: 24/01/23

Date of sample receipt: 24/01/23
Test completion Date: 06/02/23

Sl No.	Parameters	Unit	Result	Reference Method	IS 10500:2012 Acceptable Limit
13	Arsenic	mg/L	BDL	APHA 23rd Edition,3114A,Page:3-36	0.01
14	Iron(as Fe)	mg/L	1.5	APHA 23rd Edition,3500-Fe B,Page:3-80	0.3
15	Total Coliform	MPN/100	Nil	APHA 23rd Edition,9222B,Page:9-81	Shall not be detectable in any 100 ml Sample
16	Fecal Coliform	MPN/100	Nil	APHA 23rd Edition,9222 D,Page:9-89	Shall not be detectable in any 100 ml Sample

NOTE: (TDS) Total Dissolved Solids.

For Envision Enviro Technologies North East

Rimpi Sarma
Environmental Chemist
Test Done By

Dr. Pranita Chakraborty
Quality Manager
Authorized Signatory/Reviewed By

Note: : i) The results relate only to the parameters tested.
ii) The test report shall not be reproduced except in full, without written approval of laboratory
iii) Parameter no.11 to 16 were analysed by Department of Chemistry B.Borooah College as per our MOU.

End of report

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TC-7669

TEST REPORT:
Report No: 230206_1503163_0
Sample ID No:EETNE/Jan/04/23/D
Test Starting Date: 24/01/23

Date of Report: 06/02/23
Date of sample receipt: 24/01/23
Test completion Date: 06/02/23

Name & Address of Client	M/s. Lower Kopili Project. Near Lanka, Dist: Dima Hasao.	
Sample Description	Type: Ground Water	Source: APGCL Camp
Sample collected by	M/s. Lower Kopili Project	

Sl No.	Parameters	Unit	Result	Reference Method	IS 10500:2012 Acceptable Limit
1	pH	—	7.48	APHA 23rd Edition,4500 H+,Page:4-95	6.5-8.5
2	Turbidity	NTU	7.0	APHA 23rd Edition,2130,Page:2-13	1
3	TDS	mg/L	90	APHA 23rd Edition,2540 C ,Page :2-69	500
4	Dissolved Oxygen	mg/L	7.3	APHA 23rd Edition,4500-O C,Page:4-146	100
5	Total hardness	mg/L	64.7	APHA 23rd Edition,2340 B,Page:2-48	200
6	Calcium	mg/L	30.4	APHA 23rd Edition,3500-Ca B,Page:3-69	75
7	Magnesium	mg/L	16.8	APHA 23rd Edition,3500-Mg B,Page:3-86	30
8	Total Alkalinity	mg/L	133	APHA 23rd Edition,2320,Page:2-37	200
9	Sulphate	mg/L	15.4	APHA 23rd Edition,4500-SO_4^{2-} E,Page:4-199	200
10	Nitrates	mg/L	3.5	APHA 23rd Edition,4500-NO_3 B,Page:4-127	45

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Sample ID No: EETNE/Jan/04/23/D
Test Starting Date: 24/01/23

Date of sample receipt: 24/01/23
Test completion Date: 06/02/23

Sl No.	Parameters	Unit	Result	Reference Method	IS 10500:2012 Acceptable Limit
11	Arsenic	mg/L	BDL	APHA 23rd Edition,3114A,Page:3-36	0.01
12	Iron(as Fe)	mg/L	0.247	APHA 23rd Edition,3500-Fe B,Page:3-80	0.3
13	Total Coliform	MPN/100	Nil	APHA 23rd Edition,9222B,Page:9-81	Shall not be detectable in any 100 ml Sample
14	Fecal Coliform	MPN/100	Nil	APHA 23rd Edition,9222 D,Page:9-89	Shall not be detectable in any 100 ml Sample

NOTE: (TDS) Total Dissolved Solids.

For Envision Enviro Technologies North East

Rimpi Sarma
Environmental Chemist
Test Done By

Dr. Pranita Chakraborty
Quality Manager
Authorized Signatory/Reviewed By

Note: i) The results relate only to the parameters tested.
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iii) Parameter no.9 to 14 were analysed by Department of Chemistry,B.Borooah College as per our MOU.

End of report

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TEST REPORT:
Report No: 230314_1503163_0
ULR No:TC766922000000038P
Sample ID No: EETNE/March/2_A/23/D
Test Starting Date: 01/03/23

Date of Report: 14/03/23
Date of sample receipt:01/03/23
Test completion Date: 14/03/23

Name & Address of Client	M/s. Lower Kopili Project. Near Lanka, Dist: Dima Hasao.				
Sample Description	Type: Surface Water (1 km D/S of dam site)			Source: Kopili River	
Sample collected by	M/s. En-vision Enviro Technologies North East				
Sample Collection Particulars	Date 28/02/2023	Time 3:50 P.M	Temperature 27°C	Quantity Drawn: 4 Lt	Sampling Method: EETNE/SOP/02

Sl No.	Parameters	Unit	Result	Reference Method
1	pH	—	4.5	APHA 23rd Edition,4500 H+,Page:4-95
2	Turbidity	NTU	2.10	APHA 23rd Edition,2130,Page:2-13
3	TDS	mg/L	32.5	APHA 23rd Edition,2540 C, Page :2-69
4	TSS	mg/L	83.8	APHA 23rd Edition,2540,Page:2-70
5	Oil and Grease	mg/L	<5	APHA 23rd Edition,5520 B,Page:5-42
6	Dissolved Oxygen	mg/L	7.2	APHA 23rd Edition,4500-O C,Page:4-146
7	Total hardness	mg/L	74.6	APHA 23rd Edition,2340 B,Page:2-48
8	Calcium	mg/L	34.8	APHA 23rd Edition,3500-Ca B,Page:3-69
9	Magnesium	mg/L	17.5	APHA 23rd Edition,3500-Mg B,Page:3-86
10	Total Alkalinity	mg/L	42.9	APHA 23rd Edition,2320,Page:2-37
11	Chloride	mg/L	14.5	APHA 23rd Edition,4500-Cl B,Page:4-75
12	Sulphate	mg/L	10.8	APHA 23rd Edition,4500 SO_4^{2-}E,Page:4-199
13	Nitrates	mg/L	2.3	APHA 23rd Edition,4500-NO_3 B,Page:4-127
14	Phosphate	mg/L	<0.02	APHA 23rd Edition,4500-P,Page:4-163
15	Salinity	%	0.6	APHA 23rd Edition,25208,Page:2-60
16	conductivity	µS/cm	84.5	APHA 23rd Edition,25208,Page:2-60

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Sample ID No: EETNE/March/2_A/23/D

Date of sample receipt: 01/03/23

Test Starting Date: 01/03/23

Test completion Date: 14/03/23

Sl No.	Parameters	Unit	Result	Reference Method
17	Arsenic	mg/L	BDL	APHA 23rd Edition,3114A,Page:3-36
18	Iron(as Fe)	mg/L	0.87	APHA 23rd Edition,3500-Fe B,Page:3-50
19	Total Coliform	MPN/100	2	APHA 23rd Edition,92228,Page:9-81
20	Fecal Coliform	MPN/100	Nil	APHA 23rd Edition,9222 D,Page:9-89
21	BOD	mg/L	5	APHA 23rd Edition,5210B,Page:5-6
22	COD	mg/L	23	APHA 23rd Edition,5220 B,Page:5-18

For Envision Enviro Technologies North East, Guwahati

Rimil Sarma
Environmental Chemist
Test Done By

Dr. Pranita Chakraborty
Quality Manager
Authorized Signatory /Reviewed By

Note: i) The results relate only to the parameters tested and item sampled.
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TEST REPORT:
Report No: 230314_1503163_0
ULR No:TC766923000000039P
Sample ID No: EETNE/Mar/2_B/23/D
Test Starting Date: 01/03/23

Date of Report: 14/03/23
Date of sample receipt: 01/03/23
Test completion Date: 14/03/23

Name & Address of Client	M/s. Lower Kopili Project. Near Lanka, Dist: Dima Hasao.				
Sample Description	Type: Surface Water(1 km U/S of dam site)			Source: Kopili River	
Sample collected by	M/s. En-vision Enviro Technologies North East				
Sample Collection Particulars	**Date** 28/02/2023	**Time** 10:30 A.M	**Temperature** 25°C	**Quantity Drawn:**4L	**Sampling Method:** EETNE/SOP/02

Sl No.	Parameters	Unit	Result	Reference Method	IS 10500:2012 Permissible Limit
1	pH	—	4.4	APHA 23rd Edition,4500 H+,Page:4-95	6.5-8.5
2	Turbidity	NTU	3.61	APHA 23rd Edition,2130,Page:2-13	5
3	TDS	mg/L	30.8	APHA 23rd Edition,2540 C, Page :2-69	2000
4	TSS	mg/L	65.9	APHA 23rd Edition,2540,Page:2-70	----
5	Oil and Grease	mg/L	<3	APHA 23rd Edition,5520 B,Page:5-42	—
6	Dissolved Oxygen	mg/L	7.0	APHA 23rd Edition,4500-O C,Page:4-146	100
7	Total hardness	mg/L	69.5	APHA 23rd Edition,2340 B,Page:2-48	600
8	Calcium	mg/L	32.8	APHA 23rd Edition,3500-Ca B,Page:3-69	200
9	Magnesium	mg/L	15.7	APHA 23rd Edition,3500-Mg B,Page:3-86	100
10	Total Alkalinity	mg/L	35.2	APHA 23rd Edition,2320,Page:2-37	600
11	Sulphate	mg/L	11.8	APHA 23rd Edition,4500-SO_4^{2-} E,Page:4-199	400
12	Nitrates	mg/L	3.5	APHA 23rd Edition,4500-NO_3 B,Page:4-127	No relaxation
13	Phosphate	mg/L	<0.02	APHA 23rd Edition,4500-P,Page:4-163	No relaxation
14	Salinity	%	0.6	APHA 23rd Edition,2520B,Page:2-60	No relaxation
15	conductivity	µS/cm	97	APHA 23rd Edition,2520B,Page:2-60	No relaxation

Page 1 of 2

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Sample ID No: EETNE/March/2_B/23/D
Test Starting Date: 01/03/23

Date of sample receipt: 01/03/23
Test completion Date: 14/03/23

Sl No.	Parameters	Unit	Result	Reference Method	IS 10500:2012 Permissible Limit
16	Arsenic	mg/L	BDL	APHA 23rd Edition,3114A,Page:3-36	No relaxation
17	Iron(as Fe)	mg/L	1.3	APHA 23rd Edition,3500-Fe B,Page:3-80	No relaxation
18	Total Coliform	MPN/100ml	4	APHA 23rd Edition,9222B,Page:9-81	Shall not be detectable in any 100 ml Sample
19	Fecal Coliform	MPN/100ml	Nil	APHA 23rd Edition,9222 D,Page:9-89	Shall not be detectable in any 100 ml Sample
20	BOD	mg/L	5	APHA 23rd Edition,5210B,Page:5-6	No relaxation
21	COD	mg/L	27	APHA 23rd Edition,5220 D,Page:5-18	No relaxation

For Envision Enviro Technologies North East, Guwahati

Rimpi Sarma
Environmental Chemist
Test Done By

Dr. Pranda Chakraborty
Quality Manager
Authorized Signatory /Reviewed By

Note: i) The results relate only to the parameters tested and item sampled.
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TEST REPORT
Report No: 230314_1503163_0
ULR No: TC766923000000040P
Sample ID No: EETNE/Mar/2_C/23/D
Test Starting Date: 28/02/23

Date of Report: 14/03/23
Date of sample receipt: 01/03/23
Test completion Date: 14/03/23

Name & Address of Client	M/s. Lower Kopili Project. Near Lanka, Dist: Dima Hasao.				
Sample Description	Type: Surface Water (3 km D/S of dam site)			Source: Kopili River	
Sample collected by	M/s. En-vision Enviro Technologies North East				
Sample Collection Particulars	Date 28/02/2023	Time 2:42 P.M	Temperature 28°C	Quantity Drawn:4L	Sampling Method: EETNE/SOP/02

Sl No.	Parameters	Unit	Result	Reference Method
1	pH	---	4.34	APHA 23rd Edition,4500 H+,Page:4-95
2	Turbidity	NTU	2.21	APHA 23rd Edition,2130,Page:2-13
3	TDS	mg/L	35	APHA 23rd Edition,2540 C, Page :2-69
4	TSS	mg/L	72.8	APHA 23rd Edition,2540,Page:2-70
5	Oil and Grease	mg/L	<5	APHA 23rd Edition,5520 B,Page:5-42
6	Dissolved Oxygen	mg/L	7.5	APHA 23rd Edition,4500-O C,Page:4-148
7	Total hardness	mg/L	60.6	APHA 23rd Edition,2340 B,Page:2-48
8	Calcium	mg/L	31.8	APHA 23rd Edition,3500-Ca B,Page:3-69
9	Magnesium	mg/L	14.9	APHA 23rd Edition,3500-Mg B,Page:3-86
10	Total Alkalinity	mg/L	42.5	APHA 23rd Edition,2320,Page:2-37
11	Sulphate	mg/L	10.7	APHA 23rd Edition,4500-SO_4^{2-}E,Page:4-199
12	Nitrates	mg/L	9.8	APHA 23rd Edition,4500-NO_3 B,Page:4-127
13	Phosphate	mg/L	<0.02	APHA 23rd Edition,4500-P,Page:4-163
14	Salinity	%	0.3	APHA 23rd Edition,2520B,Page:2-60
15	Conductivity	µS/cm	76	APHA 23rd Edition,2520B,Page:2-60

Page 1 of 2

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Sample ID No: EETNE/March/2_C/23/D
Test Starting Date: 01/03/23

Date of sample receipt: 01/03/23
Test completion Date: 14/03/23

Sl No.	Parameters	Unit	Result	Reference Method
16	Chloride	mg/L	15.9	APHA 23rd Edition,4500-Cl B,Page:4-75
17	Arsenic	mg/L	BDL	APHA 23rd Edition,3114A,Page:3-36
18	Iron(as Fe)	mg/L	1.7	APHA 23rd Edition,3500-Fe B,Page:3-80
19	Total Coliform	MPN/100	3	APHA 23rd Edition,9222B,Page:9-81
20	Fecal Coliform	MPN/100	Nil	APHA 23rd Edition,9222 D,Page:9-89
21	BOD	mg/L	6	APHA 23rd Edition,5210B,Page:5-6
22	COD	mg/L	45	APHA 23rd Edition,5220 b,Page:5-18

For Envision Enviro Technologies North East, Guwahati

Envir... Chemist
Te... By

Dr. Pranita Chakraborty
Quality Manager
Authorized Signatory /Reviewed By

Note: i) ... relate only to the parameters tested and item sampled.
ii) ... report shall not be reproduced except in full, without written approval of laboratory
iii) ... 11 to 20 are analyzed by Department of Chemistry,B.Borooah College as per our MOU.

End of report

Page 2 of 2

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TEST REPORT:
Report No: 230206_1503163_0
Sample ID No: EETNE/Jan/06/23/D
Test Starting Date: 24/01/23

Date of Report: 06/02/23
Date of sample receipt: 24/01/23
Test completion Date: 06/02/23

Name & Address of Client	M/s. Lower Kopili Project. Near Lanka, Dist: Dima Hasao.	
Sample Description	Type: Surface Water	Source: Lanku Nala
Sample collected by	M/s. Lower Kopili Project	

Sl No.	Parameters	Unit	Result	Reference Method
1	pH	---	7.75	APHA 23rd Edition,4500 H+,Page:4-95
2	Turbidity	NTU	10.1	APHA 23rd Edition,2130,Page:2-13
3	TDS	mg/L	86	APHA 23rd Edition,2540 C, Page :2-69
4	TSS	mg/L	65.7	APHA 23rd Edition,2540,Page:2-70
5	Dissolved Oxygen	mg/L	6.4	APHA 23rd Edition,4500-O C,Page:4-146
6	Total hardness	mg/L	51.7	APHA 23rd Edition,2340 B,Page:2-48
7	Calcium	mg/L	24.9	APHA 23rd Edition,3500-Ca B,Page:3-69
8	Magnesium	mg/L	12.5	APHA 23rd Edition,3500-Mg B,Page:3-86
9	Total Alkalinity	mg/L	119	APHA 23rd Edition,2320,Page:2-37
10	Chloride	mg/L	15.3	APHA 23rd Edition,4500-Cl B,Page:4-75
11	Sulphate	mg/L	9.6	APHA 23rd Edition,4500-SO_4^{2-} E,Page:4-199
12	Nitrates	mg/L	4.1	APHA 23rd Edition,4500-NO_3^- B,Page:4-127
13	Phosphate	mg/L	<.02	APHA 23rd Edition,4500-P,Page:4-163
14	Conductivity	µS/cm	250	APHA 23rd Edition,2520B,Page:2-60

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Sample ID No: EETNE/Jan/06/23/D
Test Starting Date: 24/01/23

Date of sample receipt: 24/01/23
Test completion Date: 06/02/23

Sl No.	Parameters	Unit	Result	Reference Method
15	Arsenic	ug/L	BDL	APHA 23rd Edition,3114A,Page:3-36
16	Iron(as Fe)	mg/L	1.5	APHA 23rd Edition,3500-Fe B,Page:3-80
17	Salinity	%	0.4	APHA 23rd Edition,2520B,Page:2-60
16	Total Coliform	MPN/100 ml	3	APHA 23rd Edition,9222B,Page:9-81
17	Fecal Coliform	MPN/100 ml	Nil	APHA 23rd Edition,9222 D,Page:9-89
18	BOD	mg/L	5	APHA 23rd Edition,5210B,Page:5-6
19	COD	mg/L	27	APHA 23rd Edition,5220 b,Page:5-18

For Envision Enviro Technologies North East, Guwahati

Rimpi Sarma
Environmental Chemist
Test Done By

Dr. Pranita Chakraborty
Quality Manager
Authorized Signatory /Reviewed By

Note: i) The results relate only to the parameters tested.
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iii) Parameter no.9 to 17 are analyzed by Department of Chemistry,B.Boroooah College as per our MOU.

End of report

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TEST REPORT:
Report No: 230314_1503163_0
ULR No:TC766923000000002P
Sample ID No: EETNE/March/02/23/D
Test Starting Date: 01/03/23

Date of Report: 14/03/23
Date of sample receipt: 01/03/23
Test completion Date: 14/03/23

Name & Address of Client	M/s. Lower Kopili Project. Near Lanka, Dist: Dima Hasao.				
Sample Description	Type: Surface Water (8 km D/S of dam site)		Source: Kopili River		Latitude:25.681362 Longitude:92.803848
Sample collected by	M/s. En-vision Enviro Technologies North East				
Sample Collection Particulars	Date 28/02/2023	Time 4:50 P.M	Temperature 29°C	Quantity Drawn:4L	Sampling Method: EETNE/SOP/02

Sl No.	Parameters	Unit	Result	Reference Method
1	pH	---	4.00	APHA 23rd Edition,4500 H+,Page:4-95
2	Turbidity	NTU	1.56	APHA 23rd Edition,2130,Page:2-13
3	TDS	mg/L	63	APHA 23rd Edition,2540 C, Page :2-69
4	TSS	mg/L	41.3	APHA 23rd Edition,2540,Page:2-70
5	Oil and Grease	mg/L	<2	APHA 23rd Edition,5520 B,Page:5-42
6	Dissolved Oxygen	mg/L	7.1	APHA 23rd Edition,4500-O C,Page:4-146
7	Total hardness	mg/L	53.8	APHA 23rd Edition,2340 B,Page:2-48
8	Calcium	mg/L	29.1	APHA 23rd Edition,3500-Ca B,Page:3-69
9	Magnesium	mg/L	13.6	APHA 23rd Edition,3500-Mg B,Page:3-86
10	Total Alkalinity	mg/L	125.2	APHA 23rd Edition,2320,Page:2-37
11	Sulphate	mg/L	16.4	APHA 23rd Edition,4500-SO_4^{2-} E,Page:4-199
12	Nitrates	mg/L	3.8	APHA 23rd Edition,4500-NO_3 B,Page:4-127
13	Phosphate	mg/L	BDL	APHA 23rd Edition,4500-P,Page:4-163
14	Salinity	%	0.2	APHA 23rd Edition,2520B,Page:2-60
15	Conductivity	µS/cm	180	APHA 23rd Edition,2520B,Page:2-60

Page 1 of 2

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Recognized by Pollution Control Board, Assam

Sample ID No: EETNE/March/02/23/D
Test Starting Date: 01/03/23

Date of sample receipt: 01/03/23
Test completion Date: 14/03/23

Sl No.	Parameters	Unit	Result	Reference Method
16	Chloride	mg/L	17.2	APHA 23rd Edition,4500-Cl B,Page:4-75
17	Arsenic	mg/L	<0.001	APHA 23rd Edition,3114A,Page:3-36
18	Iron(as Fe)	mg/L	1.1	APHA 23rd Edition,3500-Fe B,Page:3-80
19	Total Coliform	MPN/100	3	APHA 23rd Edition,9222B,Page:9-81
20	Fecal Coliform	MPN/100	Nil	APHA 23rd Edition,9222 D,Page:9-89
21	BOD	mg/L	10	APHA 23rd Edition,5210B,Page:5-6
22	COD	mg/L	46	APHA 23rd Edition,5220 b,Page:5-18

For Envision Enviro Technologies North East, Guwahati

Rimpi Sarma
Environmental Chemist
Test Done By

Dr. Pranita Chakraborty
Quality Manager
Authorized Signatory /Reviewed By

Note: i) The results relate only to the parameters tested and item sampled.
ii) The test report shall not be reproduced except in full, without written approval of laboratory

End of report

Page 2 of 2

House No. 6, 1st Floor, Samaguri Path, Pub-Sonitpur, Chandmari, Guwahati-781003, Assam.
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RO Water

en-vision Recognized by Pollution Control Board, Assam

TEST REPORT:

Report No: 230206_1503163_0
Sample ID No: EETNE/Jan/08/23/D
Test Starting Date: 24/01/23

Date of Report: 06/02/23
Date of sample receipt: 24/01/23
Test completion Date:06/02/23

TC-7869

Name & Address of Client	M/s. Lower Kopili Project. Near Lanka, Dist: Dima Hasao.	
Sample Description	Type: RO Water	Source: PMC Camp
Sample collected by	M/s. Lower Kopili Project .	

Sl No.	Parameters	Unit	Result	Reference Method	IS 10500: 2012 Acceptable limit
1	pH	---	7.91	APHA 23rd Edition,4500 H+,Page:4-95	6.5-8.5
2	Turbidity	NTU	<0.2	APHA 23rd Edition,2130,Page:2-13	1.0
3	Total hardness	mg/L	31.5	APHA 23rd Edition.2340 B,Page:2-48	200
4	Total Alkalinity	mg/L	58.7	APHA 23rd Edition,2320 B,Page:2-37	200
5	Residual Chlorine	mg/L	<0.01	APHA 23rd Edition,4500-Cl B,Page:4-63	0.2
6	Fluoride	mg/L	0.26	APHA 23rd Edition,4500-F D,Page:4-90	1.0
7	Chloride	mg/L	16.7	APHA 23rd Edition,4500-Cl B,Page:4-75	250
8	Iron(as Fe)	mg/L	0.13	APHA 23rd Edition,3500-Fe B,Page:3-80	0.3
9	Total coliform	MPN/100 mL	Nil	APHA 23rd Edition,9222B,Page:9-81	Absent

For Envision Enviro Technologies North East

Rimpi Sarma
Environmental Chemist
Test Done By

Dr. Pranita Chakraborty
Quality Manager
Authorized Signatory

Note: i) The results relate only to the parameters tested.
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iii) Parameter no.4 to 9 are analyzed by Department of Chemistry,B. Borooah College as per our MOU.

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Page 1 of 2

RO inlet

en-vision Recognized by Pollution Control Board, Assam

TEST REPORT:
Report No: 230314_1503163_0
ULR NO-TC766923000000007F
Sample ID No: EETNE/March/06/23/D
Test Starting Date: 01/03/23

Date of Report: 14/03/23
Date of sample receipt: 01/03/23
Test completion Date: 14/03/23

TC-7669

Name & Address of Client	M/s. Lower Kopili Project. Near Lanka, Dist: Dima Hasao.				
Sample Description	Type: RO Inlet	Source: Canteen	Latitude:25.680317 Longitude:92.80195		
Sample collected by	M/s. Lower Kopili Project .				
Sample Collection Particulars	Date 28/02/23	Time 01:35 P.M	Temperature 29°C	Quantity Drawn:3L	Sampling Method: EETNE/SOP/02

Sl No.	Parameters	Unit	Result	Reference Method	IS 10500: 2012 Acceptable limit
1	p^H	---	7.7	APHA 23rd Edition,4500 H+,Page:4-95	6.5-8.5
2	Turbidity	NTU	0.21	APHA 23rd Edition,2130,Page:2-13	1.0
3	Total hardness	mg/L	58.4	APHA 23rd Edition,2340 B,Page:2-48	200
4	Total Alkalinity	mg/L	140	APHA 23rd Edition,2320 B,Page:2-37	200
5	Residual Chlorine	mg/L	BDL	APHA 23rd Edition,4500-Cl B,Page:4-63	0.2
6	Fluoride	mg/L	0.25	APHA 23rd Edition,4500-F D,Page:4-90	1.0
7	Chloride	mg/L	13.7	APHA 23rd Edition,4500-Cl B,Page:4-75	250
8	Iron(as Fe)	mg/L	0.14	APHA 23rd Edition,3500-Fe B,Page:3-80	0.3
9	Total coliform	MPN/100 mL	Nil	APHA 23rd Edition,9222B,Page:9-81	Absent

For Envision Enviro Technologies North East

Rimpi Sarma
Environmental Chemist
Test Done By

Dr. Pranita Chakraborty
Quality Manager
Authorized Signatory/Reviewed By

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Page 1 of 2

en-vision

Recognized by Pollution Control Board, Assam

TC-7669

TEST REPORT:
Report No: 230206_1503163_0
Sample ID No: EETNE/Jan/07/23/D
Test Starting Date: 24/01/23

Date of Report: 06/02/23
Date of sample receipt: 24/01/23
Test completion Date: 06/02/23

Name & Address of Client	**M/s. Lower Kopili Project. Near Lanka, Dist: Dima Hasao.**	
Sample Description	**Type: Surface Water**	**Source: RO Water**
Sample collected by	**M/s. Lower Kopili Project**	

Sl No.	Parameters	Unit	Result	Reference Method	IS 10500:2012 Acceptable Limit
1	p^H	—	7.22	APHA 23rd Edition,4500 H+,Page:4-95	6.5-8.5
2	Turbidity	NTU	4.0	APHA 23rd Edition,2130,Page:2-13	1
3	TDS	mg/L	42	APHA 23rd Edition,2540 C, Page :2-69	500
4	TSS	mg/L	18.3	APHA 23rd Edition,2540,Page:2-70	----
5	Oil and Grease	mg/L	<2	APHA 23rd Edition,5520 B,Page:5-42	----
6	Dissolved Oxygen	mg/L	7.1	APHA 23rd Edition,4500-O C,Page:4-146	100
7	Total hardness	mg/L	45.8	APHA 23rd Edition,2340 B,Page:2-48	200
8	Calcium	mg/L	23.1	APHA 23rd Edition,3500-Ca B,Page:3-69	75
9	Magnesium	mg/L	11.4	APHA 23rd Edition,3500-Mg B,Page:3-86	30
10	Total Alkalinity	mg/L	91	APHA 23rd Edition,2320,Page:2-37	600
11	Chloride	mg/L	14.3	APHA 23rd Edition,4500-Cl⁻B,Page:4-75	250
12	Sulphate	mg/L	11.7	APHA 23rd Edition,4500-SO_4^{2-} E,Page:4-199	200
13	Nitrates	mg/L	3.1	APHA 23rd Edition,4500-NO_3^- B,Page:4-127	45
14	Phosphate	mg/L	<0.02	APHA 23rd Edition,4500-P,Page:4-163	No Relaxation
15	Salinity	%	0.3	APHA 23rd Edition,2520B,Page:2-60	—
16	conductivity	µS/cm	120	APHA 23rd Edition,2520B,Page:2-60	No Relaxation

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TC-7669

Recognized by Pollution Control Board, Assam

Sample ID No: EETNE/Jan/07/23/D
Test Starting Date: 24/01/23

Date of sample receipt: 24/01/23
Test completion Date: 06/02/23

Sl No.	Parameters	Unit	Result	Reference Method	IS 10500:2012
					Acceptable Limit
17	Arsenic	mg/L	BDL	APHA 23rd Edition,3114A,Page:3-36	0.01
18	Iron(as Fe)	mg/L	0.176	APHA 23rd Edition,3500-Fe B,Page:3-80	0.3
19	Total Coliform	MPN/100	Nil	APHA 23rd Edition,9222B,Page:9-81	Shall not be detectable in any 100 ml Sample
20	Fecal Coliform	MPN/100	Nil	APHA 23rd Edition,9222 D,Page:9-89	Shall not be detectable in any 100 ml Sample
21	BOD	mg/L	<2	APHA 23rd Edition,5210B,Page:5-6	---
22	COD	mg/L	<5	APHA 23rd Edition,5220 D,Page:5-18	---

For Envision Enviro Technologies North East, Guwahati

Rimpi Sarma
Environmental Chemist
Test Done By

Dr. Pranita Chakraborty
Quality Manager
Authorized Signatory/Reviewed By

Note: i) The results relate only to the parameters tested.
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iii) Parameter no.11 to 20 are analyzed by Department of Chemistry,B.Borooah College as per our MOU.

End of report

Page 2 of 2

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Waste water

en-vision

Recognized by Pollution Control Board, Assam

TC.7669

TEST REPORT:
Report No: 230314_1503163_0
ULR NO-TC766923000000009F
Sample ID No: EETNE/March/03_A/23
Test Starting Date: 28/02/23

Date of Report: 14/03/23
Date of sample receipt: 01/03/23
Test completion Date: 14/03/23

Name & Address of Client	**M/s. Lower Kopili Project. Near Lanka, Dist: Dima Hasao.**				
Sample Description	**Type: Waste water**	**Source: Workman Colony**		**Latitude:25.681362 Longitude:92.803844**	
Sample collected by	**M/s. En-vision Enviro Technologies North East**				
Sample Collection Particulars	**Date 01/03/23**	**Time 01:49 P.M**	**Temperature 26°C**	**Quantity Drawn:2L**	**Sampling Method: EETNE/SOP/02**

SN	Parameter	Unit	Result	Method Followed by	Permissible Limit (CPCB)
1	pH	—	7.00	APHA 23rd Edition,4500 H+,Page:4-95	6.5-9.0
2	TSS	mg/L	81.3	APHA 23rd Edition,2540,Page:2-70	100
3	BOD	mg/L	27	APHA 23rd Edition,5210B,Page:5-6	30
4	COD	mg/L	82	APHA 23rd Edition,5220 b,Page:5-18	250
5	OIL & GREASE	mg/L	3.5	APHA 23rd Edition,5520 B,Page:5-42	10

Note : (TSS) Total Suspended Solids, (BOD) Biochemical Oxygen Demand, (COD) Chemical Oxygen Demand.

For Envision Enviro Technologies North East

Rimpi Sarma
Environmental Chemist
Test Done By

Dr. Pranita Chakraborty
Quality Manager
Authorized Signatory/Reviewed By

Note: i) The results relate only to the parameters tested and item sampled.
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End of Report

Page 1 of 1

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Phone : +91 8811096201 ● e-mail : envisionglyt@gmail.com

en-vision

Recognized by Pollution Control Board, Assam

TC-7669

TEST REPORT:
Report No: 230314_1503163_0
ULR NO-TC766923000000009F
Sample ID No: EETNE/March/03_A/23
Test Starting Date: 28/02/23

Date of Report: 14/03/23
Date of sample receipt: 01/03/23
Test completion Date: 14/03/23

Name & Address of Client	**M/s. Lower Kopili Project. Near Lanka, Dist: Dima Hasao.**				
Sample Description	**Type: Waste water**	**Source: Workman Colony**			**Latitude:25.681362 Longitude:92.803844**
Sample collected by	**M/s. En-vision Enviro Technologies North East**				
Sample Collection Particulars	**Date 01/03/23**	**Time 01:49 P.M**	**Temperature 26°C**	**Quantity Drawn:2L**	**Sampling Method: EETNE/SOP/02**

SN	Parameter	Unit	Result	Method Followed by	Permissible Limit (CPCB)
1	pH	---	7.00	APHA 23rd Edition,4500 H+,Page:4-95	6.5-9.0
2	TSS	mg/L	81.3	APHA 23rd Edition,2540,Page:2-70	100
3	BOD	mg/L	27	APHA 23rd Edition,5210B,Page:5-6	30
4	COD	mg/L	82	APHA 23rd Edition,5220 b,Page:5-18	250
5	OIL & GREASE	mg/L	3.5	APHA 23rd Edition,5520 B,Page:5-42	10

Note : (TSS) Total Suspended Solids, (BOD) Biochemical Oxygen Demand, (COD) Chemical Oxygen Demand.

For Envision Enviro Technologies North East

Rimpi Sarma
Environmental Chemist
Test Done By

Dr. Pranita Chakraborty
Quality Manager
Authorized Signatory/Reviewed By

Note: i) The results relate only to the parameters tested and item sampled.
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Annexure XVI

Progress summary of project "PHYCO-REMEDIATION TECHNOLOGY" CARRIED OUT BY M/S TRINITY INTERNATIONAL FOR THE RESTORATION OF HIGHLY ACIDIC RIVERS, KYRHUKHLA AND LUNAR INCLUDING THE MOOKYMPAD SIDE STREAM

A team of CPCB official and MPCB officials led by Smt. JenniferSwaine, Sr. Scientist, visited different sites at Kyrhuhkhla River & Lunar River on 01.02.2023 to Monitor/inspect the Phycoremediation project carried out by Trinity International in coal mining areas of Jaintia Hills. The objective of this visit was to draft& finalize the protocols for monitoring as well as identification of sample collection sites in upcoming months to assess the effectiveness of the Phyco-remediation Technology. On 1st November, 2021, Directorate of Mineral Resources, Shillong awarded work order to the Trinity International for restoration of highly acidic rivers-Kyrhuhkhla and Lunar River and its side stream using Phyco-remediation technology.

The main objective of this project is to raise the existing level of pH up-to acceptable level of pH as per Central Pollution Control Board standards. Acidic river water will be treated by using green Micro Algae consortia technology. Consequently, the company is expected to achieve lower concentration of Sulphates, heavy Metals while achieving pH correction to acceptable standards. As per the contract, the period of treatment is 24 months from the date of signing the contract Agreement, including period of construction of Six Months subject to Force Majeure over the length of 10 Km for River Kyrhuhkhla and 13.3 Km for Lunar River. The range of restoration /treatment is as follows:

Methodology:

Methodology for the restoration of highly acidic rivers is given below:

- River water was collected from the designated river restoration sites for initial algae culture and multiplication;
- The algal consortia containing multiple native species of algae was inoculated in collected wastewater and optimized for their maximum growth along with the pH correction.
- To maintain the algal growth in the wastewater, different nutrient (Mixture of Phycoplus and organic seaweed) added from the nutritional tanks.
- Further, the wastewater from the river was collected in constructed dugout and bamboo ponds and water was analysed for pH.
- The algal consortium (2-5%) from the polycarbonate tanks was inoculated in the dugout and bamboo ponds.
- The optimized media (mixture of Seaweed and Phycoplus) was added to the dugout and bamboo ponds according to the prevailing pH condition and other water parameters.
- The algal growth in the dugout pond and bamboo pond was observed initially for the period of 5 days for its maximum growth as well as to optimize to outdoor conditions.
- After attaining the desired pH (approx. 6.5-7) up to 85-90% of water from the dugout and bamboo tanks will be transferred back to the river. This is an ongoing activity from all tanks.
- Further to maintain the growth as well as retention of algal culture in the river, check dams (At a distance of 250 to 350 meters) have been setup at multiple points along the river course.

- Check dams help in retention of algal consortia for pH correction in the river. It provided necessary retention time required for the culture to sustain over longer period.

The above process is repeated at different intervals according to the prevailing pH condition at each site.

Working Principal & Optimum Algal Concentration:

Algal cell concertation is determined by analysing the optical density of the culture at 680 nm. The dosing is done when optical density reached 1.5-2 in the algal tank. On average number of cells vary from 1.5 x 107 cell to 2.0 x 107 cell per mL in the algal culture before dosing. However, the concentration of cell number may vary due to the change in pH, temperature, sunlight, algae community etc. Algae utilize sulphur etc. for the various metabolic process during its growth process.

Calculation of Cost/MLD treatment:

The cost for **per MLD treatment** of acidic water is Rs.**1349.00** as per the average flow of 260 MLD for both the rivers. The total value of the contract is Rs 25.66 Cr.

Dosing Sites: There are 3 dosing sites along river Kyrhukhla and 2 dosing sites along Lunar River as per the following details:

Dosing Sites	No. of Inoculation Tanks		Total no. of Tanks
	Bamboo Tanks	Dug Tanks	
K-1	6	4	10
K-2	13	4	17
K-3	6	3	9
L-1	7	7	14
L-2	12		12

Source: MPCB; the capacity of Bamboo Tanks are kept as 30,000 L while for the dugout tank the capacity is 100000L.

Annexure- XVII

Write up on Pyrite and Pre-Construction Water Quality at selected locations of Power House and Muck disposal area:

1. **Pre-Construction Stage Water Quality Monitoring:** In order the validate the baseline data for the water quality, a follow up baseline monitoring has again been carried out prior to start of the construction activities. The EMoP requires pre-construction monitoring of a range of parameters of which select parameters were monitored. APGCL has appointed M/s En-vision enviro technologies for such monitoring. The details of the monitoring report are given in EIA addendum.

2. During the ADB mission (31st March to 6th April 2023) it was decided that few water samples should be monitored especially near the power house sites where few locations have shown the possibility of presence of Pyrite along with collection of sample from ground water near the contract package 1 near to the muck disposal site for checking the leaching effect of muck (with possible presence of pyrite) to ground water in that area. So total 5 samples were collected as per the details given in Table 1 below:

Table 1: Location of the Water Samples

S. No.	Sample code	Location
1	S1 (GW)	From the colony of Contract Package 1 (beside the muck disposal site)
2	S2 (PH1)	Pyrite Prone Area at Power House near side way area
3	S3 (PH2)	At Power House just beneath of E-130 near the side way area
4	S4 (PH3)	Pyrite Prone Area at Power House near Tail Race Tunnel (TRT)
5	S5 (PH5)	At Powerhouse from the pool of Kopili Seepage Water near the TRT

3. ADB team visited these sites on 2nd April and spot sampling was done at site which has shown low pH (in the range of 4-4.5) at the possible pyrite prone areas (sample 2 and Sample4). That is why it was agreed for doing a detailed analysis of water quality samples in the above 5 locations. The sampling was done on 4th April and was handed over to the laboratory named ABNS Scientific Services for the testing of the water samples. The location wise sample results are given in Annexure-1 and summarized in Table 2 below and compared with the acceptable and permissible limits of water quality as per the drinking water quality standard as per IS10500: 2012 and also with the designated best use water quality criteria (issued by Central Pollution Control Board, CPCB, India).

	
Sample 1 (Ground Water) Sample collected from colony of Contract Package-1	Sample 2 (PH1) from the Pyrite Prone Area at Power House near the side way
	
Sample 4 (PH3) Pyrite prone Area at Power House near the Tail Race Tunnel	Possible Pyrite Prone area at Power House near the Side Way
	
Sample5 (PH4) at the pool of Kopili Seepage water near the Tail Race Tunnel of Power House.	Sample 3 (PH2) from the point just beneath E-130 at Power House near the side way

Table2: Water Quality Test Results for the Samples collected on 4th April 2023.

S. No	Parameter	Units	Monitoring Locations					Acceptable Limits (IS 10500:2012)	Permissible limits (IS 10500: 2012)
			Sample1 GW1 (CP-1-Colony)	Sample2 (PH-1) Pyrite Prone Area at Power House near side way area	Sample3 (PH-2) Near Power House just beneath of E-130	Sample4 (PH-3) Pyrite Prone Area at Power House near Tail Race Tunnel (TRT)	Sample5 (PH-3) at Powerhouse from the pool of Kopili Seepage Water near the TRT		
1	pH	-	7.38	2.87	4.29	2.93	4.00	6.5-8.5	No Relaxation
2	Temperature	^{0}C	26.3	29.4	31.3	30.5	29.7		
3	DO	mg/l	1.8	1.6	2.0	1.8	2.2		
4	BOD	mg/l	2.4	2	5	3	4		
5	COD	mg/l	9	8	13	12	15		
6	TSS	mg/l	11.0	13.0	16.0	22.0	16.0		
7	Salinity	mg/l	340	44	46	27	37		
8	TKN	mg/l	21.5	24.3	27.0	19.7	24.5		
9	TDS	mg/l	227.00	46	114.0	376.0	227.0	500	2000
10	Total Hardnes	mg/l	154.1	34.0	29.12	48.28	20.82	200	600
11	Oil and Grease	mg/l	BDL	2.8	BDL	3.2	3.10		
12	Magnesium	mg/l	0.92	0.05	6.6	5.4	6.14	30	100
13	Total Alkalinity	mg/l	216.3	2.4	4.4	1.9	3.2	200	
14	Chloride	mg/l	5.9	9.0	22.0	9.78	12.0	250	1000
15	Colour	Hazen	2.0	3.0	3.0	3.0	3.0	5.0	15.0
16	Conductance	µS/cm	205	429	157	313	982		
17	Turbidity	NTU	0.6	5.6	7.12	4.32	7.19	1.0	5.0
18	Arsenic	Mg/l	0.012	BDL	BDL	0.06	0.05	0.01	0.05
19	Zinc	mg/l	0.39	0.02	0.61	0.12	3.10	5.0	15.0
20	Murcury	mg/l	BDL	BDL	BDL	BDL	BDL	0.001	
21	Copper	mg/l	BDL	BDL	BDL	BDL	BDL	0.05	1.5
22	Phosphate	mg/l	BDL	0.8	0.53	0.47	0.44		
23	Sulphate	mg/l	42.0	136.0	117.0	107.0	113.0	200	400
24	Fluoride	mg/l	1.08	1.24	1.02	1.28	0.14	1.0	1.5
25	Chromium+6	mg/l	BDL	BDL	BDL	BDL	BDL	0.05	No relaxation

S. No	Parameter	Units	Monitoring Locations					Acceptable Limits (IS 10500:2012)	Permissible limits (IS 10500: 2012)
			Sample1 GW1 (CP-1-Colony)	Sample2 (PH-1) Pyrite Prone Area at Power House near side way area	Sample3 (PH-2) Near Power House just beneath of E-130	Sample4 (PH-3) Pyrite Prone Area at Power House near Tail Race Tunnel (TRT)	Sample5 (PH-3) at Powerhouse from the pool of Kopili Seepage Water near the TRT		
26	Cadmium	mg/l	BDL	BDL	BDL	BDL	BDL	0.003	No relaxation
27	Lead	mg/l	BDL	BDL	BDL	BDL	BDL	0.01	No relaxation
28	Iron (as Fe)	mg/l	0.32	3.9	1.8	4.7	1.76	0.3	No Relaxation
29	Sulphide	mg/l	BDL	0.4	0.08	0.37	0.14	0.05	No Relaxation
30	Total Coliform Bacteria	MPN/100ml	N.D	ND	ND	ND	ND	Not Detectable	
31	Feacal Coliform	MPN/100ml	N.D	ND	ND	ND	ND	Not Detectable	

Table 3: Designated Best Use Water Quality Criteria (CPCB)

Designated –Best-Use	Class of Water	Criteria
Drinking water source without conventional treatment but after disinfection	A	**pH**: 6.5-8.5 **DO**: 6mg/l or more; **BOD (5 days 20^{0}C)**: 2 mg or less **Total Coliform Organism (MPN/100ml)**: 50 or less
Outdoor Bathing (Organized)	B	**pH**: 6.5-8.5 **DO**: 5mg/l or more; **BOD (5 days 20^{0}C)**: 3 mg or less **Total Coliform Organism (MPN/100ml)**: 500 or less
Drinking water source after conventional treatment and disinfection	C	**pH**: 6-9 **DO**: 4mg/l or more; **BOD (5 days 20^{0}C)**: 3 mg or less **Total Coliform Organism (MPN/100ml)**: 5000 or less
Propagation of wildlife and Fisheries	D	pH: 6.5 to 8.5 Dissolved Oxygen 4mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste Disposal	E	pH: 6.0 to 8.5 Electrical Conductivity at 25^{0}C micro mhos/cm Max.2250 Sodium absorption Ratio Max. 26; Boron Max. 2mg/l

4. It can be seen from Table 2 that the pH value of the surface water samples vary between **2.87-4.29** showing acidic nature of the surface water quality samples collected from four different locations of the Power House areas. Out of these four locations pH value of the samples from two of the possible Pyrite Prone Areas (i.e. Sample no. 2 and Sample no. 4) have shown pH value less than 3. This implies possible presence of Pyrite in these areas. The ground water sample taken from the colony of the contract package-1 has shown a pH value of 7.38 which is in the normal range.

5. Sulphide value of the Sample2 and Sample-4 (i.e. samples from the Pyrite Prone locations) have shown the Sulphide value in the range of **0.37-0.4 mg/l** which is higher than the permissible limits of 0.05mg/l. This Sulphide content water demands treatment before disposing off to river Kopili or any other water body. Whereas, the ground water sample does not report any Sulphide content (i.e. Below Detectable Limits) and it appears that no pyrite leachate from the surrounding areas or the muck disposal site has reached yet to the ground water level.

6. Similarly, in all the surface water samples the Iron (as Fe) is found in the range of **1.76-3.9 mg/l** which is higher than the acceptable limits **(0.3mg/l)**. The Iron level in the pyrite prone samples i.e. in Sample 2 and Sample 4 are found as **3.9 mg/L and 4.7 mg/l.**

7. The Dissolved oxygen level in these surface water samples vary between **1.6-2.2mg/l** which is less than the desired DO level required for any kind of water use as prescribed by CPCB (Class A to E as given in table 3). The BOD level of the surface water samples are found in the range of 2-5mg/l which indicate no such presence of biological pollution in the region. The COD level ranges between 8-15 mg/l also indicate no such presence of industrial pollution in the area. No traces of coliform bacteria was identified in any of these samples.

8. The total hardness of the samples (including ground water sample) is found to be within the acceptable limit of the drinking water standards. The turbidity levels of the surface water are found to be higher (4.32-7.19mg/l) which is slightly higher than the permissible limit of drinking water standard of 5mg/l. However, the pre-treatment activities can take care of these turbidity problem. The TDS value of the samples ranges between 46-376mg/l which is well within the acceptable limits of the drinking water standards i.e .500mg/l.

9. The sample test results have shown non presence of heavy metals like Cadmium, Chromium, Lead, Murcury, Copper. The arsenic level identified in few samples are within the permissible limits.

10. **Assessment of Pyrite in the study area:** Based on the previous ADB mission in December 2022, subsequent discussions and further mission during April 2023, it was felt necessary that a test of Pyrite may be needed to ascertain that excavation works has not lead to open Pyrite sections in the leading to generation of highly acidic water in the toe drains and other proposed drains in the power house area.

11. **Collection of Pyrite Samples and Testing:** A per the test report provided by Dr. Fixit Institute to M/s Global lab (engaged by CP-2 contractor), the sample was received on **04.05.2023** and the report was submitted on **10.05.2023.** The test method followed is as per **IS-2386: Part VIII-1963 (Reaffirmed 2021).** The report is enclosed in **Annexure-2** for reference. The analysis report has been submitted based on **10 kg rock boulder** sample. Samples were collected by CP-2 contractor team.


Sample collected from Power House Location by CP-2 Contractor team

12. **Visual and Microscopic Observation:** As per the visual and microscopic observations following point emerges:
    - ✓ Rock boulder samples were found to be grey and reddish white grey metamorphic rock of sedimentary origin.
    - ✓ Layering in the rock was found.
    - ✓ Along the layering rock showed plane of weakness which are broking easily;
    - ✓ Moreover, rock particles were observed to be combination of weathered and fresh pieces.
    - ✓ Some rock pieces showed brownish to reddish colored staining due to weathering of ferrous materials inside the rock such as iron oxides and biotite mica;
    - ✓ Rock was identified to be quartzite in which lamination and bedding structure are also present;
    - ✓ 5% samples are fresh and dense and 95% samples are faintly to slightly weathered; no highly weathered sample was given;
    - ✓ Microscopic analysis was mainly performed for slightly weathered particles.
    - ✓ In the slightly weathered quartzite rocks, mainly quartz mineral was identified;
    - ✓ Minor percentage of feldspar (K-feldspar), biotite mica and opaque minerals were also identified in the rock;
    - ✓ In the rock any kind of deleterious content however not observed;
    - ✓ Quartz grains were observed to be non-strained with mostly no undulose extinction.
    - ✓ Feldspar grains were observed to be in sericitized and kaolinitized form.
    - ✓ Biotite mica grains were observed minor in percentage.
    - ✓ Grains were observed to be in altered form in which iron material showed reddish coloured alteration.
    - ✓ Opaque minerals were observed to iron oxide and occasionally found in the rock.
    - ✓ Modal Analysis of the slightly weathered quartzite rock indicates that Quartz is maximum (90-92%), Feldsper (4-5%), Biotite Mica (3-4%), Opaque (1%) and others are less than 1%.
    - ✓ **Deleterious Materials like Strained Quartz, Pyrite or other reactive materials were not found.**

13. **Conclusion made in the rock sample report :** Overall, rock boulder particles were found in "Fair to Satisfactory" condition as per petrographic examination. Since in the rock particles, faintly to slightly weathered particles were mainly found. Alteration in other than quartz minerals was commonly observed. Plane of weakness was also observed along the layering of rock. Hence, it is recommended to check mechanical properties of the rock particles before use it as construction material.

14. **No presence of Pyrite reported in the report.** Laboratory report is enclosed in **below.**

15. **Conclusion and Recommendation:** The sample collected for the testing of Pyrite was 10 kg boulders by L&T and then given to the laboratory for testing. The CP-2 contractors reported that the samples were collected from the Power House site (as presented in photographs and reported to EMC through APGCL). The rocks in the Power house area is widely distributed and since the sample is collected by CP-2 contractor, it is expected that the representative samples were collected on the guidance of Geologist of CP-2 contractor for a true representation of the area.

16. However, the catchment area for the drains from where samples are collected is around 4.5 Ha near the Power House. Whereas the submergence area itself is 620 Ha. For such a large area, it is difficult to draw a correlation between the collected rock samples and collected water samples. However, since low pH is reported from the drain surface water, we certainly need to neutralize the waste water before its usage or disposal to the river Kopili.

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TEST REPORT

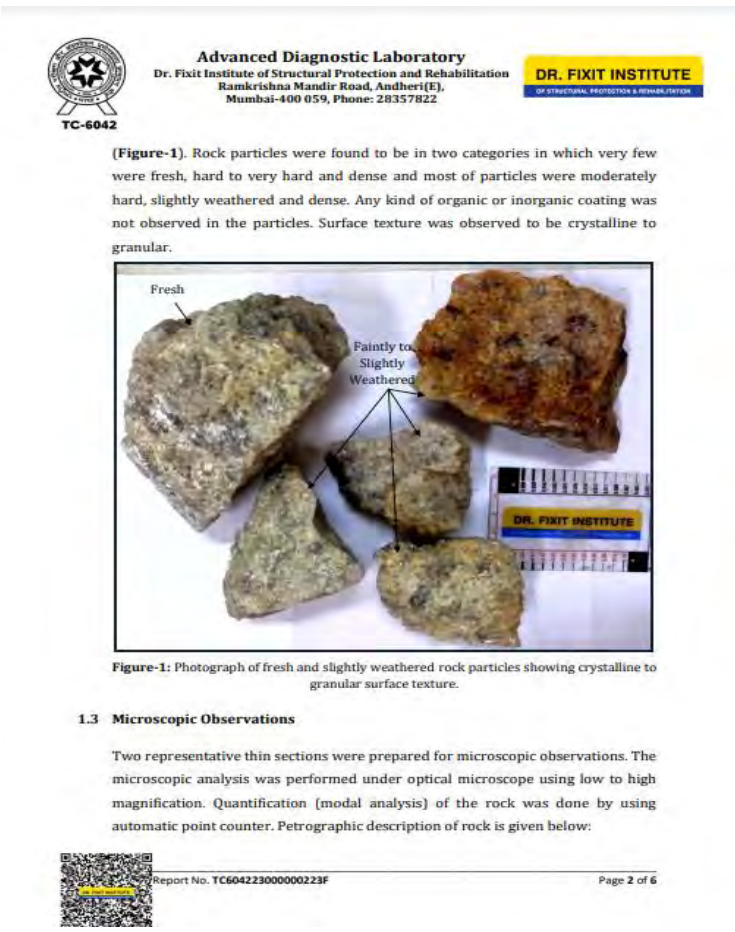
Report No.	: TC604223000000223F	**Date:** 10/05/2023
Job Reference	: 1957	
Name & address of client	: **M/s Global Lab** Ground & 1st Floor, 1073, Lashkarhat, Ward No. 107, Picnic Garden, Opp. Eastern Kolkata Medical Centre Kolkata- 700 039	
Customer Sample Reference	: Soil including Rock **Source**: Service Bay, Power House **Location**: Co-ordinate: E25.698128; N92.805157	
Project/Site Address	: **M/s Larsen & Toubro Limited** 120 MW-Lower Kopili Hydro Electric Project Assam (Package-2), Lanka, Assam-788 931	
Date of Sample Received	: 04/05/2023	
Description of sample	: Rock Boulder	
Duration of testing	: 05/05/2023 to 10/05/2023	
Test Method Followed	: As per IS-2386: Part VIII-1963 (Reaffirmed 2021)	
Discipline	: Mechanical	
Group	: Building Material	

1.1 Sample detail

Approximately 10 kg rock boulder samples were sent by M/s Global Lab, Kolkata to Advanced Diagnostic Laboratory, Dr. Fixit Institute, Andheri (E), Mumbai for petrographic examination of rock sample for aggregate as per IS 2386: Part VIII.

1.2 Visual/Macroscopic Observations

Rock boulder sample was found to be grey and reddish white grey metamorphic rock of sedimentary origin. Layering in the rock was found. Along the layering rock showed plane of weakness and easily broking. Moreover, rock particles were observed to be combination of weathered and fresh pieces. Some rock pieces showed brownish to reddish coloured staining due to weathering of ferrous materials inside the rock such as iron oxides and biotite mica. Rock was identified to be quartzite in which lamination and bedding structure are also present



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(**Figure-1**). Rock particles were found to be in two categories in which very few were fresh, hard to very hard and dense and most of particles were moderately hard, slightly weathered and dense. Any kind of organic or inorganic coating was not observed in the particles. Surface texture was observed to be crystalline to granular.

Figure-1: Photograph of fresh and slightly weathered rock particles showing crystalline to granular surface texture.

1.3 Microscopic Observations

Two representative thin sections were prepared for microscopic observations. The microscopic analysis was performed under optical microscope using low to high magnification. Quantification (modal analysis) of the rock was done by using automatic point counter. Petrographic description of rock is given below:

In the rock pieces mostly identified to be slightly weathered rock. On the basis of visual observations, microscopic analysis was mainly performed for slightly weathered particles. In the slightly weathered quartzite rocks, mainly quartz mineral was identified (**Figure-2**). Minor percentage of feldspar (K-feldspar), biotite mica and opaque minerals were also identified in the rock.

Quartz grains were observed to be mostly fresh in nature. Grains are found to be coarse to very coarse in size. Bonding between intra quartz grains were observed to be tight and fresh. However, bonding between quartz and other minerals such as feldspar, biotite mica etc. was comparatively weak. This is because of presence of weathered feldspar, biotite and opaque minerals in the slightly weathered rock.

In the rock any kind of deleterious content however not observed. Quartz grains were observed to be non-strained with mostly no undulose extinction. Feldspar grains were observed to be in sericitized and kaolinitized form. Biotite mica grains were observed minor in percentage. Grains were observed to be in altered form in which iron material showed reddish coloured alteration. Opaque minerals were observed to iron oxide and occasionally found in the rock. Opaque minerals were also observed in altered form. Modal Analysis of the rock is given in Table-1.

Table-1: Modal analysis of slightly weathered quartzite rock

Mineralogy	Modal Analysis (Average of About 300 Points)	Granularity		
	Approximate %age	Maximum	Minimum	Average
Quartz	90-92	7-8 mm	800 µm	3-4 mm
Feldspar	04-05	-	-	-
Biotite Mica	03-04	-	-	-
Opaque	01	-	-	-
Others	<1	-	-	-

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2. Overall Evaluation

On the basis of mineralogy, textural characteristics, microstructures and modal analysis, the summary of overall evaluation is given in Table-2.

Table-2: Summary of Observations

Aggregate Type	Rock Boulder Particles	
Maximum Size	NA	
Particle Shape	NA	
Cementing Materials	Used clean rock pieces	
Rock Type	Quartzite rock of sandstone group of rocks as per Appendix-C of IS 383-2016.	
Surface Texture	Crystalline	
Inorganic Coating	None	
Organic Coating	None	
Deleterious Materials (Strained quartz, pyrite and other reactive minerals)	Not found	
Expansive Mineral(s)	None	
Condition	Fresh and dense Faintly to Slightly Weathered Highly Weathered	05% 95% None
General Comment	Most of rock pieces found to be moderately hard, faintly weathered to slightly weathered and dense. Grains were interlocked through granular textures in which plane of weakness observed bonding between quartz and other altered minerals. Moreover, plane of weakness was also found along the layering. Grain size was observed larger that may also effect in mechanical properties of rocks. Any kind of deleterious minerals however were not found in the rock particles.	
Concluding Remarks	Overall, rock boulder particles were found in **"Fair to Satisfactory"** condition as per petrographic examination. Since in the rock particles, faintly to slightly weathered particles were mainly found. Alteration in other than quartz minerals was commonly observed. Plane of weakness was also observed along the layering of rock. Hence, **it is recommended to check mechanical properties of the rock particles before use it as construction material.**	

Authorized Signatory

Dr. Mashud Ahmad
Section Head- Concrete Petrography

Note: Enclosed Photomicrographs

Remarks:

1. **DFI-SPR has not drawn the sample and hence does not vouch for its representativeness. The report and comments refer only to the sample tested.**
2. **This petrographic report shall not be reproduced wholly or in part and cannot be used evidence in the court of law without written approval of Dr. Fixit Institute, Mumbai.**

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Photomicrographs

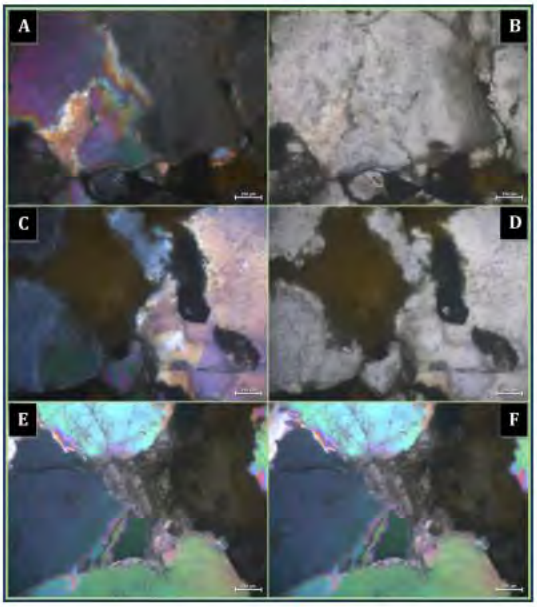

Figure-2: Photomicrographs of slightly weathered quarzitic Rock; **A to F)** Photomicrographs are showing quartz mineral grains along with k-feldspar, biotite mica opaque minerals in altered form. (A, C & E: 5x, XPL and B, D & F: same photomicrographs as A, C & E in PPL). [XPL = Cross polarised light and PPL = Plane polarised light].

Annexure- XVIII

Snippets of The Site Visit

Photographs related to the Water Treatment Plant installed and pH measurement at the intake and outlet

Consent to Established and Consent to Operate displayed at the project site

Batching Plant along with SRC Units

Additive (Xypex) used with SRC to provide water -proofing

Sedimentation tank constructed to collect the discharge water from the Batching and additive units of CP-2 contractor.


Slurry deposited from Sedimentation tank has choaked the nala due to cementing. This needs to be cleared on regular basis.


Stone Quarry Area at Longku

Batching Plant at Longku

Construction Activities at Powerhouse and Dam Site

Discussion with L&T Admin and EHS Staff

Fire Extinguisher at CP-2 Petrol Pump

Vehicles Wash Area at CP-2

Grey water Discharged into Nature at CP-2 labour Camp

Display of Emergency contact and Safety Signages

VR training provided to all workmen and staff to give more insight of safety and environment information. CP-2

Site Visit Photographs at the Transmission Line and Substation area under CP-4

Side slope issues requiring action for protection including measures like Bio-engineering

Progress in Dam Construction during the month of June 2023






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