

अनुसूची -६

Connection Agreement



नेपाल विद्युत प्राधिकरण



पेज (३३)

फेदीखोला हाइड्रोपावर कम्पनी प्रा.लि.



नेपाल विद्युत प्राधिकरण

(नेपाल सरकारको स्वामित्व)

प्रशासन निर्देशनालय

ग्रिड सञ्चालन विभाग

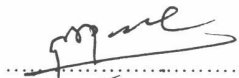
पत्र संख्या : ग्रि.सं.वि./ २०७४/०७५ च.नं.१००६

मिति: २०७५/०१/२५

✓ श्री विद्युत व्यापार विभाग,
ने.वि.प्रा., दरवारमार्ग काठमाडौं।

विषय: कनेक्सन एग्रिमेण्ट पठाईएको बारे।

श्री फेदीखोला हाइड्रोपावर कम्पनी प्रा. लि. बाट प्रवर्द्धित ३.५२ मे.वा. क्षमताको फेदी खोला (थुम्लुङ्ग) जलविद्युत आयोजना बाट उत्पादित विद्युत विद्युतगृह देखि अपर इर्खुवा ज.वि.आ. को स्वीचयार्ड सम्म ११ के.भी. सिंगल सर्किट लाईन तथा तत्पश्चात संयुक्त रुपमा १३२ के.भी. प्रसारण लाईन मार्फत ने.वि.प्रा.को प्रस्तावीत २२०१३२३३ के.भी. खंदवारी सास मा २२० के.भी. मा प्रवाह गर्ने सम्बन्धमा प्रणाली योजना विभाग, ने.वि.प्रा.बाट फेदी खोला (थुम्लुङ्ग) जलविद्युत आयोजनाको Grid Impact Study मिति २०७४/११/०६ मा सम्पन्न भई प्राप्त प्रतिवेदन अनुसार निज प्रवर्द्धक र यस विभाग बिच ने.वि.प्रा. संचालक समितिको मिति २०७३/०४/१२ को ७३४औं बैठकबाट स्वीकृत MOU on Grid Connection को Model Document (प्रविधिक पक्ष मात्र समावेश गरिएको तथा Planned संरचना समयमा सम्पन्न नभएमा हुन सक्ने जोखिम सम्बन्धी आर्थिक पक्ष हरू PPA गर्दा समावेश गर्ने गरी) बमोजीम मिति २०७५/०१/१२ मा MOU on Grid Connection सम्पन्न भएकोले सो को एक प्रति यसै साथ संलग्न गरी आवश्यक कार्याथ पठाईएको व्यहोरा अनुरोध गरीन्छ। साथै मिति २०७४/११/०२ मा कार्यकारी निर्देशक ज्यू बाट स्वीकृत Grid Impact Study प्रतिवेदनको clause 9: Conclusion and Recommendations को बुंदा (i)मा "The issue of Surplus energy needs to be addressed in an urgent basis while concluding PPA's" हुने उल्लेख भएको समेत जानकारीको लागि अनुरोध गरिन्छ।


(प्रकाश सिंह प्रधान)

बोधार्थ:

श्री उपकार्यकारी निर्देशक ज्यू
प्रशासन निर्देशनालय, ने.वि.प्रा. दरवारमार्ग, काठमाडौं।

श्री वृहद प्रसारण लाईन आयोजना २२० के.भी.
ने.वि.प्रा. दरवारमार्ग, काठमाडौं।

श्री ग्रिड विकास विभाग
ने.वि.प्रा. दरवारमार्ग, काठमाडौं।

श्री प्रणाली योजना विभाग
ने.वि.प्रा. दरवारमार्ग, काठमाडौं।

श्री प्रणाली संचालन विभाग
ने.वि.प्रा., स्वीचाटार, काठमाडौं।

श्री फेदीखोला हाइड्रोपावर क.प्रा.लि.
काठमाडौं।

नेपाल विद्युत प्राधिकरण	
योजना अनुगमन तथा स.प्र. निर्देशनालय	
विद्युत व्यापार विभाग	
दर्ता नं.- ४२९९	दर्ता मिति: २०७५/११/२६
(१) श्री विद्युत खरिद कार्याही महाशाखा	
(२) श्री संचारण अनुगमन शाखा	
(३) श्री निर्माण अनुगमन शाखा	
(४) श्री एमएस (५) अन्य.....	
(६) जाँचा गर्ने (ख) छलफल गर्ने (ग) पेश गर्ने	
(घ) काँटोल गर्ने (ङ) परिध्व (च) अन्य.....	

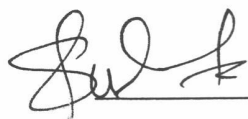
१/२६
२०७५/०१/२५
१/२६

नयाँबानेश्वर, काठमाण्डौ ३४

फोन नं. : ४६२२४४७, ४६२०४८६, ४६२१४६५, ४६२०६१९, फ्याक्स: ४६२०५८६

-Email: gridnea@wlink.com.np

MEMORANDUM OF UNDERSTANDING
ON
GRID CONNECTION
BETWEEN
PHEDIKHOLA HYDROPOWER COMPANY
PVT. LTD.
AND
NEPAL ELECTRICITY AUTHORITY
FOR
PHEDI KHOLA (THULUNG) HYDROPOWER
PROJECT
(3.52 MW)



Kathmandu, Nepal
April, 2018



Table of Content**CONNECTION AGREEMENT****GENERAL CONDITIONS OF MOU**

	Page
	5
1. Definitions	5
2. Interpretation	5
3. Term	6
4. Force Majeures	6
5. Default	7
6. Termination	8
7. Dispute Resolution	8
8. Indemnity	8
9. Good Faith	8
10. Relationship between Parties	8
11. Regulatory Approvals	9
12. Governing Law	9
13. NEA Grid Code Compliance	9
14. Grid Connection Voltage	9
15. SCADA system	9
16. Construction Schedule	9
17. Construction Cost	9
18. Equipment Compatibility	9
19. Equipment Specifications	10
20. Metering arrangements	10
21. Operation and Maintenance	10
22. Shutdown charge	10
23. Amendments	11
24. Other Provisions	11
25. Exhibits and Annexes	11
26. Notices	11-12
27. Project specific conditions	13-15

EXHIBITS

EXHIBIT - 1	16
EXHIBIT - 2	17
EXHIBIT - 3	18
EXHIBIT - 4	19
EXHIBIT - 5	20
EXHIBIT - 6	21
EXHIBIT - 7	22
EXHIBIT - 8	23
EXHIBIT - 9	24
EXHIBIT - 10	25

ANNEXES

ANNEX - 1	26
ANNEX - 2	27
ANNEX - 3	28
ANNEX - 4	29
ANNEX - 5	30
ANNEX - 6	31
ANNEX - 7 (GIS - ANNEX 2)	32




MEMORANDUM OF UNDERSTANDING (MOU)

This Memorandum of Understanding is concluded here in office of the Grid Operation Department Kathmandu, Nepal on 2075/01/12(Nepali calendar) accordingly 2018/04/25(Gregorian calendar) subject to timely completion of the following transmission infrastructures as indicated in the Grid Impact Studies [GIS Report Annex- 2 attached herewith] for the proper power evacuation of the project.

Between

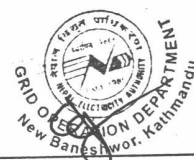
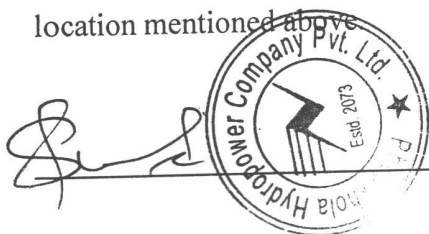
PhediKhola Hydropower Company Pvt. Ltd. (herein after referred as the "Grid User"), duly registered under the Company Act 2063 of Nepal having its head office at Kathmandu, Nepal and represented by its authorized representative, ***Director, Mr. Prakash Chandra Dulal.***

And

Nepal Electricity Authority (herein after referred as the "NEA"), constituted under the Nepal Electricity Authority Act 2041), having its registered office at Durbar Marg Kathmandu, Nepal and represented by its authorized representative, ***Director Mr. Dirghayu Kumar Shrestha*** Grid Operation Department (herein after referred as the Grid Owner).

Whereas, the Grid User has applied for a Power Purchase Agreement with the NEA for purchase by NEA of electricity supplied by the Grid User from ***Phedi Khola(Thulung) Hydropower Project [3.52MW]*** located at Eastern Development Region, Koshi Zone, Bhojpur District, Salpasilicho Gaupalika and desires to interconnect this power station to the NEA Grid at the switchyard of Proposed 220/132/33 kV Khandbari(Tumlingtar) Substation, Bhojpur District, Koshi Zone.

Whereas the Grid Owner agrees to connect the facilities of the Grid User at the location mentioned above



Signatories

In witness whereof, each signatory having been appropriately authorized to enter into this Memorandum of Understanding on behalf of the Party for whom they sign, the Parties have caused this Memorandum of Understanding to be executed by their respective duly authorized representatives.

Signed on behalf of

PhediKhola Hydropower Co. Pvt. Ltd.

Name: Mr. Prakash Chandra Dulal

Designation: Director

Signature:

Company Seal:



Witness on behalf of

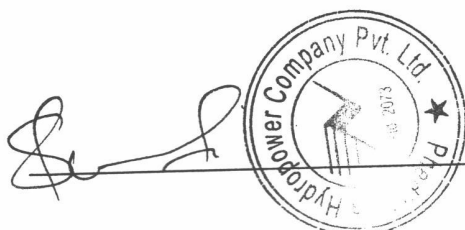
PhediKhola Hydropower Co. Pvt. Ltd.

Name:

Designation:

Signature:

Company Seal:



Signed on behalf of

Nepal Electricity Authority:

Name: Mr. Dirghayu Kumar Shrestha

Designation: Director, GOD

Signature:

Company Seal:



Witness on behalf of

Nepal Electricity Authority:

Name: Mr. Prakash Singh Pradhan

Designation: Manager, GOD

Signature:

Name: Mr. Ananta Upreti

Designation: Asst. Manager, GOD

Signature:



GENERAL CONDITION OF MOU

Now therefore, in consideration of these premises and of the mutual covenants and understandings herein after set forth, the Grid Owner and the Grid User agree to the following:

1. Definitions

All terms appearing in this Memorandum of Understanding with their initial letters in capital shall have the respective meanings as given to them in the NEA Grid Code.

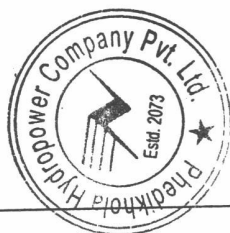
2. Interpretation:

Unless the context of this Memorandum of Understanding otherwise requires;

- a) References to singular include the plural and vice versa;
- b) If there is any contradiction or inconsistency between this Memorandum of Understanding and the Power Purchase Agreement, the latter shall prevail;
- c) If there is any contradiction or inconsistency between the main text and the Exhibits/Annexes herein, the former shall prevail.

3. Term:

- 3.1 The term of this Memorandum of Understanding shall be 365 days from the date of this Memorandum of Understanding unless the term is extended in accordance with Articles 3.2.
- 3.2 Should the Parties sign a Power Purchase Agreement within the term specified in Article 3.1, this Memorandum of Understanding shall automatically become a part of the PPA and the term of this Memorandum of Understanding shall remain effective for the entire term of the PPA and any extension thereof.
- 3.3 Once the Connection is energized, the term of the Memorandum of Understanding shall remain in effect unless the Memorandum of Understanding is terminated pursuant to Article 6 of this Memorandum of Understanding.
- 3.4 Should the term of this Memorandum of Understanding expires pursuant to Article 3.1 or any extension thereof pursuant to Article 3.2, a new Memorandum of Understanding is required for which the prospective Grid User shall submit a fresh application for updating the Grid Impact Study. The Grid User shall bear the cost of this new Impact Study.



4. Force Majeure

- 4.1 Force Majeure denotes those events, which are beyond the reasonable control of a Party and which makes a Party's performance of its obligations under this Memorandum of Understanding impossible or so impractical as reasonably to be considered impossible in the circumstances. Such events include, but is not limited to, abnormal flood, earthquake, lightning strikes, fire, epidemic, war, invasion, riot, civil disturbance, sabotage, explosion, military or usurped power, strikes, lockouts or other industrial actions (except where such strikes, lockouts or other industrial actions are within the power of the Party invoking the Force Majeure).
- 4.2 Force Majeure shall not include (a) any event which a Party could have reasonably foreseen at the time of this Memorandum of Understanding, (b) any event which is the result of the negligence or intentional action of a Party, (c) any event which could have been avoided or overcome during the course of a Party's performance under this Memorandum of Understanding and (d) insufficiency of funds to undertake its performance under this Memorandum of Understanding.
- 4.3 A Party claiming Force Majeure may not be considered to be in default pursuant to Article 5 and the Memorandum of Understanding may not be terminated if the Force Majeure event is of a temporary nature (not exceeding six months) and the affected Party is making all reasonable efforts with due diligence to end or mitigate the consequences of the Force Majeure event and to resume its performance under this Memorandum of Understanding as soon as possible.
- 4.4 A Party claiming Force Majeure shall notify in writing the other Party of such a Force Majeure event as soon as possible but in any event not later than seven (7) business days following the occurrence of the event along with the evidence of the nature and cause of the event and an estimate of time likely to be required for resumption of its performance. Similarly, the affected Party shall promptly provide the other Party a written notice of the cessation of the Force Majeure event.
- 4.5 The Memorandum of Understanding may be terminated if a Force Majeure event continues for more than six (6) months.
- 4.6 In case the Grid User is an IPP, the relevant provisions in the PPA shall also govern regarding article 4.

5. Default

- 5.1 A Grid User shall be in default under any one or more of the following conditions:



- a) The Grid User fails to comply with the provisions in this Memorandum of Understanding;
- b) The Grid User persistently fails to remedy situations, whenever called for;
- c) The Grid User fails to provide reasonable assurance of its ability to perform its duties;
- d) Representation or warranty made herein by the Grid User is not true or correct;
- e) Permits, licenses and other governmental/regulatory authorizations required for construction, installation and operation of the Grid User's facilities expire or are cancelled by the concerned authorities;
- f) In case the Grid User is a customer of the NEA, the Grid User fails to comply with the rules and regulations of the NEA;
- g) In case of IPP's, the Grid User is in default under the relevant provisions of the PPA.

5.2 In case the Grid User is judged to be in default pursuant to Article 5.1, the Grid Owner shall serve a notice to the defaulting Party citing the reason(s) for the default and providing not less than six (6) business days following receipt of the notice to rectify the problem, if rectifiable. The Grid Owner shall terminate this Memorandum of Understanding if in its opinion the Grid User has failed to remedy the problem to the reasonable satisfaction of the Grid Owner. However, the Grid Owner may grant reasonable time extension, if in its opinion the Grid User has made diligent effort to remedy the default and the Grid User would be able to rectify the default within the given time extension.

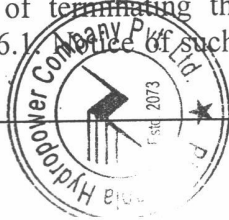
6. Termination:

6.1 This Memorandum of Understanding shall be terminated under any one of the following conditions:

- a) Upon mutual agreement in writing to terminate this Memorandum of Understanding;
- b) Upon the conditions stipulated in the NEA Grid Code;
- c) Upon default of a Party pursuant to Article 5 (Default);
- d) Upon a Force Majeure event pursuant to Article 4 (Force Majeure);
- e) Upon the conditions of termination stipulated in the Power Purchase Agreement.

The Grid Owner shall terminate this Memorandum of Understanding pursuant to Article 6.1, by issuing a 30-day's notice to the Grid User terminating its use of the Grid under this Memorandum of Understanding and requiring the Grid User to disconnect its facilities at the Connection Point in accordance with the Grid Owner's instructions specified in the letter or as provided later.

The Grid Owner reserves the right, as an interim measure, to suspend its services, partially or completely, to the Grid User at the Connection Point instead of terminating the Memorandum of Understanding pursuant to Article 6.1. Notice of such suspension shall be served to the Grid User and



this notice shall also include period of suspension and any other necessary information.

7. Dispute Resolution

Any dispute, claim, or differences arising under or in connection with this Memorandum of Understanding shall be settled through the dispute resolution procedures prescribed in the PPA.

8. Indemnity

The Parties shall indemnify, defend and hold harmless each other, including their respective employees, agents, contractors, subcontractors, against any claim, loss or liability or any indirect or consequential damages under or in connection with this Memorandum of Understanding, including loss or injury suffered by that Party or its employees, agents or subcontractors, loss of profit, loss of revenue, cost of capital, cost of purchased or replacement capacity or energy and loss of use of any property, facilities or equipment where such claim, damage or liability arises from the failure to operate the Grid or a Connected facility.

In case the Grid User is an IPP, the provisions in the PPA shall govern. If the PPA does not have these provisions then in such case this MOU shall be applicable.

9. Good Faith

The Parties shall act in good faith in relation to the performance and implementation of this Memorandum of Understanding and to take such other reasonable measures as may be necessary for the realization of their objectives.

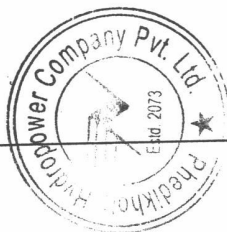
10. Relationship between Parties

10.1 Nothing in this Memorandum of Understanding is intended, nor shall it be construed or interpreted as creating an association, joint venture or partnership between the Parties or to impose any partnership obligations or liabilities upon either Party.

10.2 Neither Party shall have any right, power or authority to enter into any agreement or undertaking for or on behalf of, to act as or be an agent or representative of, or to otherwise bind the other Party.

11. Regulatory Approvals

Each Party shall be responsible for obtaining any government/regulatory approvals necessary for performance under this Memorandum of Understanding. The Parties shall cooperate with and assist each other as reasonably necessary in seeking the necessary approvals.



12. Governing Law

This Memorandum of Understanding shall be governed by the laws of the Nepal Government.

13. NEA Grid Code Compliance

The Grid User shall comply with the NEA GRID CODE 2005(amended and future amendment(s) if any) except as stated otherwise in this Memorandum of Understanding.

14. Grid Connection Voltage

The facilities owned by the Grid User shall be connected to the NEA Grid at the Delivery Point at 132 kV voltage level.

15. SCADA system

The Grid User shall install SCADA system as per the requirements of NEA Grid Code which shall be compatible with NEA's existing system.

16. Construction Schedule

Grid User shall be responsible for having the connection facilities ready for energizing within the time specified in the PPA .

17. Construction Cost

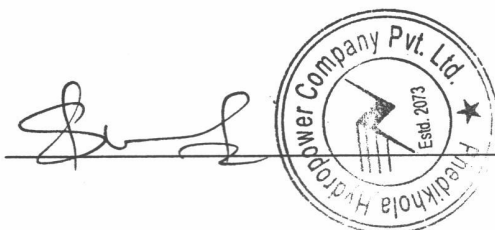
Grid User shall bear the cost for design, procurement, construction, installation, commissioning and all other related works of the connection facilities.

18. Equipment Compatibility

The Grid User shall provide equipment compatible (similar/matching the existing equipment, panels etc in clearance, appearance and function) with those in Grid Owner's Substation equipment, where such compatibility is necessary to ensure proper operation of the facilities. Such equipment are generally related to, but not limited to, protection relays, communication, telemetry and control mechanism.

19. Equipment Specification

The Grid User shall provide, in addition to the standard ratings, data on operational technical limits of major equipment such as capability of generators, time versus frequency characteristics of turbines and their cavitation zones, maximum current rating, etc.



20. Metering arrangements

20.1 For Generators, including IPP's with total installed capacity exceeding 5 MW.

The Grid User shall install Main and Check meters with accuracy class 0.1 at the Delivery Point. The accuracy class of the instrument transformers shall be 0.2.

The Check Meter shall be supplied from a secondary core of CT & PT separate from the one feeding supply to the Main Meter.

20.2 For Generators, including IPP's with total installed capacity equal to or less than 5 MW.

The Grid User shall install Main and Check meters with accuracy class 0.2 at the Delivery Point. The accuracy class of the instrument transformers shall be 0.5. The Check Meter shall be supplied from a secondary core of CT & PT separate from the one feeding supply to the Main Meter.

21. Operation and Maintenance

21.1 The necessary operation and maintenance of the Grid User's Connection Facilities (including the Transmission Line from the Project up to the Delivery Point, communication equipment and the SCADA system up to the Delivery Point) shall be performed by the Grid User.

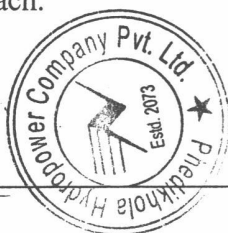
21.2 Operation of the control and relay panels associated with the Grid User's Connection Facilities (limited to switching, resetting of relays, auxiliaries and data recording) shall be taken care by the Grid Owner.

22. Shutdown Charge

The Grid User shall pay shutdown charge to NEA as per NEA rules during interconnection of the Project. The Grid user shall apply to Grid Owner for the shutdown at least 15 days before the requested date of shutdown.

23. Amendments

This Memorandum of Understanding may be amended or modified in writing agreed and duly signed by authorized representatives of the both Parties. No breach of any covenant, agreement, representation or warranty made herein shall be deemed waived unless expressly stated in writing. The waiver or breach of any term or provision of this Memorandum of Understanding by any Party shall not be construed as a waiver of any subsequent breach.



24. Other Provisions

Additional provisions may be incorporated herein as deemed necessary at the time of concluding this Memorandum of Understanding.

25. Exhibits And Annexes

All Exhibits and Annexes attached herein form an integral part of this Memorandum of Understanding and the Memorandum of Understanding shall be construed in the light of such Annexes and Exhibits. This Memorandum of Understanding includes following attached Annexes and Exhibits:

EXHIBIT 1: Facility Location Map
EXHIBIT 2: User's System Single Line Diagram
EXHIBIT 3: Interconnection Facilities Single Line Diagram
EXHIBIT 4: Protection Scheme/Settings
EXHIBIT 5: Transformer Connection and Grounding
EXHIBIT 6: SCADA and Communication Scheme
EXHIBIT 7: Interconnection Implementation Schedule
EXHIBIT 8: Fixed Assets Boundary
EXHIBIT 9: Maintenance Program
EXHIBIT 10: Metering Scheme
ANNEX 1: Description of User's Facility
ANNEX 2: Committed Project Planning Data
ANNEX 3: Registered Equipment Data
ANNEX 4: Authorized Representatives
ANNEX 5: Exceptions to Grid Code Requirements
ANNEX 6: Survey License and Company Registration Certificate
ANNEX 7: GIS-ANNEX 2

26. Notices

- 26.1 Any notice, demand, request, authorization, direction or communication related to this Memorandum of Understanding shall be given in writing. All communications by a Party shall be deemed delivered when received by the other Party.
- 26.2 The delivery of such communications may be by hand, registered mail, courier that provides evidence of delivery or facsimile.
- 26.3 All notices to the Grid Owner shall be addressed as follows:

*NEA, Grid Operation Department
Transmission Directorate, NEA
Kathmandu, Nepal
Tel :-4620619
Fax :-4620586*

- 26.4 All notices to the Grid User shall be addressed to:



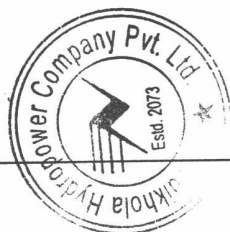
M/S PhediKhola Hydropower Co. Pvt.Ltd.

Kathmandu, Nepal

Tel:- 9851221372

Fax:-

- 26.5 Either Party may change its address for notices specified above or the persons to whom it notices should be given, by notice to the other Party in the manner provided above.
- 26.6 The minutes of meeting dated **25th April, 2018 (Baishak 12th, 2075B.S)** between Grid Owner and the Grid User is the part of this Memorandum of Understanding.



27. PROJECT SPECIFIC CONDITIONS**MINUTES OF MEETING**

A meeting was held on 25th April 2018 (12th Baishak, 2075) between Grid Operation Department, NEA(hereinafter called the "Grid Owner") and M/S PhediKhola Hydropower Co.Pvt. Ltd., Kathmandu, Nepal(hereinafter called the "Grid User") regarding Power Evacuation Issues of the 3.52 MW Capacity Phedi Khola(Thulung) Hydropower Project (hereinafter called the Project).

Grid User Representatives:

1. Mr.Prakash Chandra Dulal
Director

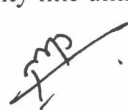
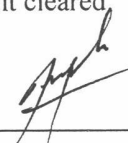
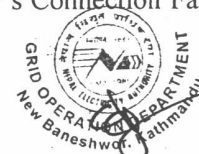

Grid Owner Representatives:

1. Mr. Dirghayu Kumar Shrestha
Director,GOD
2. Mr. Prakash Singh Pradhan
Manager,GOD
3. Mr. Ananta Upreti
Asst. Manager,GOD


AGREED POINTS

The Grid Owner has reviewed the application for Connection Agreement proposal submitted by the Grid User. The Grid Owner and the Grid User had a meeting for Power Evacuation Issues of the Project to be developed by the Grid User and agreed as follows:

1. The Delivery Point of the Project shall be 220 kV Bus Bar of Proposed **220/132/33kV Khandbari(Tumlingtar) Substation of NEA.**
2. The Connection Point of the Project shall be Bus Bar at Switchyard of Upper Irkhuwa Hydropower Project.
3. The Grid User shall build **approximately 5 km long 11 kV Single Circuit Transmission Line** using **ACSR "Dog"** to evacuate its Power to switchyard of Upper Irkhuwa Hydropower Project(14.5MW) then a common 132kV transmission to Proposed **220/132/33kV Khandbari(Tumlingtar) Substation of NEA.**
4. The Grid User needs to install required bay and other necessary equipment at its own cost.
5. The Grid User's Connection Facilities have been as shown in EXHIBIT-3 of the Memorandum of Understanding.
6. The Grid User shall submit the drawings and specifications of the equipment to the Grid Owner and Power Trade Department for approval. The Grid user shall also submit the data of the equipment as per the NEA GRID CODE before commissioning of the Project.
7. In case of any line fault on the Transmission Line (from the Project up to the Delivery Point), the Grid Owner shall inform and isolate the Grid User's Connection Facilities from the Grid User's faulty line until the fault cleared.

8. The transient stability analysis of the Project will be carried out by System Planning Department of NEA and if any necessary reinforcement is required in NEA Grid shall be carried out by the concerned party (NEA or Grid User). *[Not Applicable]*

9. Other Provisions:

9.1 The Project will only be connected at 132 kV Bus of the Proposed 220/132/33 kV Khandbari(Tumlingtar) Substation in FY 2022/23 AD provided all the conditions specified below in clauses 12.1.1 to 12.1.2 are met or satisfied:

9.1.1 The following Transmission Line and Substation Projects complete and commission before commissioning of the 3.52MW Capacity Phedi Khola Hydropower Project :

- Completion and Commissioning of Tumlingtar(Khandbari) - Baneswor -Basantapur-New Duhabi 220kV Double Circuit Transmission Line and associated Substations.
- Completion and commissioning of 132kV Common transmission line from Switchyard of Upper Irkhuwa Hydropower Project to Khandbari Substation.

9.1.2 The Grid User agrees to abide by the dispatch instruction (Scheduling and Dispatching of Generator/Generation to avoid overloading of the system) of NEA's Load Dispatch Center (LDC) during following periods and Cases:

- i. The developer shall agree to abide by the dispatch instruction of NEA's Load Dispatch Center (LDC) from FY 2022/23 AD to FY 2024/25 AD as the loading of one circuit of 400kV Dhalkebar-Muzaffarpur transmission line is beyond 120% with the outage of other circuit during Wet Period.
- ii. From FY 2022/23 to FY 2024/2025, Dhalkebar-Muzaffarpur 400kV double circuit line is overloaded in Normal case for wet off Peak period. So the developer of Phedi Khola Hydropower Project (3.52MW) shall agree to abide by the dispatch instructions of NEA's Load Dispatch Center in wet Off Peak Period normal case also.
- iii. GIS is carried out by assuming the Second Cross Border 400kV double circuit (New Butwal-Gorakhpur transmission line) will be completed by FY 2025/26. In case in the absence of Second Cross Border 400kV double circuit (New Butwal-Gorakhpur transmission line), the developer of Phedi Khola Hydropower Project (3.52MW) shall agree to abide by dispatch instruction of NEA's Load Dispatch Center from FY 2025/26 onwards in Wet Period as the loading of one circuit of 400kV Dhalkebar- Muzaffarpur transmission line is beyond 120% and in wet off peak period in normal case.



- 9.2 The developer constructs approximately 3 km long 11 kV Single Circuit Transmission Line using ACSR "Dog" to evacuate its Power to switchyard of Upper Irkhuwa Hydropower Project(14.5MW) then a common 132kV transmission to Proposed 220/132/33kV Khandbari(Tumlingtar) Substation of NEA. The Mutual Agreement between Phedikhola Hydropower Company Pvt. Ltd. and Arati Power Company Ltd. should address the issues of Common 132 Transmission Line, Losses and Metering.
- 9.3 NEA bears no responsibility due to delaying of construction of common 132kV Single Circuit ACSR "Dog" Conductor transmission line to NEA's Proposed 220/132/33kV Khandbari(Tumlingtar) Substation of NEA.
10. The Grid User shall pay the following Rental charge and operation charge to NEA effective from the Commercial Operation Date (COD) of the project.
- NRs. 216,000.00 (Nepalese Rupees two hundred sixteen thousand only) per year per Bay, if NEA provides land to the Grid User for the construction of 132 kV Bay at the connection point.
 - NRs. 108,000.00 (Nepalese Rupees One hundred eight thousand only) per year per Panel for providing space to install the Grid User's Control Panel.
 - NRs. 108,000.00 (Nepalese Rupees One hundred eight thousand only) per year per Panel for the operation charge of the Grid User's Control and Relay Panel.
11. The Grid User shall pay shutdown charge to NEA as per NEA rules during interconnection of the Project. The Grid User shall apply to Grid Owner for the shutdown at least 15 days before the actual date of shutdown.
12. The financial impacts related to:
- Transmission System infrastructures and their permissible loading issues.
 - Non/Late commissioning of transmission line and associated Substations.
 - System operation and Power/Energy Dispatch issues.
- shall be specified in the Power Purchase Agreement(PPA).
13. Both parties agreed on above clauses and the NEA GRID CODE 2005(amended) governs this MOU.

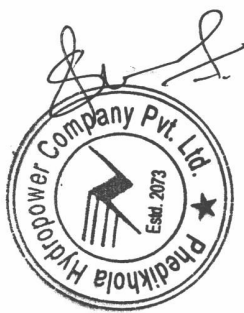
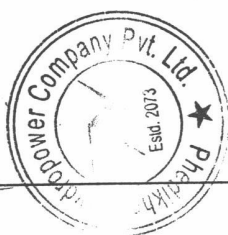
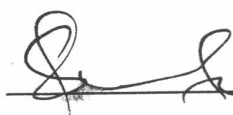


EXHIBIT – 1
FACILITY LOCATION MAP

This Exhibit shall be a geographical map indicating the locations of the User System, the proposed Connection and Delivery Point and the approximate alignment of the transmission/sub-transmission line between the User System and the Connection Point.

Refer Exhibit -1, Attachment



3030000N

Gainkharka
3 km

29

27°22'30"

27°22'30"

28

27

26

25

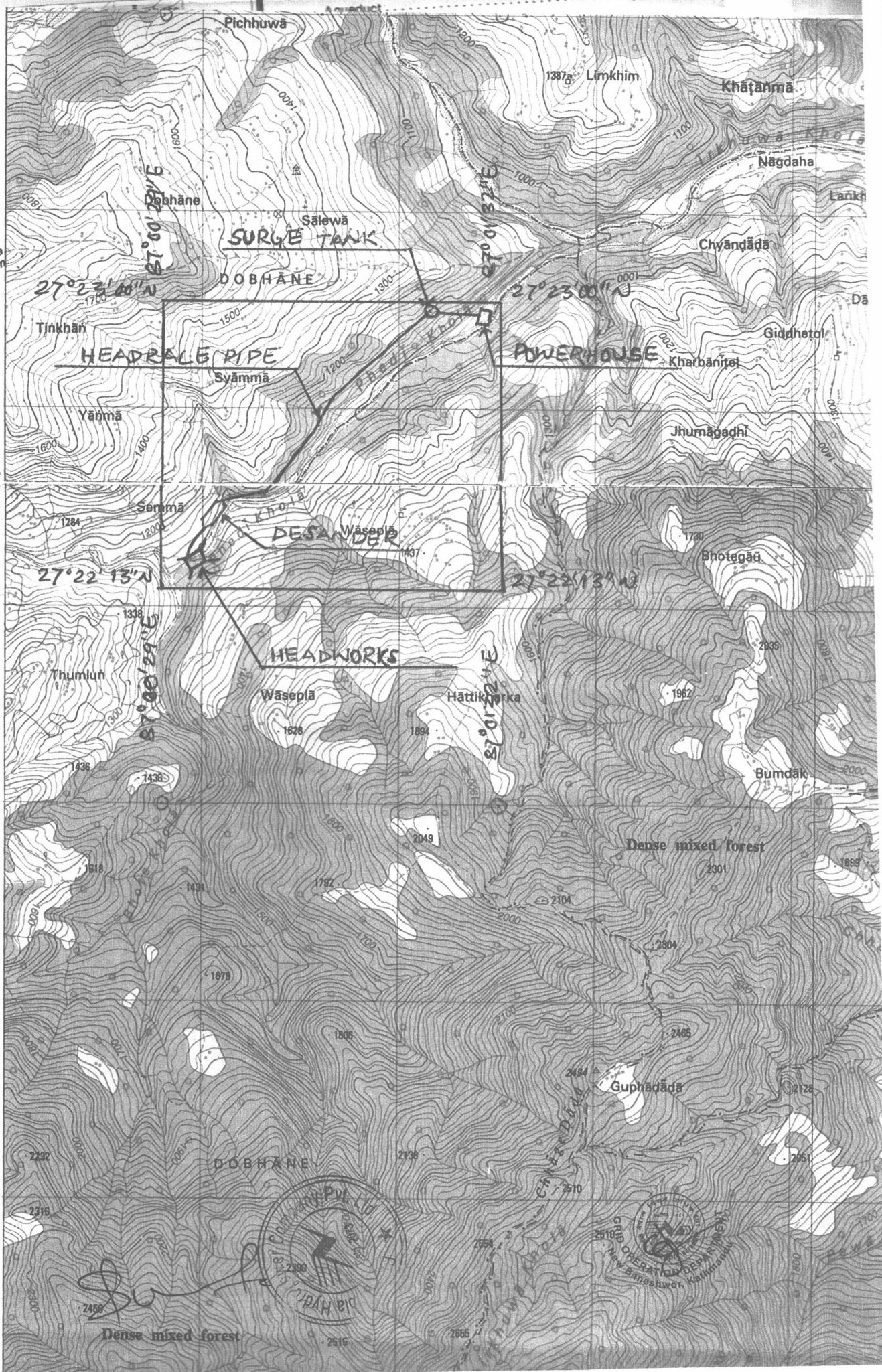


EXHIBIT – 2
USER'S SYSTEM SINGLE LINE DIAGRAM

This Exhibit shall provide a single line diagram showing circuit connections of all major equipment and related devices in the User System in accordance with Article 5.9 of the NEA Grid Code. Before energizing the Connection Point, this single line diagram shall be updated to reflect any changes. At the same time each equipment and device shall be numbered and labeled in accordance with the numbering and nomenclature protocol provided by the Grid Owner in accordance with Article 5.11 of the NEA Grid Code.

Refer Exhibit -2, Attachment

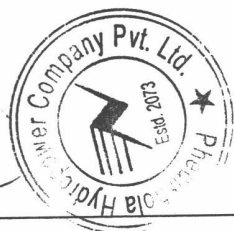
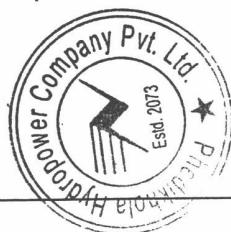





EXHIBIT - 3
CONNECTION/DELIVERY POINT DIAGRAM

This Exhibit shall provide a composite single line diagram for the entire Connection/Delivery Point showing circuit connections of all major equipment and related devices on Grid User's side as well as the Grid Owner's side of the Connection Point in accordance with Article 5.9 of the NEA Grid Code. Before energizing the Connection Point, this single line diagram shall be updated to reflect any changes. At the same time each equipment and device shall be numbered and labeled in accordance with the numbering and nomenclature protocol provided by the Grid Owner in accordance with Article 5.11 of the NEA Grid Code.

Refer Exhibit-3, Attachment



Proportional Transmission Line loss Calculation of upper Irkhuwa HPP and Phedi Khola HPP

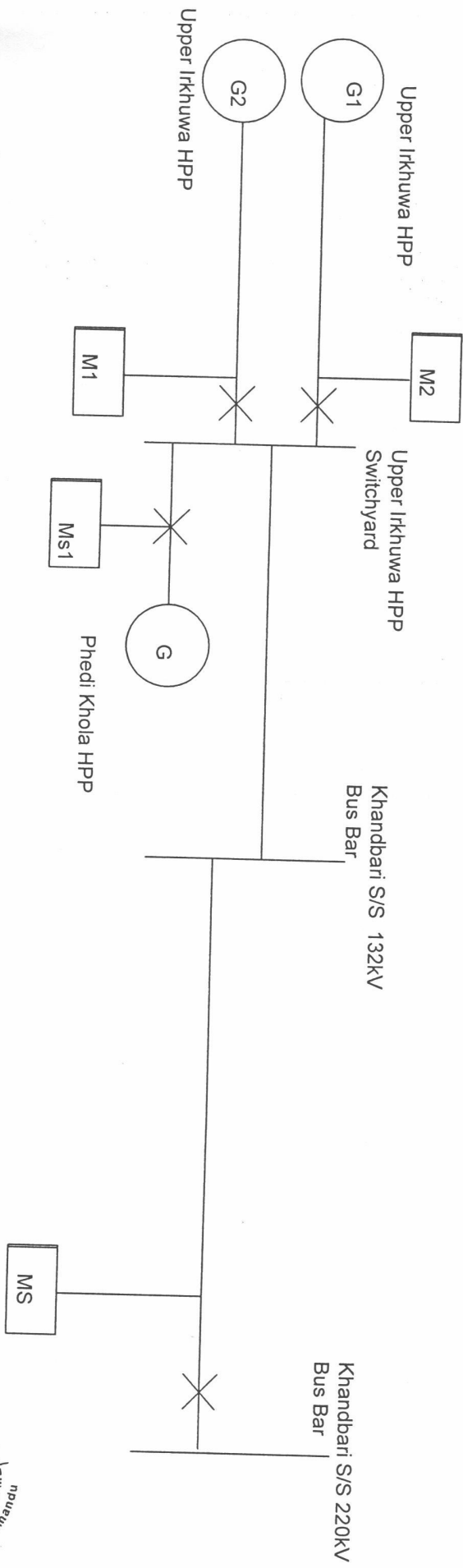


EXHIBIT - 4 PROTECTION SCHEME

The principal protection schemes in the User System as well as at the Connection Point shall be shown in this Exhibit in accordance with Article 5.7 of the NEA Grid. Exact fault clearance settings of various protection relays shall be provided prior to the actual connection pursuant to Article 5.4.6 of the NEA Grid Code.

Protection Scheme at the Generator's System:-

Each Generator's System shall have following minimum Protection:

- a. Each generating unit shall be provided with protection against pole slipping, loss of excitation, over current, earth fault, out of step and frequency and Breaker Failure Relay as back up as specified in Article 5.7.2 of NEA Grid Code.
- b. Generator Transformer shall be protected with differential relay, restricted earth fault relay and over current & earth fault relay as backup as specified in Article 5.7.5 of NEA Grid Code.
- c. 132kV transmission line shall be protected by 145kV switchgear with directional over current/ earth fault and breaker failure relay as backup protection.
- d. The Circuit breaker shall have facilities of three-pole tripping with single shot auto-reclosure.
- e. The Grid User shall provide additional protection as per Best Industry Practice.

Protection Scheme at the Connection Point/Delivery Point :-

Equipment at connection Point shall have following minimum Protection:

- a. Protection scheme at the Connection Point/Delivery point is shown on the drawing attached in Exhibit-3
- b. The Grid User agrees to meet the protection requirement as specified in Article 5.7 of the NEA Grid Code and Provide minimum protection as specified in Article 5.7.3, and Article 5.7.5.
- c. The Grid User shall provide additional protection as per Best Industry Practice.



EXHIBIT - 5
TRANSFORMER CONNECTIONS AND GROUNDING

Connection and grounding of each power transformer in the User System and at the Connection Point shall be shown in this Exhibit. The value of the grounding resistance shall be provided prior to the energizing the Connection.

Shall be provided during detail planning.



EXHIBIT - 6
SCADA AND COMMUNICATION SCHEME

Communication scheme, telemetry and control mechanism in the User system at the Connection Point shall be indicated in this Exhibit in accordance with Articles 5.4.6 and 6.9 of the NEA Grid Code.

The Grid User shall install dedicated telephone lines for communication and facsimile.

The Communication scheme, telemetry and control mechanism in the user system shall be in accordance with Article 5.4.6 & 6.9 of NEA Grid Code.



EXHIBIT - 7
INTERCONNECTION IMPLEMENTATION SCHEDULE

Scheduled completion and commissioning dates, including the Connection date, of various facilities in the User System and the Connection shall be indicated in this Exhibit in accordance with Article 5.4 of the NEA Grid Code. The assumptions on which the schedule is based shall be clearly spelt out.

Refer Exhibit-7, attachment.






EXHIBIT - 7
INTERCONNECTION IMPLEMENTATION SCHEDULE

Scheduled completion and commissioning dates, including the Connection date, of various facilities in the User System and the Connection shall be indicated in this Exhibit in accordance with Article 5.4 of the NEA Grid Code. The assumptions on which the schedule is based shall be clearly spelt out.

Refer Exhibit-7, attachment.





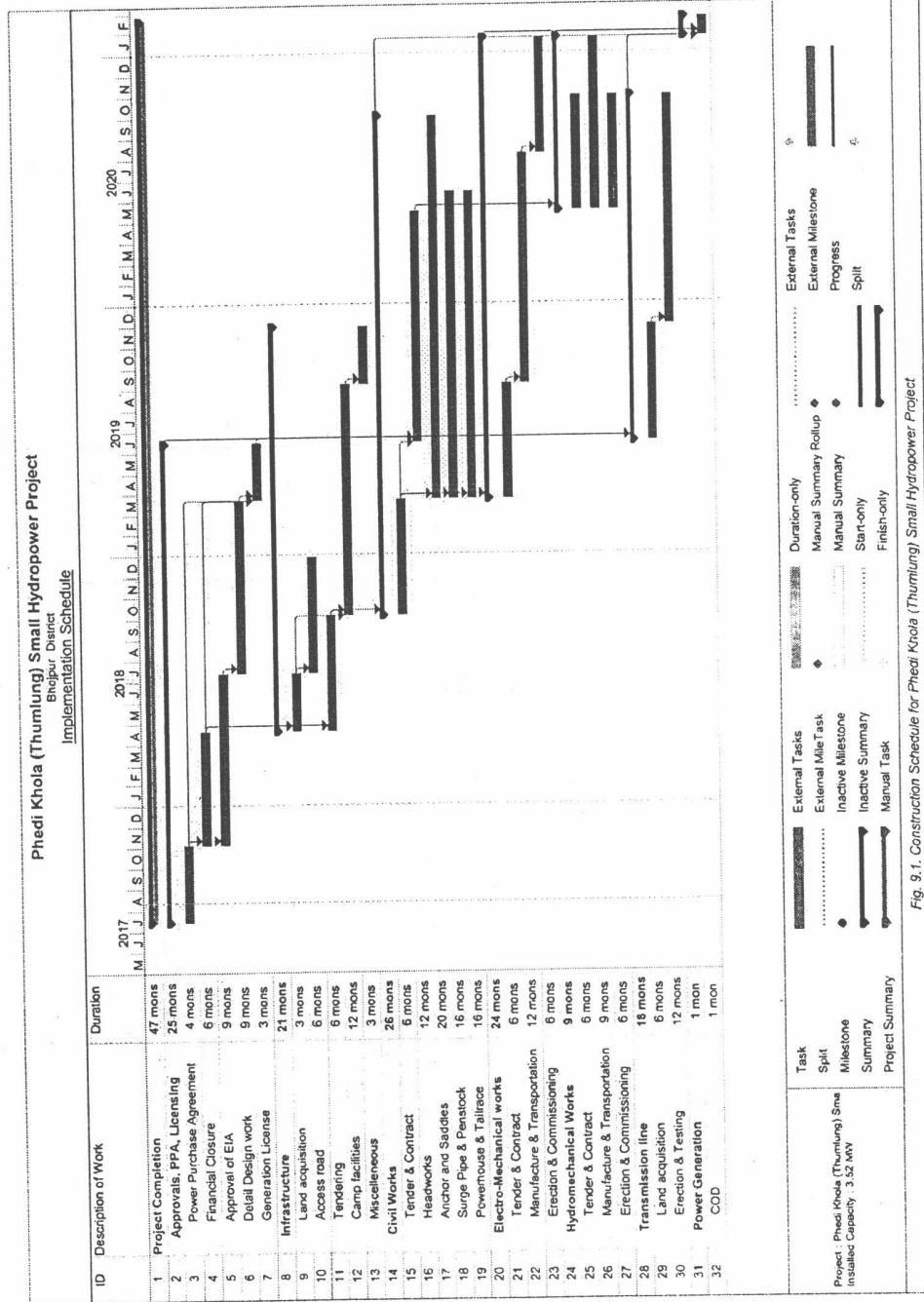



Figure 9-1: Implementation schedule of Phedi Khola (Thumlung) Hydropower Project

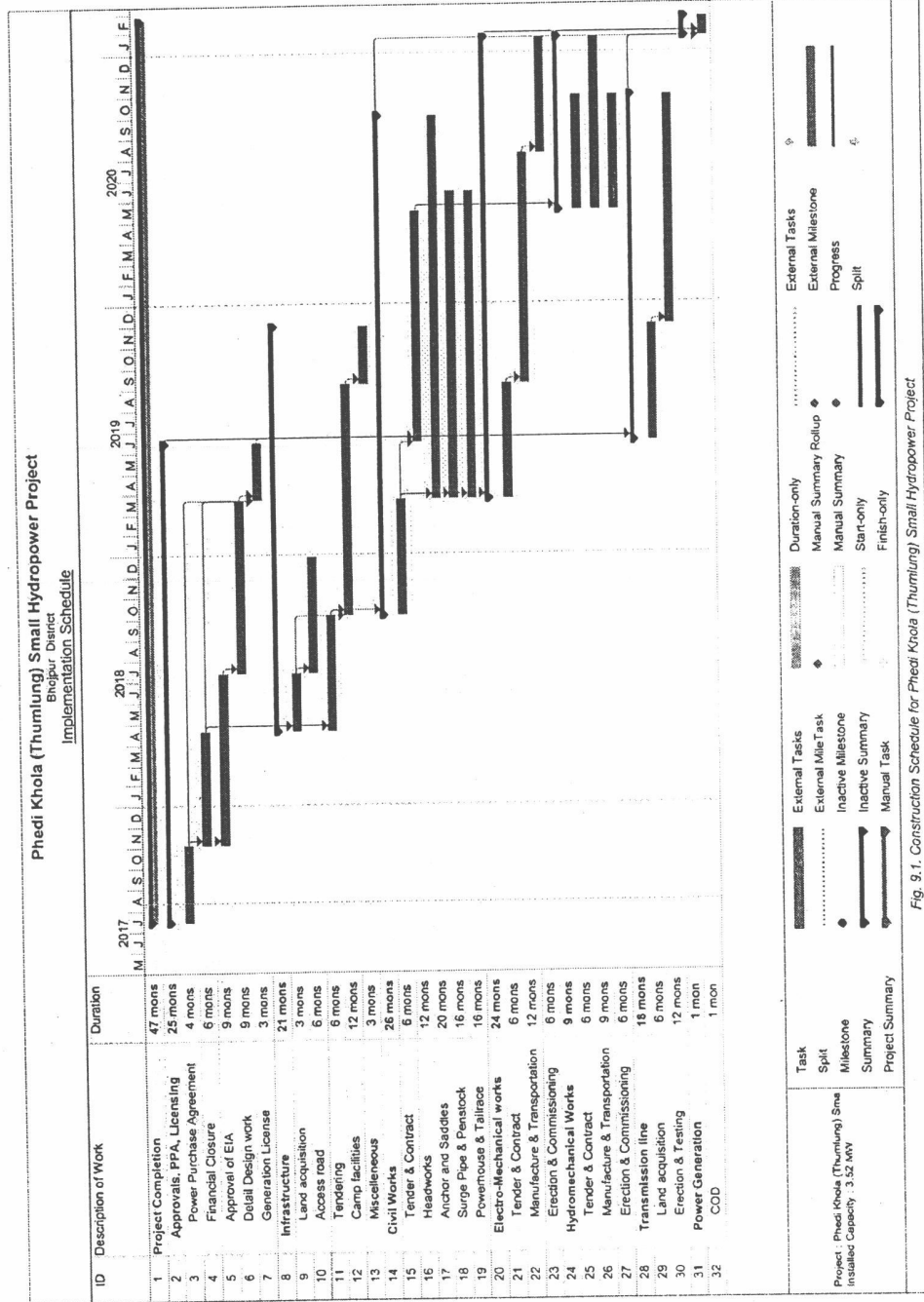


Figure 9-1: Implementation schedule of Phedi Khola (Thumlung) Hydropower Project

EXHIBIT - 8
FIXED ASSETS BOUNDARY

This Exhibit shall clearly show the demarcation of the ownership and the responsibility for control and operation of the equipment and devices (including metering, communications and any lines or cables emanating from each of the owner's side) at the Connection Point in accordance with Article 5.8 of the NEA Grid Code. This Exhibit shall be provided two weeks prior to the Completion Date.

1. The necessary construction, operation and maintenance of the 132 kV transmission line up to Connection Point and construction & maintenance of all the equipment (Line Bay with associated equipment) at the Connection/Delivery Point shall be carried out by the Grid User itself.
2. Operation of the control and relay panels (limited to switching, resetting of relays, auxiliaries and data recording) at the Connection/Delivery Point shall be taken care by Grid Owner. Necessary maintenance and replacement of equipment shall be in the scope of Grid User.

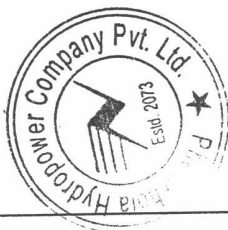


EXHIBIT – 9 MAINTENANCE PROGRAM

This Exhibit shall show the maintenance schedule for the facilities at the Connection Point. This program shall be submitted prior to energizing the Connection in accordance with Article 5.8.1 of the NEA Grid Code.

Maintenance and replacement of the Switchgear, Relay and Control Panels, equipment and all other relevant accessories supplied and installed by the Grid User shall be carried out by the Grid User itself. However operation of the control & relay panels (limited to Switching, resetting of relays and auxiliaries and data recording) shall be taken care by Grid Owner. In addition to this Grid Owner shall inform to Grid User having noticed of any abnormal condition, which does not come under the scope of Grid Owner.



EXHIBIT - 10 METERING SCHEME

Metering arrangements in the User System and at the Connection shall be indicated in this Exhibit in accordance with Chapter 9 of the NEA Grid Code.

Metering scheme is shown on the Connection Point Diagram Exhibit-3 Attachment.

- a. The Delivery Point shall be the 132kV bus bar of Proposed 220/132/33kV Khandbari Substation of NEA. The Grid User needs to install necessary bays and other necessary equipment at its own cost at the Proposed Khandbari Substation for the interconnection of project with the INPS.
- b. Grid User shall install the Main and Check energy Meters of accuracy class 0.1 at the Delivery Point as shown in Exhibits 2 and 3.
- c. The Main and Check Meters shall be supplied from the different secondary cores of CT and PT of accuracy class 0.2.
- d. Billing of energy of Phedikhola HPP(3.52MW) will be done by deducting Transmission loss from Upper Irkhuwa HPP switchyard to NEA Proposed 220/132/33 kV Khandbari Substation proportional to energy recorded by meter of Phedikhola HPP w.r.t. total energy recorded by meter of Phedi Khola HPP at switchyard of Upper Irkhuwa HPP and Upper Irkhuwa HPP at Upper Irkhuwa HPP switchyard.

$$\text{Total Transmission loss}(T_L) = (M_{S1} + M_{S2}) - M_S$$

$$\text{Transmission loss of Phedikhola HPP} = T_L / (M_{S1} + M_{S2}) \times M_{S1}$$

M_S : Energy recorded by meter at Khandbari Substation.

M_{S1} : Energy recorded by meter of Phedikhola HPP at Substation of Upper Irkhuwa HPP.

$M_{S2} = (M_1 + M_2)$: Energy recorded by meters of Upper Irkhuwa hydropower project at Substation of Upper Irkhuwa hydropower project (as shown in diagram.)

M_1 : Energy recorded by meter at Generator (G1) of Upper Irkhuwa hydropower project.

M_2 : Energy recorded by meter at Generator (G2) Upper Irkhuwa hydropower project.

$$\text{Transmission Loss of Upper Irkhuwa HPP} = T_L / (M_{S1} + M_{S2}) \times M_{S2}$$

- e. Provisions for sealing of the 3 sets of energy meters including secondary terminals of instrument transformers shall be made by both parties for preventing unauthorized use.
- f. The burden of instrument transformers shall comply with the Grid Code as described in Chapter 9.



ANNEX - 1

DESCRIPTION OF GRID USER'S FACILITIES

The Grid User shall herein provide a brief description of User's facilities, the reasons for grid connection requirement, salient features, including current proposed capacity of plant and any expansion plan, financing scheme, construction schedule, etc.

The Phedi Khola Hydropower Project(3.52MW) is a run-off-river project and uses the water of Phedi . The Project is located at Koshi Zone, Bhojpur District, Salpasilicho Gaupalika of Eastern Development Region of Nepal. The geographical co-ordinates of the project location are 27°22'58"N-27°24'17"N and 87°01'33"E-87°03'51"E .

Project is designed with Design discharge of 2.61m³/s. Its catchment area is about 58.26 km² in intake site. The designed capacity of this Project is 3.52MW with 2 units of synchronous brushless generators. The capacity of each generator to be provided is 2.07MVA generating at 6.3kV with 0.85 pf.

Power Evacuation Scheme

The developer constructs approximately 3 km long 11 kV Single Circuit Transmission Line using ACSR "Dog" to evacuate its Power to switchyard of Upper Irkhuwa Hydropower Project(14.5MW) then a common 132kV transmission to Proposed 220/132/33kV Khandbari(Tumlingtar) Substation of NEA.

The Construction period is 3 years.

Refer Annex-1 Attachment:



ANNEX - 2 EQUIPMENT SPECIFICATIONS

The Grid User shall herein provide specifications of major equipment in the User System and at the Connection. Such major equipment shall include, but not be limited to, turbine, governor, generator, excitation system, automatic generation control, automatic voltage regulator, black start capability, power system stabilizer, transformer, circuit breakers, switchgears, isolators, current and voltage transformers, communication, telemetry and control equipment, major relays, energy meters, etc. The specification shall incorporate manufacturer's standard ratings as well as technical limits of the equipment such as generator capability, turbine capitation zones, etc. in accordance with Article 5.4.6 of the NEA Grid Code.

Refer Annex-2, Attachment



EQUIPMENT SPECIFICATIONS

Turbine

Type	: Horizontal Axis, pelton
Number	: Two (2)
Rated Output Capacity per Unit	: 1.81MW
Efficiency	: 91 %
Net Head	:154.84 m
Discharge per unit	: 1.305cubic m

Governor

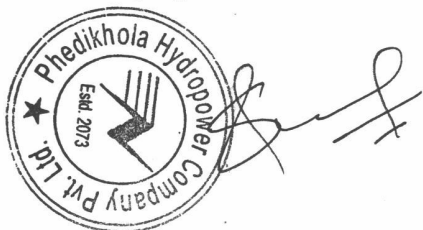
Type	: Electronic with PID flow
Speed Droop	: Between 0 to 5%

Generator

Type	: Synchronous, Three phase
Nos of Unit	: Two (2)
Rated output capacity per unit	: 2.07MVA
Power factor	: 0.85
Generating Voltage	: 6.6kV
Speed	: 750rpm
Frequency	: 50 Hz.
Excitation system	: Brushless
Efficiency	: 97 %

Transformer

Type	: - 3 Phase, Oil Immersed, Outdoor
Cooling Type	: ONAN
No. of Units	: 1(one)
Rated capacity per Unit	: 5,000kVA
Voltage ratio	: 11/6.6kV



Efficiency

: 99 %

11kV Switchgear

a) 11kV Circuit Breaker

The technical details of SF6 will be as follows:

Type

VCB

Gas circuit breaker, 3-phase, single throw in operation, Outdoor

Voltage rating:

Nominal system voltage 11kV

Rated maximum voltage 12kV

Current rating:

Rated continuous current 1250A

Rated short circuit breaking current 40 kA

One min. power frequency withstand voltage (rms) 28kV

Impulse withstand voltage (peak) 75kV

Frequency 50 Hz

Re-closing duty cycle 0-0.3sec-CO-3min-CO

b) 11kV Disconnecting Switch

Type

3-pole, Single throw outdoor

Voltage rating:

Nominal system voltage 11KV

Rated maximum voltage 12KV

Frequency 50 Hz

Insulation level:



[Handwritten signature]



Efficiency

: 99 %

11kV Switchgear

a) 11kV Circuit Breaker

The technical details of SF6 will be as follows:

Type

VCB

Gas circuit breaker, 3-phase, single throw in operation, Outdoor

Voltage rating:

Nominal system voltage 11kV

Rated maximum voltage 12kV

Current rating:

Rated continuous current 1250A

Rated short circuit breaking current 40 kA

One min. power frequency withstand voltage (rms) 28kV

Impulse withstand voltage (peak) 75kV

Frequency 50 Hz

Re-closing duty cycle 0-0.3sec-CO-3min-CO

b) 11kV Disconnecting Switch

Type

3-pole, Single throw outdoor

Voltage rating:

Nominal system voltage 11KV

Rated maximum voltage 12KV

Frequency 50 Hz

Insulation level:



[Handwritten signature]



Rated primary voltage	11KV / $\sqrt{3}$
Rated secondary voltage	110 V/ $\sqrt{3}$
Impulse withstand voltage (peak)	75kV
Frequency	50 Hz
Burden	15 VA
Power factor	0.85
Accuracy	0.2 CL for metering.

e) 11kV Lightning Arrester

Type arrester	Outdoor, gapless ZnO
Frequency	50 Hz
System voltage	22kV
Rated voltage	9kV
Impulse withstand voltage (BIL)	75kV
Power frequency withstand voltage	28kV
Nominal discharge current	10 kA

Metering Scheme:

Energy delivered by Phedi Khola HPP at Uper Irkhwa HPP , MW hr	= M_P
Energy delivered by Phedi & Uper Irkhwa HPP at NEA Khandabari s/s, MW hr	= M_{IP}
Internal Transmission line Loss of Phedi khola HPP, TLP ,MW hr	= $0.02 * M_P$
Payble Energy to Phedi khola HPP, MW hr, M_{PE}	= $[M_P - T_{LP}]$
Payble Energy to Uper Irkhwa HPP, MW hr M_{UE}	= $[M_{IP} - M_{PE}]$

Assumption :

Transformers and 132 kV transmission line loss is @2 percent attributed to Phedi Khola HPP



[Handwritten signature]



ANNEX - 3
REGISTERED EQUIPMENT DATA

Equipment data, including all Exhibits, used for planning shall be updated, confirmed and replaced with validated actual values of parameters and information about the major equipment at the time of Connection. These data shall be provided before energizing the Connection in accordance with Article 5.10 of the NEA Grid Code.



ANNEX - 4
AUTHORIZED REPRESENTATIVES

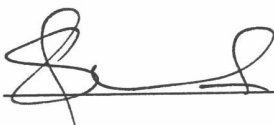
The authorized representatives of the Grid Owner and the Grid User, who will act as their Accountable Managers, Safety Coordinators as well as those responsible for the operation and maintenance of the facilities, shall be listed herein prior to energizing the Connection in accordance with Articles 5.4.6 and 5.8.1 of the NEA Grid Code.

On behalf of Grid Owner

Mr. Dirghayu Kumar Shrestha
Director
Grid Operation Department, NEA
Minbhawan, Kathmandu, Nepal

On behalf of Grid User

Mr. Prakash Chandra Dulal
Director
PhediKhola Hydropower Company Pvt. Ltd.
Kathmandu, Nepal



ANNEX - 5
EXCEPTIONS TO GRID CODE REQUIREMENTS

(All exceptions to the requirements of the Grid Code Shall be stated herein.)



ANNEX - 5
EXCEPTIONS TO GRID CODE REQUIREMENTS

(All exceptions to the requirements of the Grid Code Shall be stated herein.)

