National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

NEPRA Tower, Attaturk Avenue (East), G-5/1, Islamabad
Ph:+92-51-9206500, Fax: +92-51-2600026
Web: www.nepra.org.pk, E-mail: registrar@nepra.org.pk

No. NEPRA/R/LAG-287/9869-9874

June 30, 2015

Mr. Moeen-ud-Din Sheikh
Project Director
Punjab Power Development Company Limited
Energy Department,
77-Shah Jamal Colony, Lahore

Subject: **Generation Licence No. IGSPL/61/2015**
Licence Application No. LAG-287
Punjab Power Development Company Limited

Reference: *Your letter No. PD PPMU/1260/2014, dated 25.01.2015.*

Enclosed please find herewith Determination of the Authority in the matter of Generation Licence Application of Punjab Power Development Company Limited (PPDCL) along with Generation Licence No. IGSPL/61/2015 annexed to this determination granted by the National Electric Power Regulatory Authority to PPDCL for its 4.268 MW Deg-Outfall Hydropower Project located on Upper Chenab Canal, near fall structure at R.D. 282+735, District Sheikhupura, Punjab, pursuant to Section 15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997).

2. Please quote above mentioned Generation Licence No. for future correspondence.

Enclosure: **Generation Licence (IGSPL/61/2014)**

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

30.06.15
(Syed Safeer Hussain)

Copy to:

1. Managing Director, Punjab Power Development Board, Government of Punjab, 1st Floor, Central Design Building, Irrigation Secretariat, old Anarkali, Lahore.
2. Chief Executive Officer, NTDC, 414-WAPDA House, Lahore
3. Chief Operating Officer, CPPA, 107-WAPDA House, Lahore
4. Chief Executive Officer, Lahore Electric Supply Company Limited (LESCO), 22-A, Queens Road, Lahore
5. Director General, Environmental Protection Department, Government of Punjab, National Hockey Stadium, Ferozepur Road, Lahore

National Electric Power Regulatory Authority (NEPRA)

Determination of the Authority in the Matter of Generation Licence Application of Punjab Power Development Company Limited for its Deg-Outfall Hydro Power Project

June 25, 2015
Case No. LAG-287

(A). Background

(i). Pakistan is primarily an agricultural country and almost seventy percent (70%) of its population is directly or indirectly linked with this Sector. In order to meet with the water requirements of the agriculture sector, a large number of link canals, head works and other canals have been built.

(ii). The canal network laid all over the country offers a very good opportunity to harness the hydel potential for electric power generation. In order to utilize the said potential, Govt. of Punjab (GoPb) has established a Special Purpose Vehicle in the name of Punjab Power Development Company Limited (PPDCL).

(B). Filing of Generation Licence Application

(I). In accordance with Section-15 of Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (the NEPRA Act), PPDCL submitted an application on January 29, 2015 requesting for the grant of Generation Licence for its Deg-Outfall Hydro Power Project (DOFHPP), located at Upper Chenab Canal, Near Fall Structure at R.D. 282+735, District Sheikhupura in the Province of Punjab.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

(ii). The Registrar examined the submitted application to confirm its compliance with the NEPRA Licensing (Application and Modification Procedure) Regulations, 1999 (the "Regulations") and found the same compliant with the Regulations. The Authority considered the matter in its Regulatory Meeting Regulatory Meeting (RM-15-136), held on February 24, 2015 and also found the form and content of the application in substantial compliance with Regulation-3 of the Regulations. Accordingly, the Authority admitted the application for consideration of the grant of the Generation Licence as stipulated in Regulation-7 of the Regulations. The Authority approved the advertisement [containing (a). the prospectus; (b). a notice to the general public about the admission of the application of PPDCL], inviting the general public for submitting their comments in the matter as stipulated in Regulation-8 of the Regulations. The Authority also approved the list of the persons for providing their comments or otherwise to assist the Authority in the consideration of the above mentioned application of PPDCL. Accordingly, the advertisement was published in one Urdu and one English National Newspaper on March 03, 2015.

(iii). Apart from the above, separate letters were also sent to Government Ministries, their Attached Departments, Representative Organizations and Individual Experts etc. on March 03, 2015 informing about the admission of the application. Further, the said stakeholders were directed for submitting their views/comments in the matter.

(C). Comments of Stakeholders

(i). In reply to the above, the Authority received comments from five (05) stakeholders. These included Indus River System Authority (IRSA), Central Power Purchasing Agency (CPPA) of National Transmission & Despatch Company Limited (NTDC), Energy Department Govt. of Sindh (EDGoS), Pakhtunkhwa Energy Development Organization (PEDO) and Punjab Power Development Board (PPDB).

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(ii). The salient points of the comments offered by the above stakeholders are summarized in the following paragraphs: -

(a). IRSA desired that the sponsors be directed for submitting copies of the Feasibility Study and for making a presentation to it. The sponsors submitted the same and IRSA later issued its clearance for the project;

(b). CPPA supported the request of PPDCL for the grant of Generation Licence subject to fulfilment of the provisions of the NEPRA Licensing (Generation) Rules, 2000 (the Rules);

(c). EDGoS in its observations supported the project of PPDCL for the grant of Generation Licence;

(d). PEDO expressed that hydropower is clean and cheap source of energy. It is the most efficient way of way of generating electricity. PEDO expressed its support for the issuance of Generation Licence;

(e). PPDB stated that it has no objection if PPDCL is issued a Generation Licence.

(iii). The Authority considered the submissions of stakeholders and found the same in support of the request of PPDCL for the consideration of the grant of Generation Licence. Accordingly, the Authority considered it appropriate to proceed further in the matter in terms of the Rules and Regulations, for the consideration/grant of Generation Licence.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(D). Grant of Generation Licence

(i). Energy is a fundamental input to economic activity, and thus to human welfare and progress. The costs of producing energy vary between different energy sources and technologies. A competitive energy mix will keep overall costs as low as possible given the available resources. Hydro power is a Renewable Energy (RE) source that is economically attractive, provides security of supply and has low levels of CO_2 emissions.

(ii). The importance of electricity in the development of the economy of any country is irrefutable. The Economic Growth of any country is directly linked with the availability of safe, secure, reliable and cheaper supply of electricity. In view of the said reasons, the Authority is of the considered opinion that for sustainable development all indigenous power generation resources including Coal, Hydel, Wind, Solar and other Renewable Energy (RE) resources must be developed on priority basis.

(iii). The existing energy mix of the country is heavily skewed towards the costlier thermal power plants, mainly operating on imported furnace oil. The import of furnace oil for electric power generation not only causes depletion of the precious foreign exchange reserves of the country but is also an environmental concern. Therefore, in order to achieve sustainable development it is imperative that indigenous RE resources are given priority for power generation and their development is encouraged.

(iv). In view of the above, the Authority contemplates that the initiative of PPDCL for exploiting the hydro potential of the Province of Punjab for power generation as very encouraging and vital. This will not only help in overcoming the severe shortage of electricity in the Province of Punjab but will also help in industrialization of the Province thus improving the living standards of the population of the Province. The Authority considers that DOFHPP will be particularly beneficial to the economy of the Province of Punjab and that to the

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Country in general as it will displace the costly electricity being generated using imported oil. The project will be a step in enhancing the energy security of the Country by reducing dependence on imported furnace oil. Further, the project will also help in reducing carbon emission by generating clean electricity, thus improving the environment.

(v). The term of a Generation Licence under the Rules is to be commensurate with the maximum expected useful life of the units comprised in a generating facility. According to the information provided, the DOFHPP will achieve Commercial Operation Date (COD) on February 28, 2016 and will have a useful life of more than thirty (30) years from its COD. The applicant/PPDCL has requested that the term of the proposed Generation Licence may be fixed to thirty (30) years, in consistent with the term of the proposed Power Purchase Agreement (PPA)/Energy Purchase Agreement (EPA) to be signed with the Power Purchaser. The Authority considers that information provided by PPDCL about the useful life of CHPP and the subsequent request to fix the term of the Generation Licence as rational. Therefore, the Authority fixes the term of the Generation Licence to thirty (30) years from its COD.

(vi). Regarding the Tariff, it is hereby clarified that under Section 7(3)(a) of the NEPRA Act, the determining of Tariff, Rate and Charges etc. is the sole prerogative of the Authority. In the particular case, PPDCL has already filed a Tariff Petition and the Authority has admitted the same for its consideration. It is expected that the Tariff Petition will be decided within due course of time. Pending, the Tariff petition the Authority directs PPDCL to charge only such Tariff which has been determined, approved or specified by the Authority in terms of Rule-6 of the Rules.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(vii). In view of the above, the Authority hereby decides to approve the grant of Generation Licence to PPDCL for its DOFHPP on the terms set out in the Generation Licence annexed to this determination. The grant of Generation Licence will be subject to the provisions contained in the NEPRA Act, relevant rules and regulations framed there under.

Authority

Syed Masood-ul-Hassan Naqvi
(Member)

Himayat Ullah Khan
(Member)

30.6.15.

Khawaja Muhammad Naeem
(Member)

Maj. (R) Haroon Rashid
(Member)/(Vice Chairman)

Brig. (R) Tariq Saddozai
(Chairman)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

30.06.15

National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan

GENERATION LICENCE

No. IGSPL/61/2015

In exercise of the Powers conferred upon the National Electric Power Regulatory Authority (NEPRA) under Section-15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, the Authority hereby grants a Generation Licence to:

PUNJAB POWER DEVELOPMENT COMPANY LIMITED

Incorporated under the Companies Ordinance, 1984
Certificate of Incorporation No. 0064048, dated January 15, 2008

for its Hydel Based Generation Facility Located on Upper Chenab Canal, Near Fall Structure at R.D. 282+735, District Sheikhupura, in the Province of Punjab

(Installed Capacity: 4.268 MW Gross)

to engage in generation business subject to and in accordance with the Articles of this Licence.

Given under my hand this 30th day of June Two Thousand & Fifteen and expires on 27th day of February Two Thousand & Forty Six.

Registrar

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Article-1
Definitions

1.1 In this Licence

(a). "Act" means "the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 ";

(b). "Authority" means "the National Electric Power Regulatory Authority constituted under Section-3 of the Act";

(c). "Bus Bar" means a system of conductors in the generation facility of the Licensee on which the electric power of all the generators is collected for supplying to the Power Purchaser;

(d). "Carbon Credits" mean the amount of Carbon Dioxide (CO_2) and other greenhouse gases not produced as a result of generation of energy by the generation facility and other environmental air quality credits and related emissions reduction credits or benefits (economic or otherwise) related to the generation of energy by the generation facility, which are available or can be obtained in relation to the generation facility after the COD;

(e). "Commercial Operations Date (COD)" means the day immediately following the date on which the generation facility of the Licensee is Commissioned;

(f). "CPPA-G" means "the Central Power Purchasing Agency (Guarantee) Limited or any other entity created for the like purpose;

(g). "Distribution Code" means the distribution code prepared by the Distribution Licensee and approved by the Authority, as it may be revised from time to time by Distribution Licensee with any necessary approval by the Authority;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(h). "Distribution Licensee" means holder of a licence for providing distribution services under the Act;

(i). "Energy Purchase Agreement" means the energy purchase Agreement, entered or to be entered into by and between the Power Purchaser and the Licensee, for the purchase and sale of electric energy generated by the generation facility, as may be amended by the parties thereto from time to time;

(j). "Grid Code" means the grid code prepared by NTDC and approved by the Authority, as it may be revised from time to time by NTDC with any necessary approval by the Authority;

(k). "IEC" means "the International Electrotechnical Commission and its successors or permitted assigns;

(l). "IEEE" means the Institute of Electrical and Electronics Engineers and its successors or permitted assigns;

(m). "Licensee" means Punjab Power Development Company Limited and its successors or permitted assigns;

(n). "LESCO" means Lahore Electric Supply Company Limited and its successors or permitted assigns;

(o). "NTDC" means National Transmission and Despatch Company Limited and its successors or permitted assigns;

(p). "Policy" means "the Policy for Development of Renewable Energy for Power Generation, 2006" of Government of Pakistan as amended from time to time;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(q). "Power Purchaser" means CPPA-G purchasing power on behalf of XW-DISCOs or any XW-DISCO which purchases electricity from the Licensee, pursuant to an Energy Purchase Agreement for procurement of electricity;

(r). "Regulation" means "the National Electric Power Regulatory Authority Licensing (Application & Modification Procedure) Regulations, 1999" as amended or replaced from time to time;

(s). "Rules" mean "the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000";

(t). "XW DISCO" means "an Ex-WAPDA distribution company engaged in the distribution of electric power".

1.2 Words and expressions used but not defined herein bear the meaning given thereto in the Act or in the Rules.

Article-2
Application of Rules

This Licence is issued subject to the provisions of the Rules, as amended from time to time.

Article-3
Generation Facilities

3.1 The location, size (capacity in MW), technology, interconnection arrangements, technical limits, technical and functional specifications and other details specific to the generation facility of the Licensee are set out in Schedule-I of this Licence.

3.2 The net capacity of the generation facility of the Licensee is set out in Schedule-II hereto.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

3.3 The Licensee shall provide the final arrangement, technical and financial specifications and other specific details pertaining to its generation facility before its COD.

Article-4
Term of Licence

4.1 The Licence is granted for a term of thirty (30) years from the COD of the generation facility.

4.2 Unless suspended or revoked earlier, the Licensee may apply for renewal of the Licence within ninety (90) days prior to the expiry of the term of the Licence, as stipulated in the Regulations.

Article-5
Licence fee

After the grant of the Generation Licence, the Licensee shall pay to the Authority the Licence fee, in the amount, manner and at the time set out in the National Electric Power Regulatory Authority (Fees) Rules, 2002.

Article-6
Tariff

The Licensee shall charge only such tariff which has been determined, approved or specified by the Authority in terms of Rule-6 of the Rules.

Article-7
Competitive Trading Arrangement

7.1 The Licensee shall participate in such manner as may be directed by the Authority from time to time for development of a Competitive Trading Arrangement. The Licensee shall in good faith work towards implementation and operation of the aforesaid Competitive Trading Arrangement in the manner and time period specified by the Authority. Provided that any such participation shall be subject to any contract entered into between the Licensee and another party with the approval of the Authority.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

7.2 Any variation or modification in the above-mentioned contracts for allowing the parties thereto to participate wholly or partially in the Competitive Trading Arrangement shall be subject to mutual agreement of the parties thereto and such terms and conditions as may be approved by the Authority.

Article-8
Maintenance of Records

For the purpose of sub-rule (1) of Rule-19 of the Rules, copies of records and data shall be retained in standard and electronic form and all such records and data shall, subject to just claims of confidentiality, be accessible by authorized officers of the Authority.

Article-9
Compliance with Performance Standards

The Licensee shall comply with the relevant provisions of the National Electric Power Regulatory Authority Performance Standards (Generation) Rules 2009 as amended from time to time.

Article-10
Compliance with Environmental Standards

The Licensee shall comply with the environmental standards as may be prescribed by the relevant competent authority from time to time.

Article-11
Power off take Point and Voltage

The Licensee shall deliver electric power to the Power Purchaser at the outgoing Bus Bar of its generation facility. The up-gradation (step up) of generation voltage up to 11 KV will be the responsibility of the Licensee.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Article-12
Provision of Information

12.1 The obligation of the Licensee to provide information to the Authority shall be in accordance with Section-44 of the Act.

12.2 The Licensee shall in addition to 12.1 above, supply information to the Power Purchaser regarding the hydrological data specific to the site of the Licensee and other related information on a regular basis and in a manner required by it.

12.3 The Licensee shall be subject to such penalties as may be specified in the relevant rules made by the Authority for failure to furnish such information as may be required from time to time by the Authority and which is or ought to be or has been in the control or possession of the Licensee.

Article-13
Carbon Credits

The Licensee shall process and obtain Carbon Credits expeditiously and credit the proceeds to the Power Purchaser as per the Policy.

Article-14
Design & Manufacturing Standards

The generation facilities of the Licensee shall be designed, manufactured and tested according to the latest IEC, IEEE standards or any other equivalent standard. All plant and equipment shall be unused and brand new.

Article-15
Power Curve

The Power Purchaser shall verify the power curve of the generation facility of the Licensee, as part of the Commissioning tests according to the latest IEC/IEEE standards and shall be used to measure its performance.

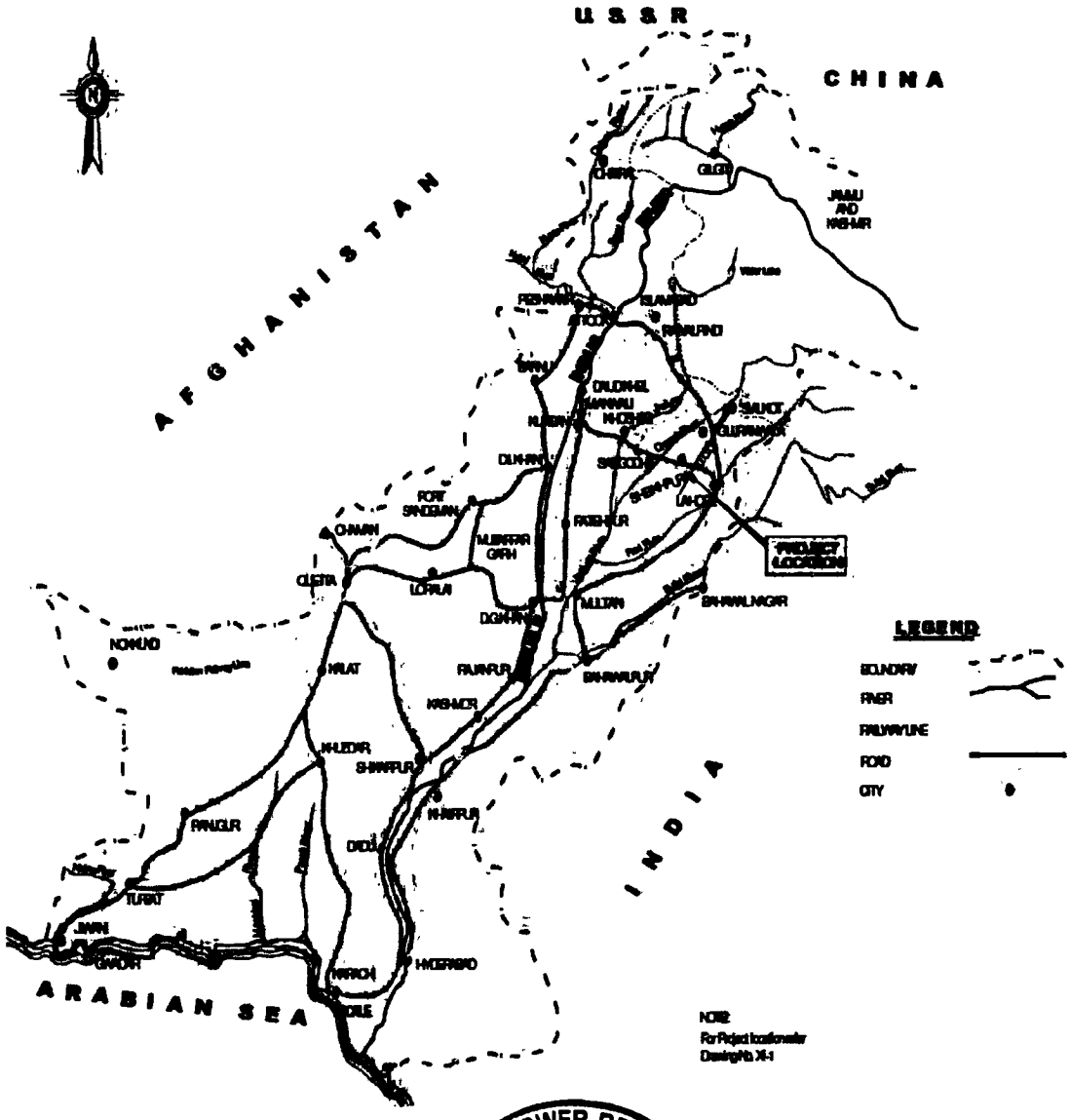
NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

SCHEDULE-I

The Location, Size (i.e. Capacity in MW), Type of Technology, Interconnection Arrangements, Technical Limits, Technical/Functional Specifications and other details specific to the Generation Facilities of the Licensee are described in this Schedule.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Location of the Hydro Power Generation Facility/Power Plant of Deg Outfall



Location of
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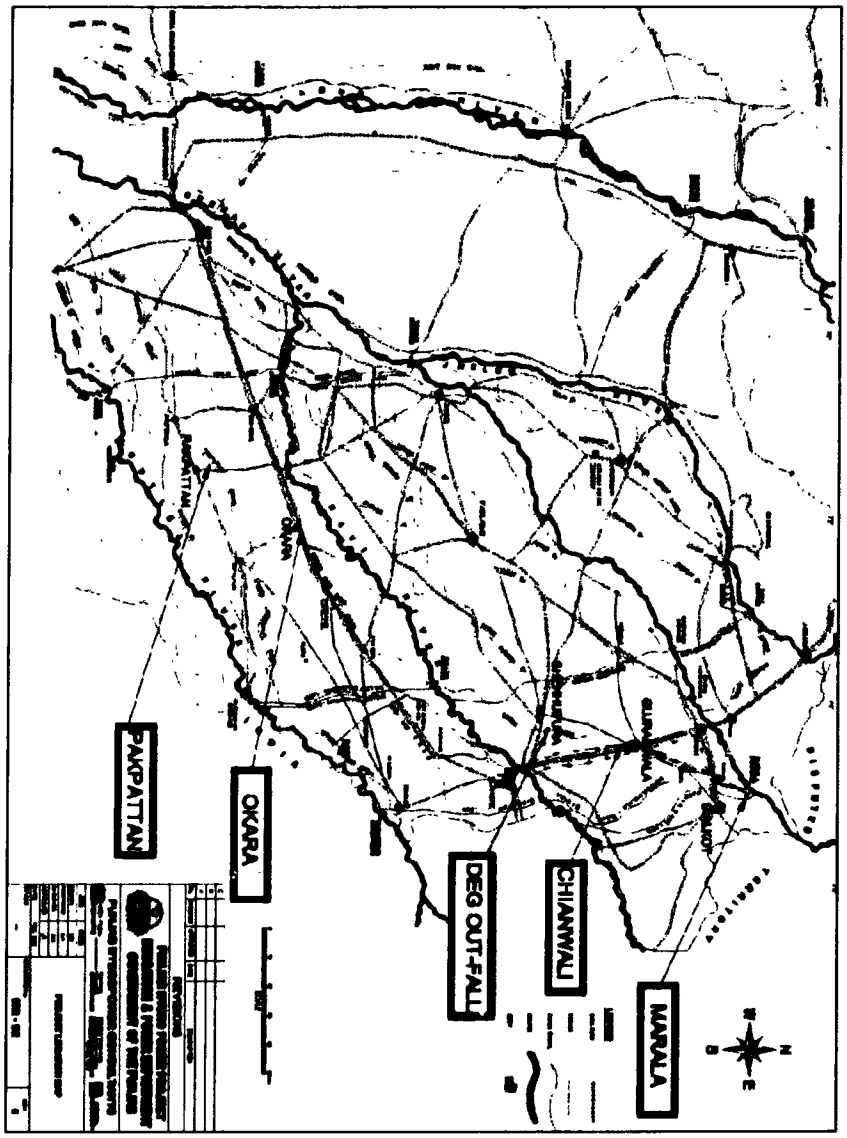
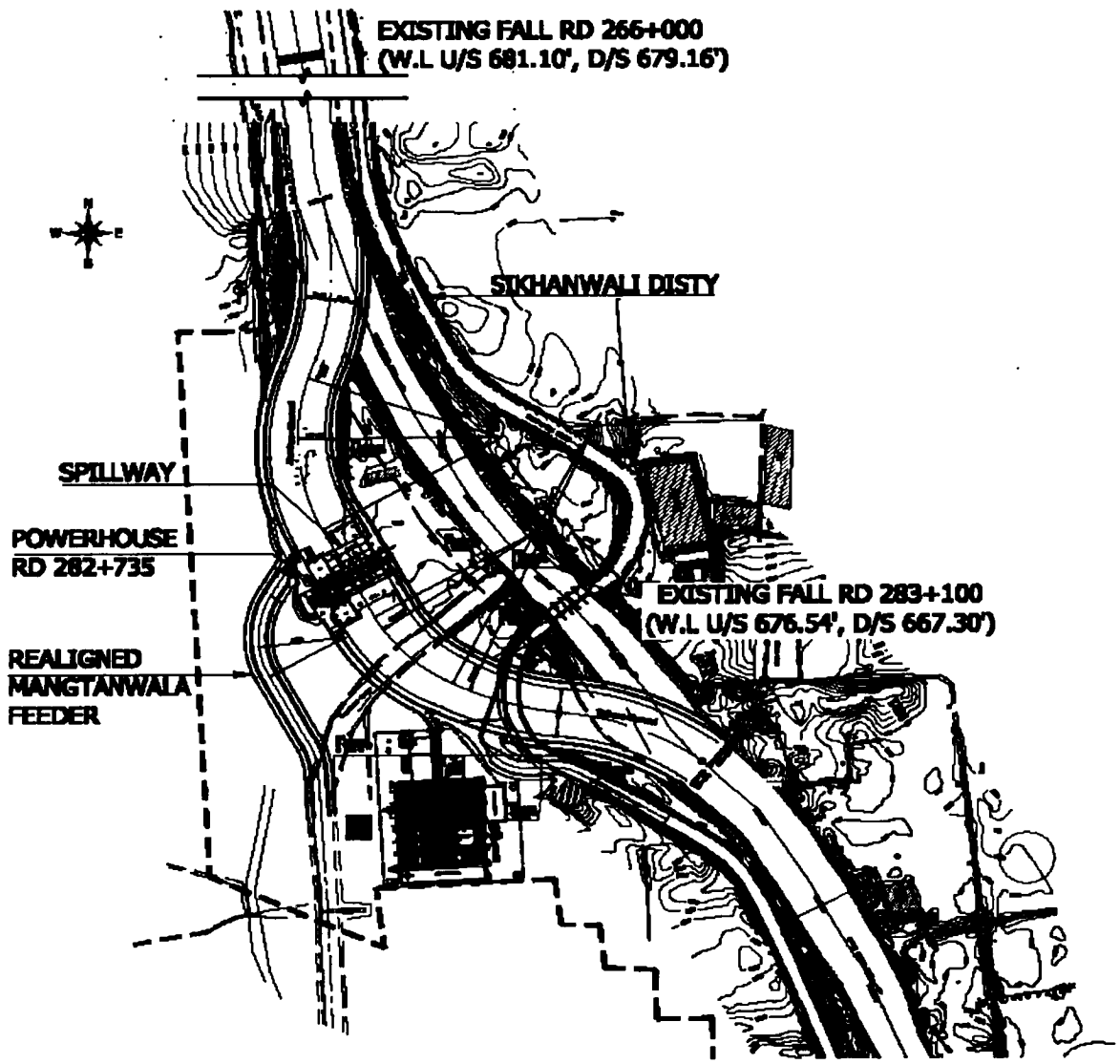
Deg Outfall



Layout of
Hydro Power Generation Facility/Power Plant of
Deg Outfall



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REGISTRAR
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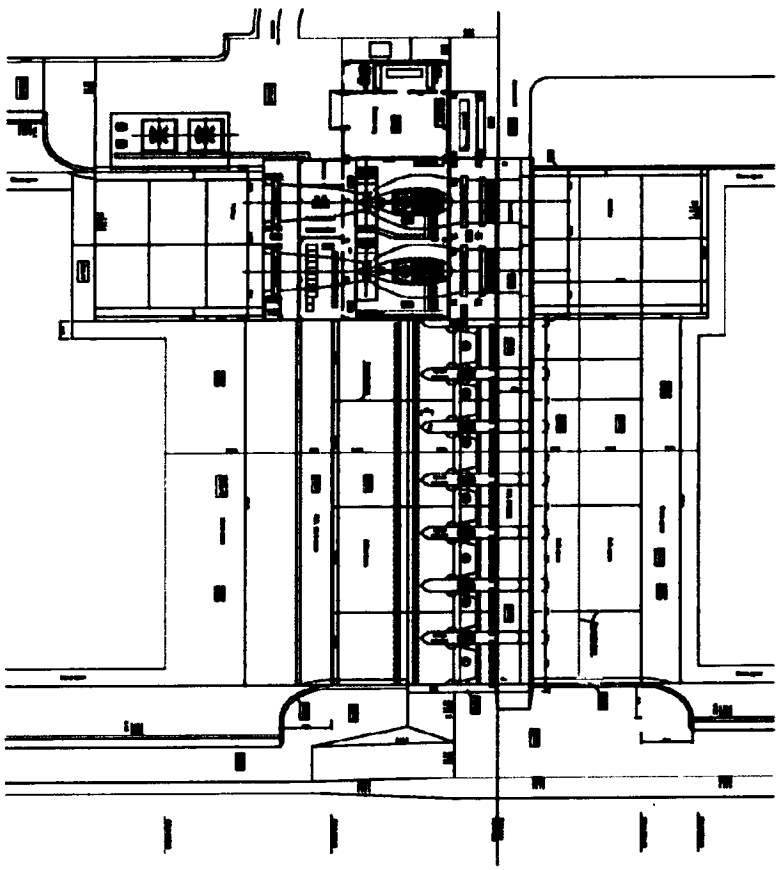
Combined Powerhouse & Spillway Plan of Hydro Power Generation Facility/Power Plant of Deg Outfall



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REGISTRAR
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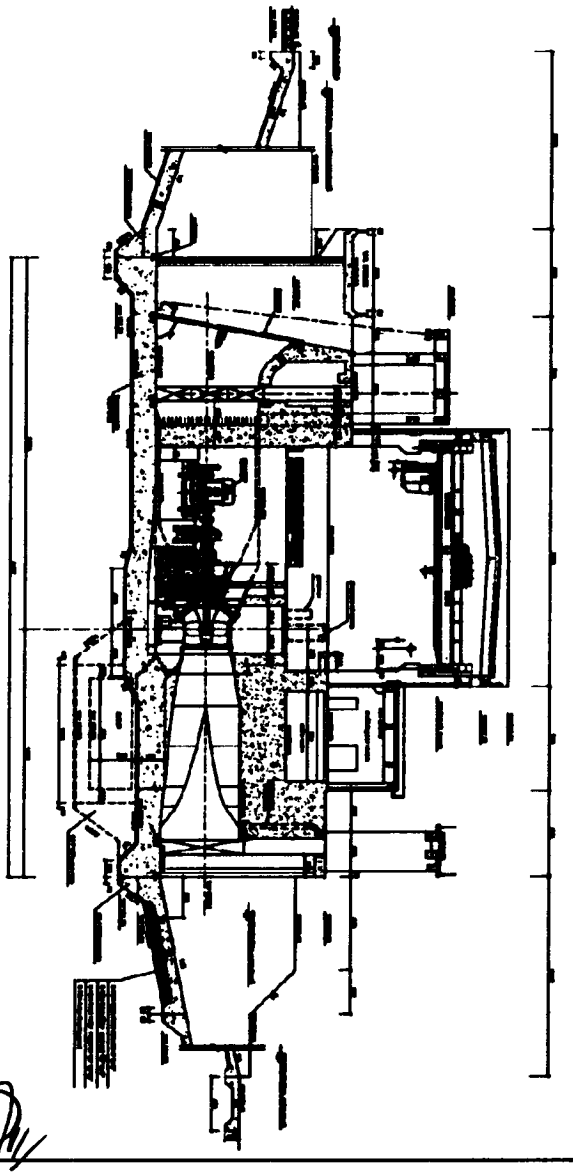
Longitudinal Section of Hydro Power Generation Facility/Power Plant of Deg Outfall



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REGISTRAR
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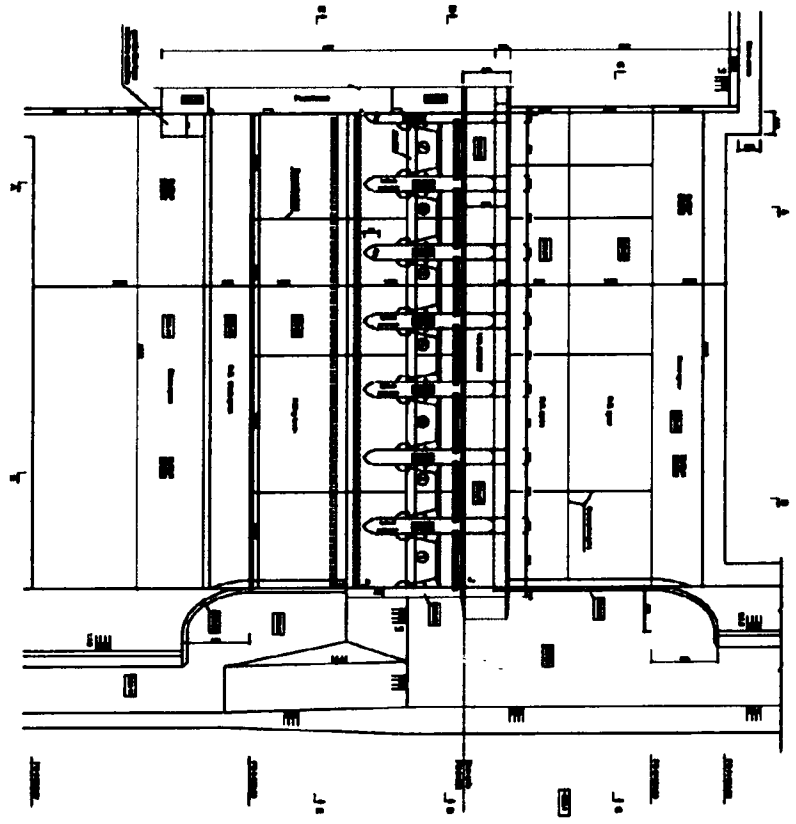
Spillway Plan of Hydro Power Generation Facility/Power Plant of Deg Outfall



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REGISTRAR
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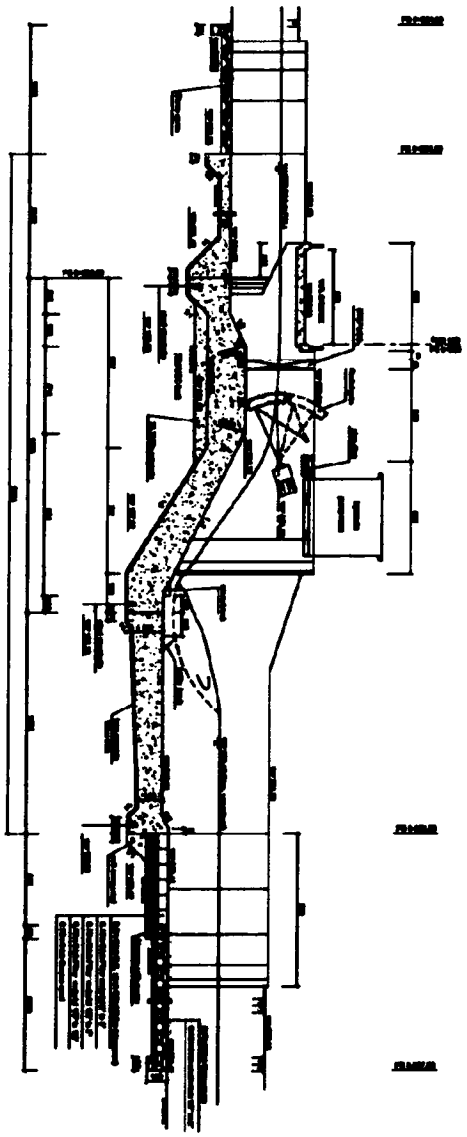
Longitudinal Section of the Spillway of the Hydro Power Generation Facility/Power Plant of Deg Outfall



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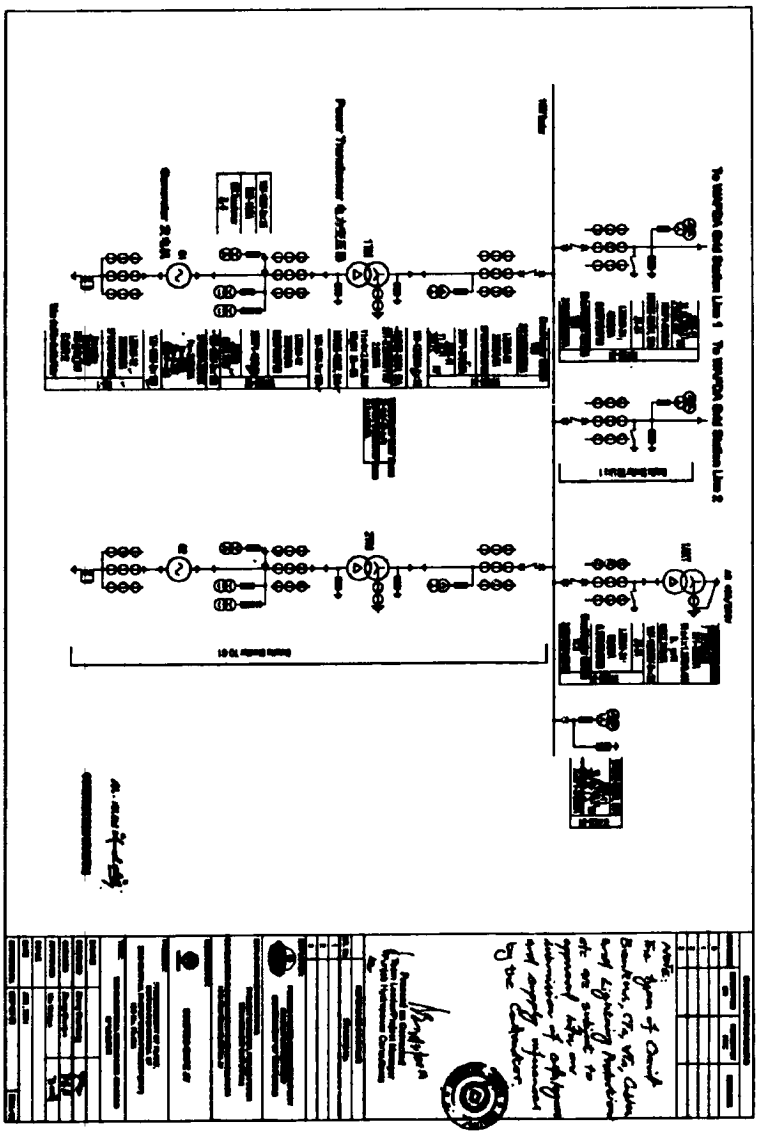
Single line Diagram of the Hydro Power Generation Facility/Power Plant of Deg Outfall



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REGISTRAR
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Interconnection Arrangement/Transmission Facilities of the Hydro Power Generation Facility/Power Plant of Deg Outfall of Punjab Power Development Company Limited

The electric power generated from the Generation Facility/Deg Outfall Hydro Power Plant of Punjab Power Development Company Limited (PPDCL)/the Licensee shall be dispersed to the load center of LESCO. The proposed Interconnection Arrangement/Transmission Facilities for dispersal of electric power will consist of the following:-

(a). one 11 KV Double Circuit Feeder on ACSR OSPREY Conductor, (measuring about 06.00-KM in length) connecting the proposed Generation Facility of PPDCL/the Licensee to 132/11 KV Attabad Grid Station;

(2). Any change in the above mentioned Interconnection Arrangement/Transmission Facilities duly agreed by PPDCL/the Licensee, Power Purchaser and LESCO, shall be communicated to the Authority in due course of time.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Detail of Generation Facility/Hydro Power Plant

(A). General/Business Information

(i).	Name of Company/ Licensee	Punjab Power Development Company Limited
(ii).	Registered Office	77- Shah Jamal Colony, Lahore, Punjab
(iii).	Business Office	-Do-

(B). Type & Location

(i).	Type of Generation Facility	Low Head Canal Fall/Run-of-Canal Hydro/Hydel Power Plant
(ii).	Location of the Generation Facility Hydro Power Plant	Near falls structure Located on Upper Chenab Canal at RD 282+735 District Sheikhupura in the Province of Punjab

(C). Water Source

(i).	Stream /Tributary/Canal	Upper Chenab Canal

(D). Discharge

(i).	Mean Monthly	88.30 m^3/s
(ii).	Total Annual Average	2,785 x 10^6 m^3

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

(E). Main Structure

(i).	Design Discharge	120 m^3/s (Through Powerhouse)
(ii).	Maximum Discharge	231 m^3/s (Through Spillway)

(F). Spillway

(i).	Units	7
(ii).	Type	Broad crested with radial gates (Glacis Type)
(iii).	Sill Level	204.79 m.a.s.l.
(iv).	Design Pressure at Sill	2.05 m
(v).	Height	2.70 m
(vi).	Width	7.10 m

(G). Trash Racks

(i).	Width	7.50 m
(ii).	Height	12.898 m
(iii).	Inclination	80°
(iv).	Bar Distance	100 mm

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
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(H). Stop Logs

(i).	Intake	Width	Height
		7.50 m	7.516 m
(ii).	Spillway	Width	Height
		7.10 m	2.65 m

(I). Draft Tube

(i).	Units	2
(ii).	Type	Horizontal Concrete with Roller Gates
(iii).	Head on Sill	8.843 m
(iv).	Height	5.775 m
(v).	Width	6.40 m

(J). Headrace Channel

(i).	Water Level at Entrance	206.919 m.a.s.l.
(ii).	Canal Width	68.275~88.81m
(iii).	Flow Depth	2.987 m
(iv).	Bed Slope	0.00015

(K). Power House

(i).	Powerhouse Level	203.60 m.a.s.l.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(ii).	Machine Hall Length	44.62 m
(iii).	Machine Hall Width	18.6 m
(iv).	Machine Hall Height	17.50 m

(L). Tailrace Channel

(i).	Bed Level	200.41 m.a.s.l.
(ii).	Canal Width	68.275~88.81m
(iii).	Bed Slope	0.00015

(M). Nominal Head at Maximum Power Output

(i).	Headrace Water Level	206.84 m.a.s.l.
(ii).	Max. Tailrace Water Level	203.40 m.a.s.l.
(iii).	Min. Tailrace Water Level	201.04 m.a.s.l.
(iv).	Maximum Gross Head	5.80 m
(v).	Minimum Gross Head	3.43 m
(vi).	Head Loss	0.45 m

(N). Hydro-mechanical Equipment

(i).	Type of Turbine	Horizontal Shaft Kaplan (Pit Type)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
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(ii).	Turbine Make & Model	Jinlun
(iii).	Units	2
(iv).	Rated Flow for each Unit	60.00m^3/s
(v).	Capacity	2.134 MW
(vi).	Rotational Speed	133.30 r.p.m.
(vii).	Rated Head	4.00 m

(O). Electrical Equipment Generator

(i).	Type of Generator	Synchronous Generator
(i).	No. of Units	02
(ii).	Capacity	2.53 MVA
(ii).	Power factor	0.80 lagging-0.95 leading
(iii).	Frequency	50 Hz
(iv).	Nominal Voltage	6.3 kV
(v).	Nominal Speed	600 r.p.m.
(vi).	Insulation class	F
(vii).	Ambient temperature	50°C

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(viii).	Excitation Static	110 V DC
(ix).	Connection	Y, Grounded through Grounding Transformer
(x).	Protection Class	IP 44
(xi).	Automatic Generation Control (AGC)	Yes
(xii).	Ramping Rate	To be provided later
(xiii).	Time required to Synchronize to Grid	-Do-

(P). Transformer

(i).	No. of Transformers	02
(ii).	Capacity	2.53 MVA each
(ii).	Low Voltage (Primary)	6.30 kV
(iii).	High voltage (secondary)	11 kV
(iv).	Frequency	50 Hz
(v).	Temperature rise	55°C
(vi).	Vector group	YNd 11
(vii).	Impedance	6.00% (approx.)
(viii).	Type of Tap Changer	(OFF LOAD)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
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(ix).	Cooling	ONAN

(Q). Power and Energy

(i).	Power	2 x 2.02 MW
(ii).	Mean Annual Energy	27.65 GWh

(R). Other Information

(i).	COD of the Generation Facility/Hydel Power Plant	February 28, 2016 (Expected)
(ii).	Expected Minimum Useful Life of the Generation Facility from COD	30 Years

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SCHEDULE-II

The Total Installed Gross Capacity (MW), De-Rated Capacity At Reference Site Conditions (MW), Auxiliary Consumption (MW) and the Net Capacity At Reference Site Conditions (MW) of the Generation Facility of Licensee is given in this Schedule

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SCHEDULE-II

(1).	Total Installed Gross Capacity of the Generation Facility/Hydel Power Plant (2 x 2.134 MW Kaplan Turbine)	04.268 MW
(2).	Total Installed De-Rated Capacity of the Generation Facility/Hydel Power Plant at Mean Site Conditions (2 x 2.134 MW Kaplan Turbine)	04.268 MW
(3).	Total De-Rated Capacity (Electrical) of the Generation Facility/Hydel Power Plant at Mean Site Conditions (2 x 2.02 MW Kaplan Turbine)	04.040 MW
(4).	Auxiliary Consumption of the Generation Facility/Hydel Power Plant (2 x 0.120MW Kaplan Turbine)	00.240 MW
(5).	Net Capacity of the Generation Facility/Hydel Power Plant at Mean Site Conditions Condition (2 x 1.900 MW Kaplan Turbine)	03.800 MW

Note

All the above figures are indicative as provided by the Licensee. The Net Capacity available to Power Purchaser for dispatch will be determined through procedure(s) contained in the Energy Purchase Agreement or any other applicable document(s).

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