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-169/ 4759-65 April 08, 2016

Mr. Sheng Zhen Dong,
Chief Executive Officer,
Karot Power Company (Pvt.) Limited,
H.No. 05, Street No. 72, F-8/3,
Islamabad, Pakistan.

Subject: **Modification-I in Generation Licence No: IGSPL/37/2013**
Licence Application No. LAG-169
Karot Power Company (Pvt.) Limited (KPCPL)

Reference: Your application vide letter No. TGSAILKPCL2015399, dated August 10, 2015, received on August 31, 2015)

It is intimidated that the Authority has approved "Licensee Proposed Modification" in Generation Licence No. IGSPL/37/2013 (issued on November 26, 2013) in respect of Karot Power Company (Pvt.) Limited (KPCPL), pursuant to Regulation 10(11)(a) of the NEPRA Licensing (Application and Modification Procedure) Regulations 1999.

2. Enclosed please find herewith determination of the Authority in the matter of Licensee Proposed Modification in the Generation Licence of KPCPL along with Modification-I in the Generation Licence No. IGSPL/37/2013, as approved by the Authority.

Encl:/As above

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

8/4/16

(Syed Safeer Hussain)

Copy to:

1. Chief Executive Officer, NTDC, 414-WAPDA House, Lahore.
2. Chief Operating Officer, CPPA-G, 107-WAPDA House, Lahore.
3. Director General, Environment Protection Agency, Govt. of KPK, 3rd Floor, Old Courts Building, Khyber Road, Peshawar.
4. Director General, Environment Protection Department, National Hockey Stadium, Ferozpur Road, Lahore.
5. Managing Director, Private Power and Infrastructure Board (PPIB), 50-Nazimuddin Road, Sector F-7/4, Islamabad.
6. Chief Secretary, Government of Azad Jammu & Kashmir, AJ&K Secretariat, Muzaffarabad.

National Electric Power Regulatory Authority (NEPRA)

Determination of the Authority in the Matter of Licensee Proposed Modification of Karot Power Company Limited

April 06, 2016
Case No. LAG-169

(A). Background

(i). The Authority granted a Generation Licence (No. IGSPL/37/2013, dated November 26, 2013) to Karot Power Company (Private) Limited (KPCPL), in terms of Section-15 of Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 ("the NEPRA Act").

(ii). The above Generation Licence was granted to KPCPL for constructing, owing and operating a 720.00 MW (Electrical) Hydro Power Project/Plant (HPP)/Generation facility to be located at River Jhelum, near the village of Karot, District Rawalpindi, in the Province Punjab.

(B). Communication of Modification

(i). KPCPL in accordance with Regulation-10(2) of the NEPRA Licensing (Application & Modification Procedure) Regulations, 1999 (the Regulations), communicated a Licensee Proposed Modification (LPM) in its existing Generation Licence on August 31, 2015.

(ii). In the "Text of the Proposed Modification", KPCPL submitted that the Preliminary Feasibility Study (PFS) of project was conducted in 2009 through SMEC International (Pty.) Limited Australia. According to the PFS, the HPP consisted of a Concrete Gravity Dam and Underground Powerhouse. However, the design of the HPP/Project has now been changed to Asphalt Concrete Core Rock Fill Dam. Further, the Powerhouse has been changed to Surface type.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

(iii). Regarding the "Statement of the Reasons in Support of the Modification", it was submitted that as part of the project execution additional investigations have been carried out to update the result of PFS. The additional investigations have revealed poor geological and seismic conditions at project site. Due to the said geological and seismic risks, the design of the project has been changed from Concrete Gravity Dam to Asphalt Concrete Core Rock Fill Dam. Further, Powerhouse of the complex which was earlier envisaged to be underground has now been planned to be a Surface Powerhouse.

(iv). About the "Statement of the Impact on the Tariff, Quality of Service (QoS) and the Performance by the Licensee of its Obligations under the Licence", KPCPL submitted that the proposed changes will not have any negative impact on QoS and performance by the Licensee of its obligations under the Generation Licence. The new design is more suitable to geological and seismic conditions at the HPP/project site. Furthermore, the change in design will enhance/improve QoS and performance of the Licensee. About the Impact of LPM on Tariff, it was submitted that the company i.e. KPCPL has already approached the Authority for determination of EPC Stage Tariff of the HPP/project.

(C). Processing of LPM

(i). After completion of all the required information as stipulated under the Regulation 10 (2) and 10 (3) of the Regulations by KPCPL, the Registrar accepted the LPM for further processing as stipulated in the Regulations. The Registrar published the communicated LPM on September 17, 2015 in one (01) English and one (01) Urdu News Paper, informing the general public about the communicated LPM and inviting their comments within a period of fourteen days of the date of the said publication.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(ii). Apart from the above, separate letters were also sent to other stakeholders which included Government Ministries and their attached Departments, Various Representative Organization and Individual Experts etc. Through the said letters, the stakeholders were informed about the communicated LPM and publication of its notice in the press. Further, the above mentioned entities were invited submitting their views and comments in the matter for assisting the Authority.

(D). Comments of Stakeholders

(i). In reply to the above, the Authority received comments of from six (06) stakeholders. These included Central Power Purchasing Agency (Guarantee) Limited (CPPAGL), Indus River System Authority (IRSA), Govt. of Azad Jammu & Kashmir (GoAJK), Private Power Infrastructure Board (PPIB), Water and Power Development Authority (WAPDA) and Energy and Power Department Govt. of Khyber Pakhtunkhwa (E&PDGoKPK). The salient points of the comments of the said stakeholders are summarized in the following paragraphs: -

(a). CPPAGL submitted that the PPIB appointed Panel of Experts (PoE) has already approved new design of the HPP/project. In this regard, CPPAGL has certain reservation as a Power Purchaser. These included (a). increase in the project cost which will result in higher generation tariff; (b). the new design does not provide efficient solution for sediment flushing; (c). increased scope of the civil works; (d). EPC contractors were given free hand to suggest their own design which is against the concept of competitive bidding; (e). There is reduction in net energy of the project and (f). increase in construction period of the project. In view of the said, the revised project layout is not considered favorable;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(b). IRSA commented that the Authority may direct the company to approach it for NOC which is mandatory prior to installation of the power plant. After receiving application for NOC, IRSA will be in position to make comments on the LPM;

(c). GoAJK stated that LPM by KPCPL is based on the approved design of the project therefore, the same is supported;

(d). PPIB informed that Letter of Support (LoS) had been issued to KPCPL. Therefore, PPIB supports the LPM as stipulated in the relevant rules and regulations;

(e). WAPDA remarked that the updated project layout conceived on the basis of detailed investigations has resulted in (a). increased scope of civil works; (b). high project cost; (c). less efficient solution for sediment flushing; (d). poor layout; and (e). unsafe on ground location of power house. It is proposed to conduct physical and sediment model studies at larger scale at IRI Nandipur during the design phase to check the structures performance and observations indicated by PoE. The sponsor should be careful about the flood evacuation arrangement to avoid any disaster in the downstream valley. While designing the structures on Chinese standards, International codes should also be followed. The changes in the revised layout likely to be made at design phase should be covered within the estimated cost by the sponsor and approved by competent authority; and

(f). E&PDGoKPK submitted that the design of the project has been changed from concrete gravity dam to asphalt concrete core rock fill dam which is more adaptable to the geological

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

conditions therefore, E&PDGoKPK supports the proposed modification.

(ii). The Authority examined the above comments of the stakeholders and observed that CPPAGL, IRSA and WAPDA had raised various observations which require clarification from KPCPL. In view of the said, the Authority directed the KPCPL for submitting its rejoinder to the observations of the above mentioned stakeholders.

(iii). In its reply to the observations of CPPAGL and WAPDA Hydel, KPCPL submitted that PoE of PPIB (also comprising of representatives of WAPDA and CPPA-G) discussed the revised design in number of meetings and approved the same after due consideration/deliberation on the issues highlighted by CPPAGL and WAPDA. Regarding higher cost and resulting higher Tariff of the project, KPCPL informed that it has already submitted an EPC Stage Tariff petition to the Authority. On the issue of sediment flushing, KPCPL submitted that the proposed mechanism for sediment flushing is efficient which will ensure normal headrace and power generation conditions. Further, the proposed twenty (20) days flushing time is quite realistic. Regarding the geological risk, KPCPL submitted that after the PFS of 2009, it has conducted comprehensive additional investigations comprising lot of supplementary studies which revealed poor geological and seismic conditions at project site. On the objection regarding instability due to surface powerhouse and deep excavation for spillways in geologically weak area, KPCPL submitted that the revised design has lowered the pressure on the main dam whereby the pressure is segregated towards spillways and underground water way. This has resulted in overall stability of the entire structure. According to the latest geological data, certain disadvantages will be associated with the underground power house scheme. About the sediment concentration when the plant has to be operated for maximum production, KPCPL has clarified that as per the sediment physical model test results the proposed sediment flushing facilities and operation mode can ensure normal headrace and power generation condition and meet the reservoir operating requirements and will not create any problem

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

during the life of the project. On the subject of the construction of more sediment flushing outlets, it was submitted that sediment removal through two low level flood discharge sediment flushing outlets, has been designed for increasing the velocity of water flowing through these outlets. The increased velocity will result in efficient discharge of sediments. Sediment flushing will be done in flooding season and on annual basis which will reduce the accumulation of sediments over the time. About model studies, KPCPL submitted that it has conducted physical modeling for sediment flushing. As per overall sediment physical model test results, current sediment flushing facilities and operation mode can ensure normal headrace and power generation conditions and meet the reservoir operating conditions.

(iv). On the observations of IRSA, the company/KPCPL submitted that it is coordinating with IRSA and will be obtaining the required NoC. Later on, KPCPL provided a copy of the NoC issued by IRSA.

(v). The Authority considered the above submissions of KPCPL and found to be plausible. In view of the said, the Authority considered appropriate to proceed further with the communicated LPM as stipulated in the Regulations and the NEPRA Licensing (Generation) Rules, 2000 (the Rules).

(E). Approval of LPM

(i). In terms of Regulation-10(5) of the Regulations, the Authority is entitled to modify any licence subject to and in accordance with such further changes as the Authority may deem fit if, in the opinion of the Authority such modification (a). does not adversely affect the performance by the licensee of its obligations; (b). does not cause the Authority to act or acquiesce in any act or omission of the licensee in a manner contrary to the provisions of the NEPRA Act or the rules or regulations made pursuant to the NEPRA Act; (c). is or is likely to be beneficial to the consumers; (d). is reasonably necessary for the licensee to effectively and efficiently perform its obligations under the licence; and (e). is reasonably necessary to ensure the continuous, safe and reliable supply of electric power to the consumers keeping in view the financial and technical viability of the licensee.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(ii). The Authority has observed that as per the original scheme in the already granted Generation Licence (No. IGSPL/37/2013, dated November 26, 2013), KPCPL/the Licensee is setting up hydel based Generation Facility to be located on River Jhelum, near the village of Karot, District Rawalpindi in the Province of Punjab. The project envisaged a Concrete Gravity Dam. However, due to poor geological and seismic conditions at project site, now the EPC Contractor has recommended Asphalt Concrete Core Rockfill Dam. Earlier, under Ground Power House was proposed which has now been shifted on the surface. The new design of the project has been duly approved by the PPIB appointed PoEs which also included representatives from WAPDA and other experts of the area. The Authority considers that proposed change in the type of the dam will not have any adverse effect on the performance of KPCPL/the Licensee of its obligations. The Authority considers that the LPM is not contrary to the provisions of the NEPRA Act or the Rules and Regulations made pursuant to the NEPRA Act as provisions of all the Rules and Regulations have been strictly followed in processing of the communicated LPM. The modification will be beneficial as the consumers will be getting cheap and clean energy. Further, the Authority considers that with the proposed modification, KPCPL/the Licensee will perform its obligations efficiently and effectively. The Authority also considers that the modification is reasonably necessary to ensure the continuous, safe and reliable supply of electric power to the consumers keeping in view the financial and technical viability of the KPCPL/the Licensee. The Authority has also observed that the KPCPL/the Licensee has duly carried out the required IEE/EIA for the Project based on the new design for which EPD Punjab and AJK have granted the necessary approval in the matter.

(iii). About the Impact on Tariff of the communicated LPM, it is clarified that the project earlier did not have any EPC stage tariff and the same has been determined vide determination of the Authority No. NEPRA/TRF-309/KPCL-2015/2544-2546, dated February 24, 2016. Therefore, the Impact of Tariff for the communicated LPM has been adequately addressed. The Authority directs KPCPL/the Licensee to follow the terms and conditions of the said determination in

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

letter and spirit and charge only such tariff which has been approved, modified and specified by the Authority. The Authority is satisfied that the Licensee/KPCPL has complied with all the requirements of the Regulations pertaining to the modification. Accordingly, the Authority in terms of Regulation-10(11)(a) of the Regulations approves the communicated LPM without any changes. Accordingly, the already granted Generation Licence (No. IGSPL/37/2013, dated November 26, 2013) in the name of KPCPL is hereby modified. The changes in "Face Sheet", "Articles of the Generation Licence", "Schedule-I" and "Schedule-II" of the Generation Licence are attached as annexure to this determination. The grant of the LPM will be subject to the provisions contained in the NEPRA Act, relevant rules framed there under, terms & conditions of the Generation Licence and other applicable documents.

Authority

Syed Masood-ul-Hassan Naqvi
(Member)

Khawaja Muhammad Naeem
(Member)

Maj. (R) Haroon Rashid
(Member)

Himayatullah Khan
(Member/Vice Chairman)

Brig. (R) Tariq Saddozai
(Chairman)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

8/4/16

National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan

GENERATION LICENCE
No. IGSPL/37/2013

In exercise of the Powers conferred upon the National Electric Power Regulatory Authority (NEPRA) under Section-26 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, the Authority hereby modifies the Generation Licence granted to KAROT POWER COMPANY (PRIVATE) LIMITED (issued on November 26, 2013 and expiring on/upto June 30, 2047), to the extent of changes mentioned as here under:-

(i). Changes in Articles of the Generation Licence attached as Revised/Modified Articles of the Generation Licence;

(ii). The validity of the Generation Licence is changed to December 30, 2050

(iii). Changes in Schedule-I attached as Revised/Modified Schedule-I; and

(iv). Changes in Schedule-II attached as Revised/Modified Schedule-II.

This **Modification-I** is given under my hand on this 8th day of **April Two Thousand & Sixteen.**

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). "Applicable Documents" have the same meaning as defined in the Rules;

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

(d). "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;

(e). "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;

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

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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

(i). "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 the necessary approval of the Authority;

(j). "IEC" means "International Electrotechnical Commission" or any other entity created for the like purpose and its successors or permitted assigns;

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

(l). "Law" means the Act, relevant rules and regulations made there under and all the Applicable Documents;

(m). "Licensee" means "**Karot Power Company (Private) Limited**" and its successors or permitted assigns;

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

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

(p). "Power Purchase Agreement" means the power 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;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR

(q). "Power Purchaser" means the CPPA-G purchasing power on behalf of XW-DISCOs;

(r). "Regulations" mean "the 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 Rules and regulations issued under the Act.

Article-2
Applicability of Law

This Licence is issued subject to the provisions of the Law, as amended or replaced 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 commissioning.

Article-4
Term of Licence

4.1 This Licence is valid from the date of its issuance (i.e. November 26, 2013) and will remain enforce 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 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 and 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.

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

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 power to the Power Purchaser at the outgoing Bus Bar of its generation facility/grid station. The up-gradation (step up) of generation voltage up to required dispersal voltage level will be the responsibility of the Licensee.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Article-12
Performance Data of Generation Facility

The Licensee shall install properly calibrated automatic computerized water flow recording device(s) and a compatible communication/SCADA system both at its generation facility and control room of the Power Purchaser for transmission of water flow data and power output data to the control room of the Power Purchaser for recording of data.

Article-13
Provision of Information

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

13.2 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-14
Emissions Trading /Carbon Credits

The Licensee shall process and obtain emissions/Carbon Credits expeditiously and share/credit the proceeds with the Power Purchaser as per the Policy.

Article-15
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.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Article-16
Power Curve

The Power Purchaser shall verify the power curve of the generation facilities 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

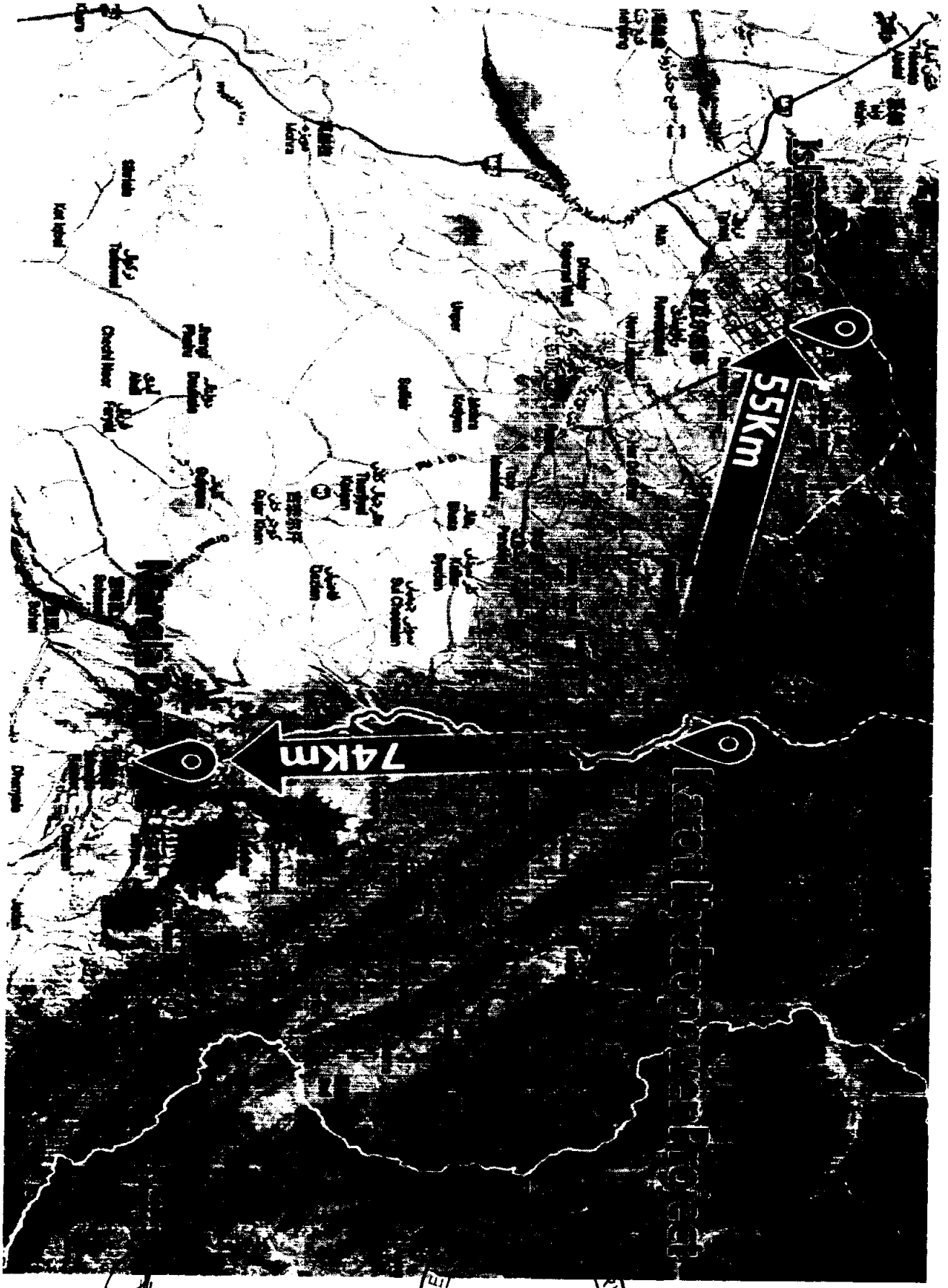
Revised/Modified
SCHEDULE-I

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 Generation Facility/Hydel Power Plant

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA



REGISTRAR

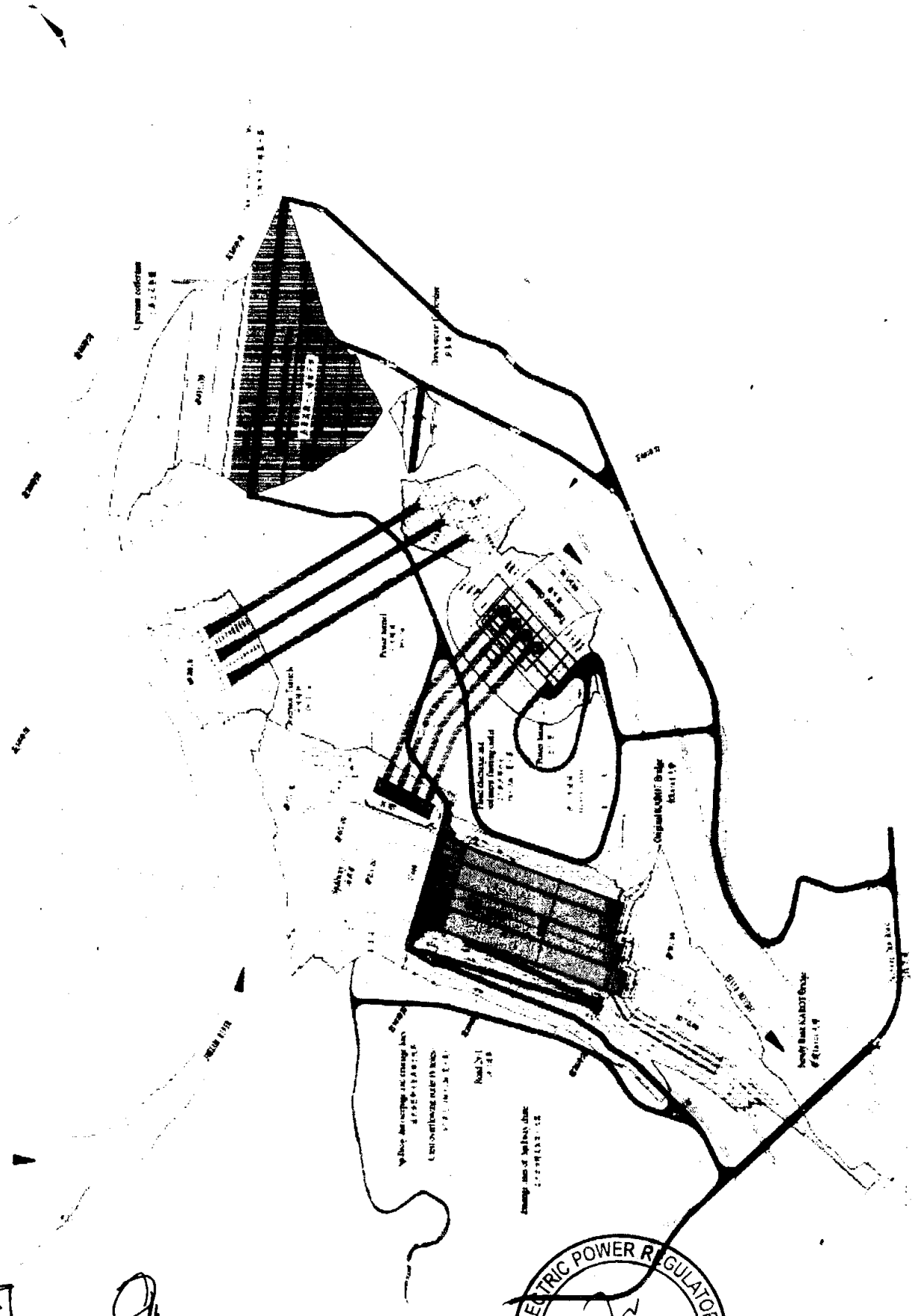
Layout of the Generation Facility/Hydel Power Plant

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

REGISTRAR

Plane view of the Generation Facility/Hydel Power Plant

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA



NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

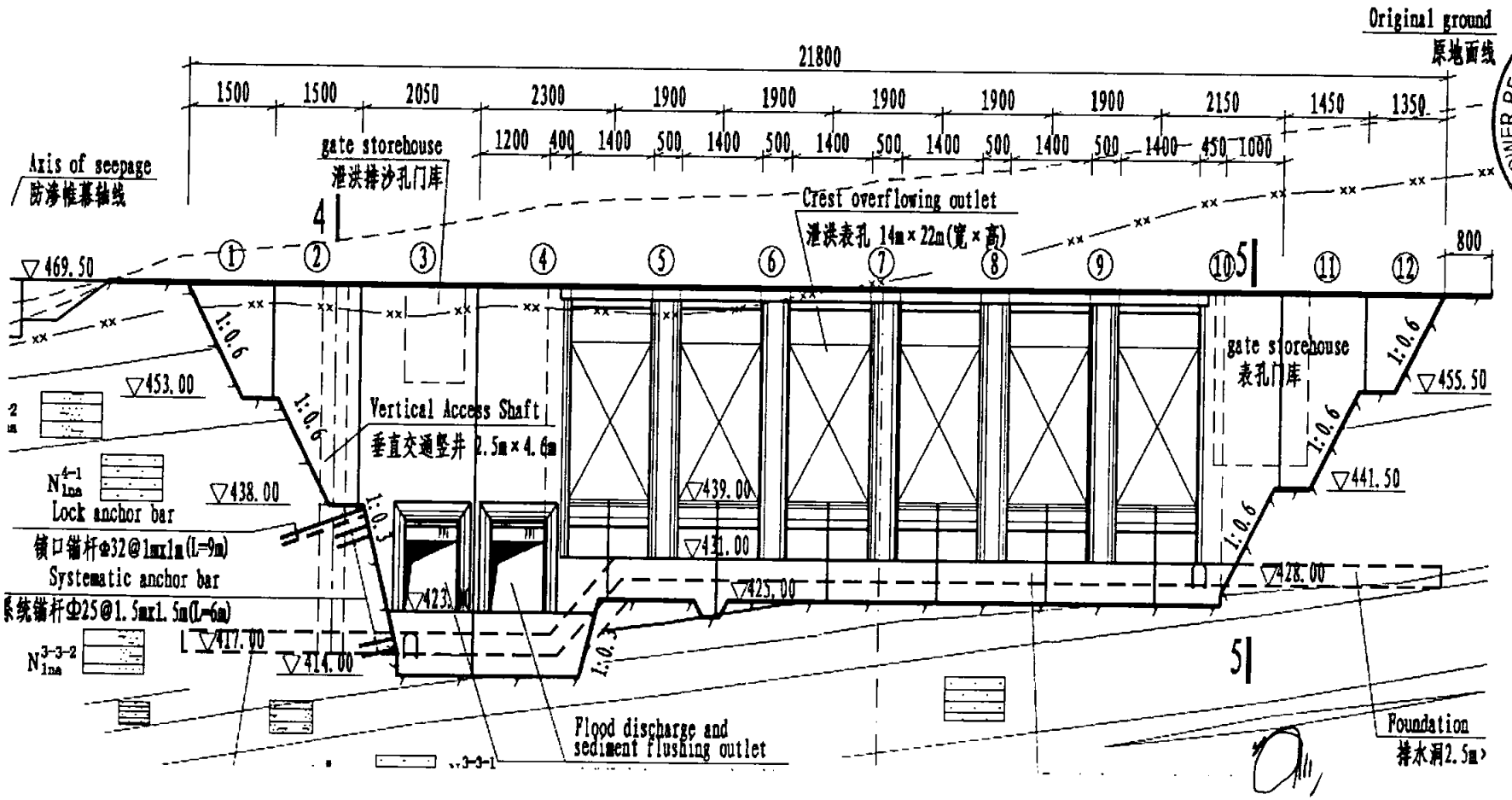
Frontal View of the Generation Facility/Hydel Power Plant

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

1 - 1(THE UPSTREAM VIEW OF SPILLWAY CONTROL SECTION)

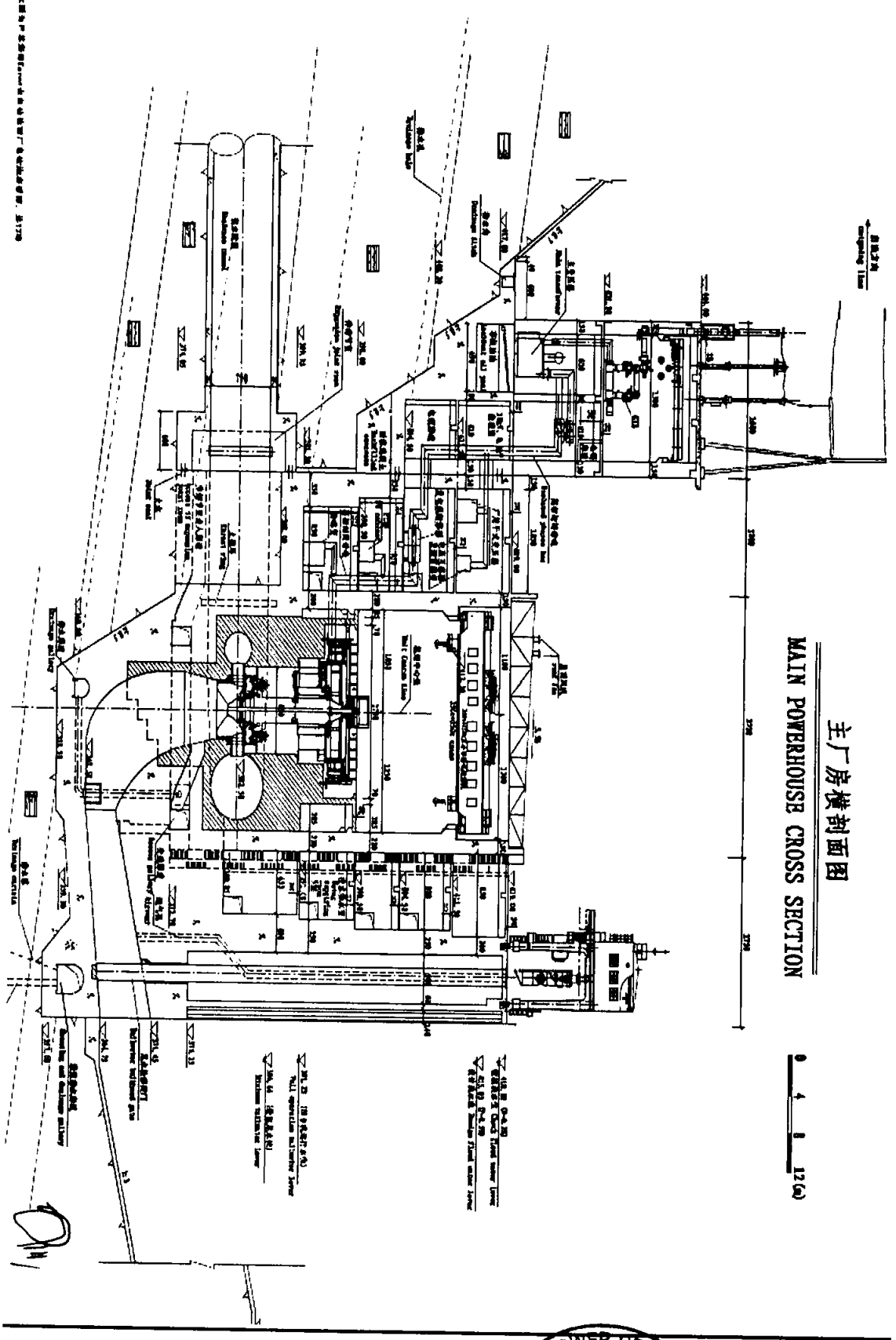
控制段上游立视图

0 10 20m



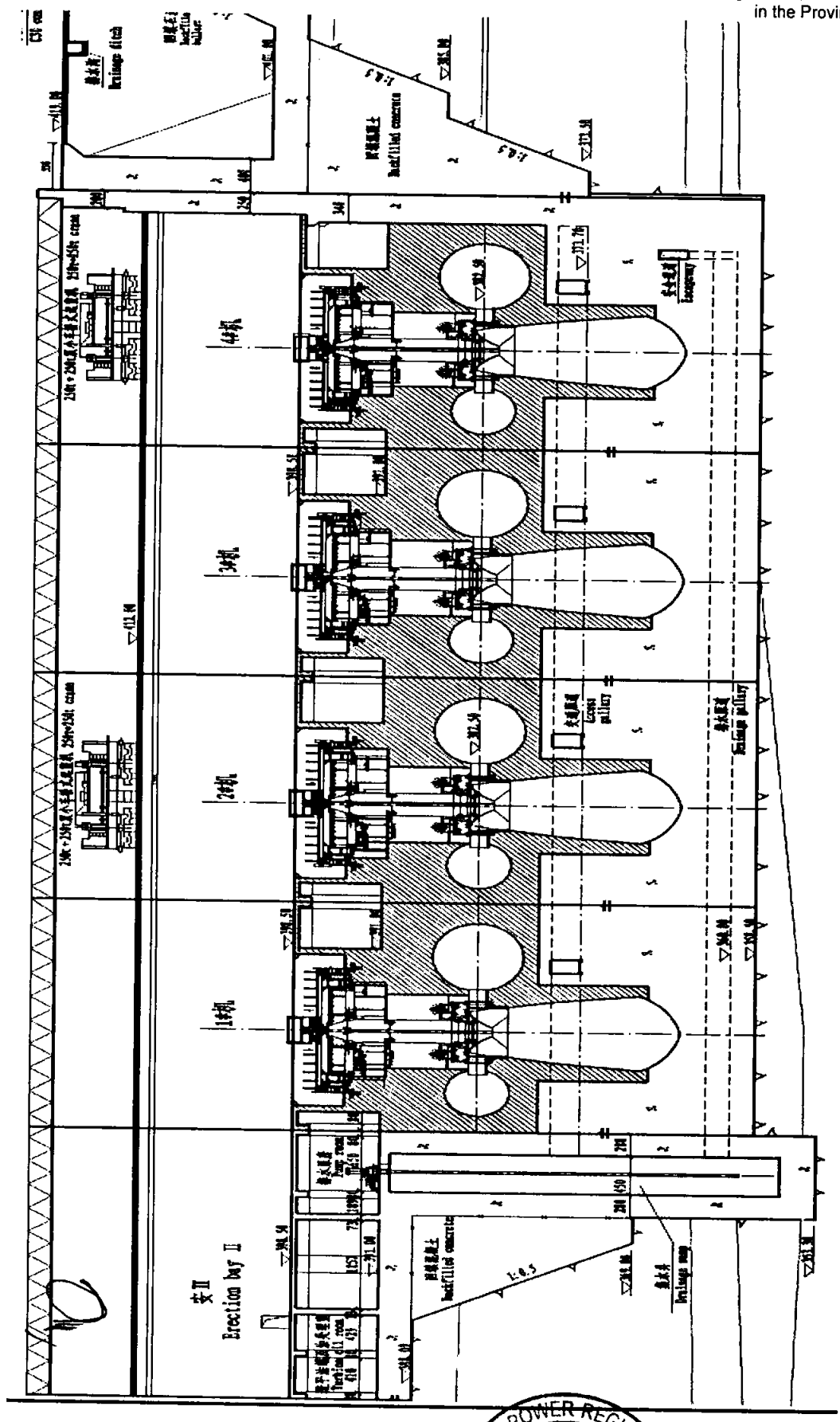
Transverse Section of the Generation Facility/ Hydel Power Plant through machine hall and draft tube Gate Gallery

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA



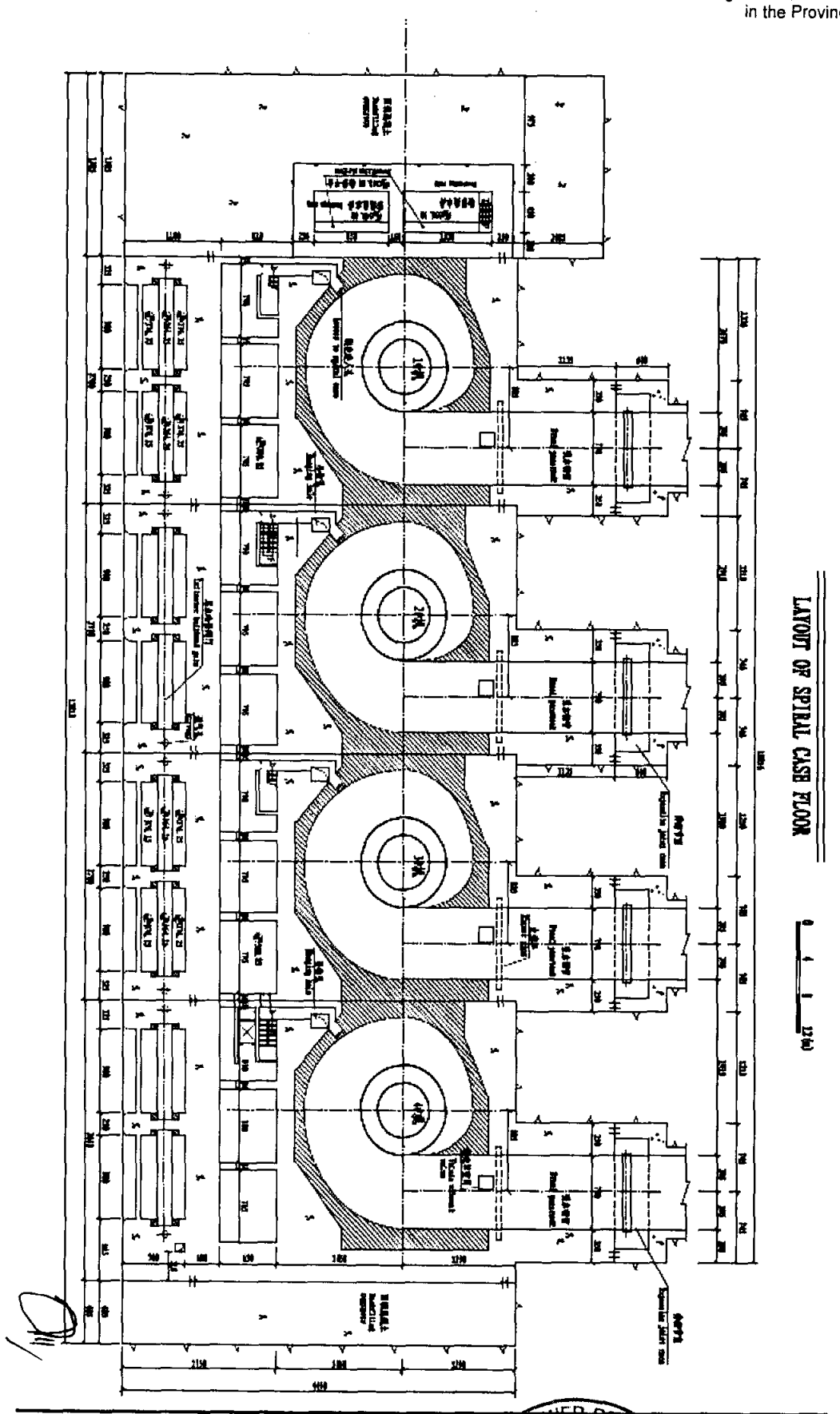
Longitudinal Section (through machine hall Cavern) of the Generation Facility/Hydel Power Plant

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA



Plane View of the Generation Facility/Hydel Power Plant

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA



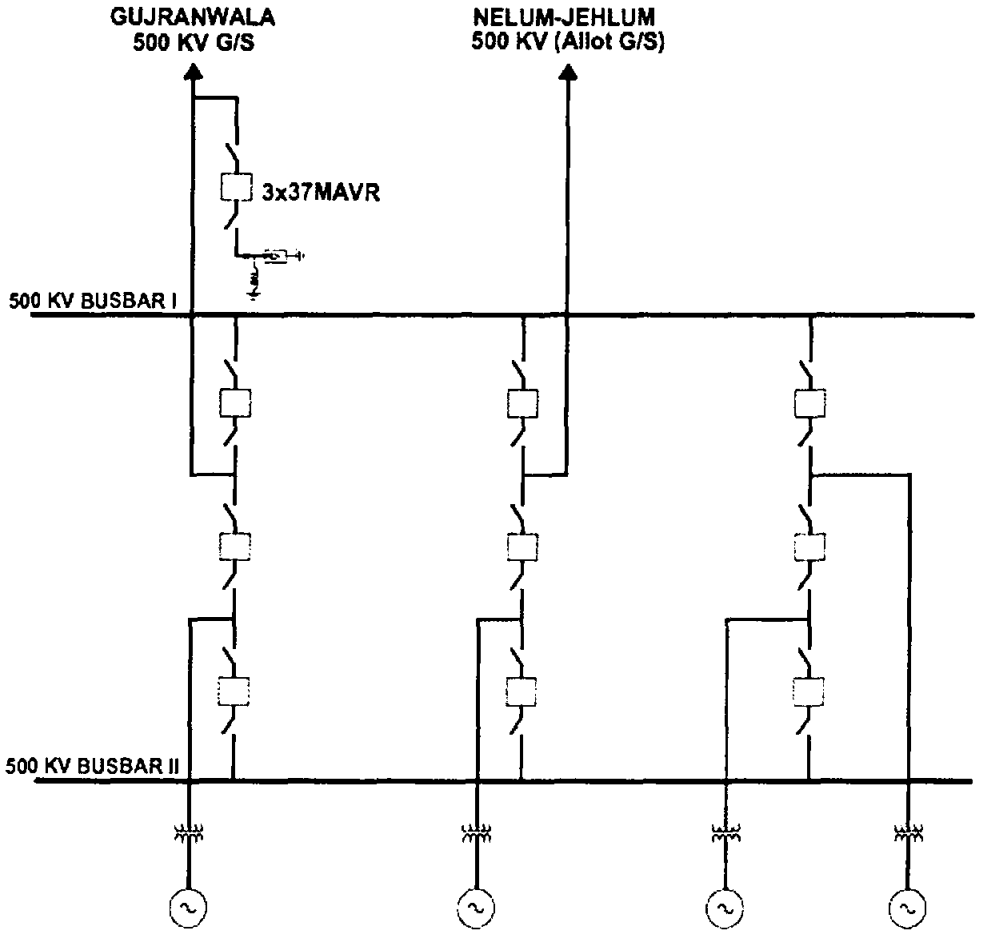
LAYOUT OF SPIRAL CASE FLOOR

REGISTRAR
NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA

Single Line Diagram of the Generation Facility/Hydel Power Plant

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

SINGLE LINE DIAGRAM OF KAROT 500 KV SUBSTATION AT KAROT H.P.P.



KAROT POWER COMPANY (PVT.) LIMITED

INTERCONNECTION OF
KAROT HYDRO-POWER PROJECT
KAROT

SINGLE LINE DIAGRAM OF
SLD - I

POWER PLANNERS INTERNATIONAL

DRAWING NO.

FIC No. 921

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA
REGISTRAR

Interconnection Arrangement/ Transmission Facilities for Dispersal of Electric Power from the Generation Facility/ Hydel Power Plant

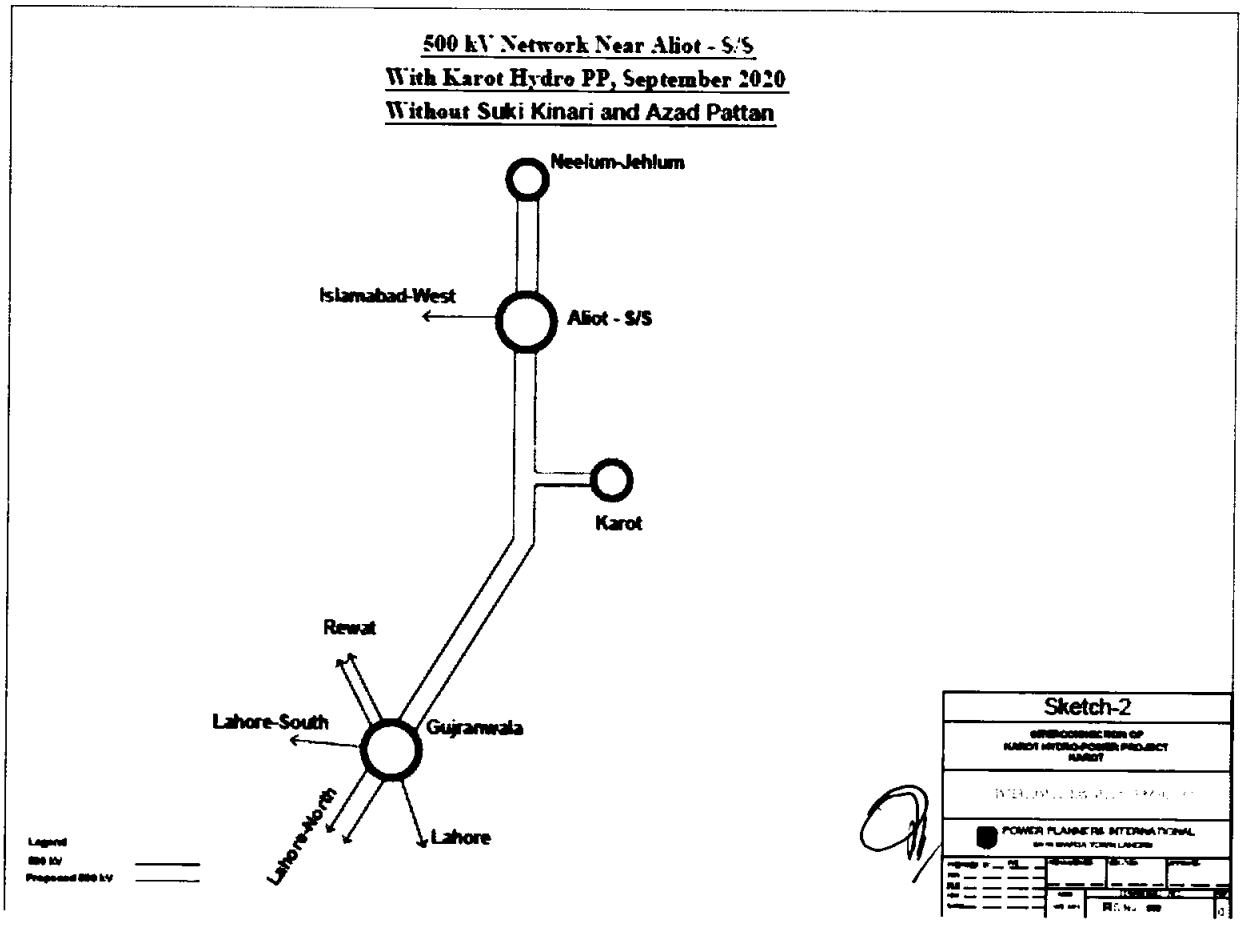
The electric power generated from the Generation Facility/Hydel Power Plant of the Licensee/ Karot Power Company (Private) Limited (KPCPL) shall be dispersed to the national grid.

(2). The proposed Interconnection/dispersal arrangement for the project will be consisting of 500 KV transmission line by making In-out of one circuit of 500 kV D/C Neelum-Jehlum Transmission Line to Gujranwala via Aliot Grid Station/Sub-Station. In this regard, the Licensee shall adhere to the provisions of the Distribution Code/Grid Code to the extent applicable.

(3). Any change in the above Interconnection Arrangement/Transmission Facilities duly agreed by KPCPL, CPPA-G and NTDC shall be communicated to the Authority in due course of time.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Schematic Diagram for Interconnection Arrangement/ Transmission Facilities for Dispersal of Electric Power from the Generation Facility



NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Detail of Generation Facility/Hydel Power Plant

(A). General Information

(i).	Name of the Company/Licensee	Karot Power Company (Private) Limited
(ii).	Registered/Business Office of the Company	House No. 05, Street N0. 72, Sector F-8/3, Islamabad
(iii).	Location of the Generation Facility	Village Karot, District Rawalpindi in the province of Punjab
(iv).	Type of Generation Facility	Hydro Power Plant

(B). Technology/Configuration of Generation Facility

(i).	Nature of Generation Facility	Run of river	
(ii).	Water Source	River of Jehlum	
(iii).	Type of Technology	Vertical Francis Turbines	
(iv).	Number of Units and Size	4 x 183 MW	
(v).	Plant size/Installed Capacity (Gross)	Mechanical Rating	732 MW
		Electrical Rating	720 MW
(vi).	Turbine Make & Model	Harbin Electric Machinery Co., Ltd. China/ Dong Fang Electric Machinery Co., Ltd. China/Zhe Fu Holding Group Co., Ltd. China	

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(C). Main Design Features

(i).	Design Discharge	1248 Cumecs
(ii).	Gross Head	79.5 m
(iii).	Rated Net Head	65 m
(iv).	Dam Height	95.5 m
(v).	Dam Type	Asphalt Concrete Core Rockfill dam
(vi).	Design Flood	29,600 Cumecs

(D). Spill Way

(i).	Spillway type	Over flow with radial gates
(ii).	No. of gates	6
(iii).	Gate size	9 m x 10 m
(iv).	Spillway discharging capacity	29,600 Cumecs

(E). Low level Sluicing Gates

(i).	No. of gates	2
(ii).	Gates Type	Radial
(iii).	Gate Size	(8 m x 9 m) each

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(F). Diversion Tunnels

(i).	No of Tunnels	3.00
(ii).	Tunnel Diameter	12.5 m
(iii).	Tunnel Length	447 m (Average length)

(G). Head Race Power Tunnels

(i).	No of tunnels	4
(ii).	Tunnel Diameter	7.9~9.6 m
(iii).	Tunnel Length	303~330 m
(iv).	No of pressure shaft	N/A
(v).	Diameter	N/A

(H). Tail Race Tunnels

(i).	No of tunnels	N/A
(ii).	Tunnel Diameter	N/A
(iii).	Tunnel Length	N/A

(I). Power House

(i).	Powerhouse type	Surface Level
(ii).	Switchyard	Open/outdoor

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR

(J). Electrical Characteristics of Generation Facility

(i).	Generation Voltage	15.75 KV
(ii).	Capacity of Generator	180 MW/225 MVA
(iii).	Automatic Generation Control	Yes
(iv).	Ramping Rate	To be provided later
(v).	Time required to Synchronize to Grid and loading the Complex to full load.	To be provided later

(K). Other Details of Generation Facility

(i).	Mean Annual Energy Estimation of the Generation Facility (Gross)	3,206 GWh
(ii).	Plant Factor of the Generation Facility	50.83%
(ii).	COD of the Generation Facility/Hydel Power Plant	December 31, 2020 (Expected)
(iii).	Expected Useful Life of the Generation Facility Hydel Power Plant from the COD	30 Years

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

SCHEDULE-II

The installed/ISO Capacity (MW), De-Rated Capacity at Mean Site Conditions (MW), Auxiliary Consumption (MW) and the Net Capacity at Mean Site Conditions (MW) of the Generation Facilities of Licensee is given in the Schedule

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

SCHEDULE-II

(1)	Total installed capacity of the Generation Facility/Hydel Power Plant (Gross ISO)	732.00 MW
(2)	Total De-Rated Capacity of the Generation Facility/Hydel Power Plant at Mean Site Conditions	732.00 MW
(3)	Total De-Rated Capacity (Electrical) of the Generation Facility/Hydel Power Plant at Mean Site Conditions	720.00* MW
(4)	Auxiliary Consumption of the Generation Facility/Hydel Power Plant	007.20 MW
(5)	Net Capacity of the Generation Facility/Hydel Power Plant at Mean Site Conditions	712.80 MW

Note

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

* Based on Generator Efficiency of 98.20 %