National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

NEPRA Tower, Ataturk Avenue (East) G-5/1, Islamabad
Ph: +92-51-9206500, Fax: +92-51-2600021
Web: www.nepra.org.pk, E-mail: info@nepra.org.pk

No. NEPRA/R/LAG-23/ 684-85 January 17, 2014

General Manager (Hydel) Operations
Water and Power Development Authority (WAPDA)
186 - WAPDA House,
Shahrah-e-Quaid-e-Azam,
Lahore

Subject: Modification-III in Generation Licence No. GL(Hydel)/05/2004, dated 03.11.2004 – WAPDA for its Hydel Power Stations

It is intimated that the Authority has approved "Licensee Proposed Modification" in Generation Licence No. GL(Hydel)/05/2004 (issued on November 03, 2004) in respect of Water and Power Development Authority (WAPDA) for its Hydel Power Stations pursuant to Regulation 10(11) of the NEPRA Licensing (Application & Modification Procedure) Regulations, 1999.

2. Enclosed please find herewith determination of Authority in the matter of Licensee Proposed Modification of WAPDA of its Hydel Power Stations along with Modification-III in the Generation Licence No. GL/(Hydel)/05/2004, as approved by the Authority.

Encl:/As above

(Syed Safeer Hussain)

Copy to Director General, Pakistan Environmental Protection Agency, House No. 311, Main Margalla Road, F-11/3, Islamabad.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

National Electric Power Regulatory Authority (NEPRA)

Determination of Authority in the Matter of Licensee Proposed Modification (LPM) of Water and Power Development Authority (WAPDA)

January 08, 2014
Application No. LAG-23

(A). Background

(i). The Authority has granted a Generation Licence (No. GL (HYDEL) /05/2004, dated November 3, 2004) to WAPDA for a cumulative Installed Capacity of 6879.56 MW.

(ii). This above mentioned Generation Licence has been granted for eighteen (18) Hydel Power Stations, distinctly located across the country.

(B). Communication of LPM

(i). In accordance with Regulation-10 of the NEPRA Licensing (Application & Modification Procedure) Regulations, 1999 (the "Regulations"), WAPDA communicated an LPM on May 31, 2013 for inclusion of four (04) new Hydel Power Stations/Plants including (a) Tarbela 4th Extension Hydro Power Project (b) Keyal Khwar Hydro Power Project (c) Golen Gol Hydro Power Project and (d) Jabban Hydro Power Project.

(ii). WAPDA in the submitted "Text of Modification" statement informed that it plans to get included four (04) upcoming Hydro Power Projects, having total Installed capacity of 1668.00 MW. In the "Reason in Support of Modification" statement WAPDA submitted that it is actively pursuing its development program for Hydel Power Projects and for this purpose this request has been submitted to NEPRA in respect of near to completion and financial close development projects.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

(iii). Regarding the "Impact on Tariff", WAPDA submitted that a detailed analysis regarding projected impact in the matter, justifying that the inclusion of the above power plants has already been submitted through a separate Tariff Petition. About the "Quality of Service (QoS)" and "Performance", WAPDA submitted that the inclusion of the above power plants would improve the overall performance of WAPDA as relatively low priced electricity would be made available to National Grid.

(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 WAPDA, the Registrar accepted the LPM as required under the Regulation 10 (4) of the Regulations.

(ii). The Registrar in terms of Regulation 10 (4) of Regulations published on July 06, 2013 a notice about the LPM in one English and one Urdu daily newspapers, informing general public, stakeholders and interested affected parties about the same and invited for comments in favor or against the LPM.

(iii). Furthermore, separate notices were also sent to Experts, Government Ministries and Representative Organizations etc. for submitting their views and comments in the matter.

(D). Comments of Stakeholders

(i). In reply to the above, the Authority received comments from two (02) stakeholders. These included Ministry of Petroleum and Natural Resources (MoP&NR) and Ministry of Water and Power (MoW&P). The salient points of the comments offered by these stakeholders are summarized in the following paragraphs: -

(a). MoP&NR in comments stated that as no gas was required for utilization of the projects of WAPDA therefore, the Ministry has no objection on modification of Generation License of WAPDA;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

(b). MoW&P remarked that the LPM may be processed under the relevant Act/Rules for addition of four (04) upcoming Hydel Plants of 1660.00 MW. Further, WAPDA may confirm the completion dates of these projects and NEPRA may ensure their on-time completion.

(ii). The Authority in its Regulatory Meeting (RM-13-624), held on November 26, 2013 considered the comments/observations of the stakeholders and decided to proceed further in the matter as stipulated in the Regulation and NEPRA Licensing (Generation) Rules 2000 (the Rules).

(E). Approval of LPM

(i). The importance of electricity in the development of the economy of any country is of imperative nature. 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.

(ii). The existing energy mix of the country is heavily skewed towards the costlier thermal power plants, mainly operating on imported furnace oil. The continuously increasing trend in fuel prices is not only creating pressure on 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 all indigenous resources are given priority for power generation and their development is encouraged.

(iii). In view of the above, the Authority contemplates that the initiative of WAPDA for exploiting the hydro potential of the country for power generation as very encouraging and vital. This will help in overcoming the severe shortage of electricity in the country and will trigger Industrial growth thereby helping in

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

raising the GDP of the country which is on the decline due to shortage of electricity.

(iv). Therefore, the Authority hereby approves the LPM, in the Generation Licence of WAPDA for addition of four (04) Hydro Power Plants including (a) Tarbela 4th Extension Hydro Power Project (b) Keyal Khwar Hydro Power Project (c) Golen Gol Hydro Power Project and (d) Jabban Hydro Power Project thereby increasing the total Installed Capacity of WAPDA (Hydel) to 8547.56 MW from 6879.56 MW.

(v). Accordingly, the already granted Generation Licence (No. GL (Hydel)/05/2004, dated November 3, 2004 in the name of WAPDA (Hydel) is hereby modified. The Fact Sheet indicating the required changes alongwith Modified/Revised Schedule-I & II of the Generation Licence are attached as Annexure to this determination. The grant of such a Licensee Proposed Modification would be subject to the provisions contained in the NEPRA Act and relevant rules framed there under.

Authority

Habibullah Khilji
Member

10/1/2014

Maj. (R) Haroon Rashid
Member

Khawaja Muhammad Naeem
Member/Vice Chairman

15.01.XIV.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

17.01.14

National Electric Power Regulatory Authority (NEPRA)

Islamabad – Pakistan

GENERATION LICENCE

GL(HYDEL)/05/2004

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 WAPDA (on November 03, 2004, Modification-I dated June 27, 2008, Modification-II dated June 20, 2011 and expiring on November 02, 2034,), to the extent of changes mentioned as here under:-

(i). Installed capacity mentioned in the **Face Sheet** may be read as **8547.56 MW** instead of **6879.56 MW**;

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

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

This **Modification-III** is given under my hand this 17th of **January Two Thousand** & **Fourteen**

Registrar

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

SCHEDULE-I
(Modified/Revised)

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

Hydel Power Station
Tarbela

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Tarbela Hydel Power Station

PLANT DETAILS

1.	Location	On Right Bank, of River Indus at Tarbela in Distt. Abbottabad, in the province of Khyber Pakhtunkhwa (KPK).				
2.	Plant	Type	Total Capacity	No. of Units		
		Storage	3478 MW	14		
3.	Head	Maximum	Minimum			
		440 ft	190 ft			
4.	Technology	Francis Turbines				
5.	Tunnel	No.	Length	Diameter		
	Total No. of Tunnel	5	-	At Intake	At Penstock	
	(i). No. of Power Tunnels	3	T1, T2 = 2400 ft. T3 = 2700 ft.	45.0 ft.	43.5 ft.	
	(ii). No. of Irrigation Tunnels	2	T4 = 2700 ft T5 = 3675 ft	45.0 ft.	36.0 ft.	
6.	Minimum Expected Useful Life of the Generation Facility	50 Years				
7.	Peaking/Base Operation	Generally during High Flow Period, the plant is operated for base load where as during Low Flow Period, it is utilized for peaking purpose.				
8.	Plant Characteristics	Generator Voltage	Units (1-10) = 13.8 KV			
			Units (11-14) = 18.0 KV			
		Power Factor	Units (1-4) = 0.85			
			Units (5-10) = 0.95			
			Units (11-14) = 0.90			

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

		Frequency	50 Hz	
		Automatic Generation Control	Yes	
9.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)
		Tarbela-Gatti-I	500	329.69
		Tarbela-Gatti-II	500	321.00
		Tarbela-Sheikh Muhammadi	500	113.07
		Tarbela-Rawat	500	110.89
		Tarbela-Burhan-I	220	035.01
		Tarbela-Burhan-II	220	035.01
		Tarbela-Burhan-III	220	035.04
		Tarbela-Sangjani-IV	220	062.05
		Tarbela-Mardan-I	220	067.00
		Tarbela-Mardan-II	220	067.00

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Mangla

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Mangla Hydel Power Station

PLANT DETAILS

1.	Location	On River Jhelum at Mangla near Mirpur, Azad Jammu & Kashmir.				
2.	Plant	Type	Total Capacity	No. of Units		
		Storage	1000 MW	10		
3.	Head	Maximum		Minimum		
		363 ft		192 ft		
4.	Technology	Francis Turbines				
5.	Tunnel	No.	Length	Diameter		
	Total No. of Tunnel	5		At Intake	At Penstock	
	(i). No. of Power Tunnels	5	1560 ft. each	30 ft.	26 ft.	
	(ii). No. of Irrigation Tunnels	-	-	-	-	
6.	Minimum Expected Useful Life of the Generation Facility	50 Years				
7.	Peaking/Base Operation	Plant is operated for base load generally during High Flow Period, where as during Low Flow Period, it is utilized for peaking.				
8.	Plant Characteristics	Generator Voltage		Units (1-10) = 13.2 KV		
		Power Factor		Units (1-10) = 0.8		
		Frequency		50 Hz		
		Automatic Generation Control		Automatic Load Frequency Control is installed on Units 3, 4, 7&8		

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

		CCT	Voltage (KV)	Length (KM)
9.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	Mangla-Ghakhar-I	220	111.09
		Mangla-Ghakhar Express -II	220	113.07
		Mangla-Ghakhar-III	220	113.07
		Mangla – KSK-I	220	170.06
		Mangla – KSK-II	220	170.06
		Mangla – KSK-III	220	172.09
		Mangla – New Rawat-I	220	79.09
		Mangla – New Rawat-II	220	79.09
		Mangla – Jhelum-New Rawat-I	132	123.91
		Mangla – Gujar Khan-New Rawat-I	132	88.36
		Mangla – Gujar Khan-New Rawat-II	132	88.36
		Mangla – Old Rawat-I	132	90.00
		Mangla – Old Rawat-II	132	90.00
		Mangla – Rajar-Kharian-I	132	61.00
		Mangla-Kharian-II	132	61.00
		Mangla-Kharian-III	132	61.00
		Mangla-Scarp-I	132	189.06
		Mangla-Scarp – II	132	109.03
		Mangla-Mirpur	132	8.00

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Warsak

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Warsak Hydel Power Station

PLANT DETAILS

1.	Location	located on River Kabul at about 30 KMs from Peshawar in Khyber Pakhtunkhwa (KPK)				
2.	Plant	Type	Total Capacity	No. of Units		
		Storage	242.5 MW	6		
3.	Head	Maximum		Minimum		
		150 ft		130 ft		
4.	Technology	Francis Turbine				
5.	Tunnel	No.	Length	Diameter		
	Total No. of Tunnel	1	-	At Intake	At Penstock	
	(i). No. of Power Tunnels	1	365 ft.	39 ft.	39 ft.	
	(ii). No. of Irrigation Tunnels	-	-	-	-	
6.	Minimum Expected Useful Life of the Generation Facility	25 Years after completion of rehabilitation.				
7.	Peaking/Base Operation	Mostly the plant runs as base load, with delivery of peak load for minimum time period during evening.				
8.	Plant Characteristics	Generator Voltage	Units (1-6) = 13.2 KV			
		Power Factor	Units (1-4) = 1.0			
			Units (5-6) = 0.85			
		Frequency	50 Hz			
		Automatic Generation Control	No			
9.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)		
		Warsak-Peshawar Cantt.-I	132	24.1		
		Warsak-Jamrud-II	132	27.69		
		Warsak-Shahi Bagh-I	132	25.91		
		Warsak-Shahi Bagh-II	132	25.91		

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Ghazi Barotha

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Ghazi Barotha Hydel Power Station

PLANT DETAILS

1.	Location	Near Village Barotha 63 KM downstream of Tarbela about 10 KM West of Attock City, Punjab		
2.	Plant	Type	Total Capacity	No. of Units
		Run off the canal with small storage for peak Hours.	1450 MW	5
3.	Head	Maximum		Minimum
		74 meter		69 meter
4.	Technology	Francis Turbine		
5.	Tunnel	-		
6.	Minimum Expected Useful Life of the Generation Facility	50 Years		
7.	Peaking/Base Operation	Peak Load Operation		
8.	Plant Characteristics	Generator Voltage	Units (1-5) = 18 KV	
		Power Factor	Units(1-5) = 0.95	
		Frequency	Frequency = 50 Hz	
		Automatic Generation Control	Yes	
9.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)
		Two circuit Tarbela-Barotha-Rawat	500	156
		Two circuit 500 KV Tarbela-Barotha-Gatti	500	80 KM

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

Hydel Power Station
Chashma

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Chashma Hydel Power Station

PLANT DETAILS

1.	Location	On Right abutment of Chashma Barrage in Dist. Mianwali, Province of Punjab.		
2.	Plant	Type	Total Capacity	No. of Units
		Run of the River	184 MW	8
3.	Head	Maximum		Minimum
		13.8 meter		3 meter
4.	Technology	Bulb type Turbine		
5.	Tunnel	The Power House is fed through 1000 meter long and 136 meter wide Headrace water channel.		
6.	Minimum Expected Useful Life of the Generation Facility	60 Years.		
7.	Peaking/Base Operation	It is run off the river plant and loading generally depends upon the water releases available.		
8.	Plant Characteristics	Generator Voltage	Units (1-8) = 11 KV	
		Power Factor	Units (1-8) = 0.90	
		Frequency	50 Hz	
		Automatic Generation Control	No	
9.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)
		Chashma-Wanbuchran-(CCT-1)	132	33.357
		Chashma-Wanbuchran-(CCT-2)	132	33.357
		Chashma Left Bank- (CCT-1)	132	1.71
		Chashma Left Bank- (CCT-2)	132	1.71

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

Hydel Power Station
Renala

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Renala Hydel Power Station

PLANT DETAILS

1.	Location	located on Lower Bari Doad Canal near Renala Town Distt. Okara.		
2.	Plant	Type	Total Capacity	No. of Units
		Run of Canal	1.1 MW	5
3.	Head	Maximum	Minimum	
		10 ft	7 ft	
4.	Technology	Francis Turbine (Horizontal Shaft)		
5.	Penstock	No.	Length	Diameter Internal
	Total No. of Penstock	Nil		
6.	Minimum Expected Useful Life of the Generation Facility	15 Years		
7.	Peaking/Base Operation	Meant for local load of Lift Irrigation Pumping Stations.		
8.	Length of Transmission Line (Radial feeder for Lift Irrigation System)	CCT	Voltage (KV)	Length (KM)
		11 KV feeder EHKL	11	60
9.	Plant Characteristics	Generator Voltage	Units (1-5) = 3.3 KV	
		Power Factor	Units (1-5) = 0.8	
		Frequency	50 Hz	
		Automatic Generation Control	No	
10.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)
		11 KV feeder EHKL	11	60

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Chichoki

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Chichoki Hydel Power Station

PLANT DETAILS

1.	Location	On Upper Chenab Canal (UCC) near village Joyanwala about 20 KMs from Sheikhupura.		
2.	Plant	Type	Total Capacity	No. of Units
		Run of Canal	13.2 MW	3
3.	Head	Maximum		Minimum
		27.7 ft		22.3 ft
4.	Technology	Kaplan Turbine		
5.	Penstock	No.	Length	Diameter Internal
	Total No. of Penstock	N.A		
6.	Minimum Expected Useful Life of the Generation Facility	30 Years.		
7.	Peaking/Base Operation	Operated as base load according to the water share in the upper Chenab Canal.		
8.	Plant Characteristics	Generator Voltage	Units (1-3) = 3.3 KV	
		Power Factor	Units (1-3) = 0.8	
		Frequency	50 Hz	
		Automatic Generation Control	No	
9.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage(KV)	Length(KM)
		Chichokimallian-Attabad-Shaikhpura	66	18

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Nandipur

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Nandipur Hydel Power Station

PLANT DETAILS

1.	Location	On Upper Chenab Canal (UCC) about 10 KMs from Gujranwala on Gujranwala Sialkot Road.		
2.	Plant	Type	Total Capacity	No. of Units
		Run of Canal	13.8 MW	3
3.	Head	Maximum		Minimum
		24.4 ft		19.5 ft
4.	Technology	Kaplan Turbine		
5.	Penstock	No.	Length	Diameter Internal
	Total No. of Penstock	N.A		
6.	Minimum Expected Useful Life of the Generation Facility	30 Years.		
7.	Peaking/Base Operation	Operated as base load according to the water share in the upper Chenab Canal.		
8.	Plant Characteristics	Generator Voltage	Units (1-3) = 3.3 KV	
		Power Factor	Units (1-3) = 0.8	
		Frequency	50 Hz	
		Automatic Generation Control	No.	
9.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)
		Nandipur-Daska	66	20
		Nandipur-Gujranwala	66	10

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Shadiwal

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Shadiwal Hydel Power Station

PLANT DETAILS

1.	Location	On Upper Jhelum Canal (UJC) about 133 KMs Down Stream of Mangla and about 7 KMs from Gujrat		
2.	Plant	Type	Total Capacity	No. of Units
		Run of Canal	13.5 MW	2
3.	Head	Maximum	Minimum	
		24.5 ft	17 ft	
4.	Technology	Kaplan Turbines		
5.	Penstock	No.	Length	Diameter Internal
	Total No. of Penstock	N.A		
6.	Minimum Expected Useful Life of the Generation Facility	30 Years.		
7.	Peaking/Base Operation	Operated as base load according to the water share in the upper Jhelum Canal.		
8.	Plant Characteristics	Generator Voltage	Units (1-2) = 11KV	
		Power Factor	Units (1-2) = 0.9	
		Frequency	50 Hz	
		Automatic Generation Control	No.	
9.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)
		Shadiwal-Gujrat	132	9.6

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Rasul

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Rasul Hydel Power Station

PLANT DETAILS

1.	Location	On Upper Jhelum Canal (UJC) about 74 KMs Down Stream of Mangla.		
2.	Plant	Type	Total Capacity	No. of Units
		Run of Canal	22 MW	2
3.	Head	Maximum	Minimum	
		85.05 ft	80.35 ft	
4.	Technology	Kaplan Turbine		
5.	Penstock	No.	Length	Diameter Internal
	Total No. of Penstock	2	281 ft.	21 ft.
6.	Minimum Expected Useful Life of the Generation Facility	30 Years.		
7.	Peaking/Base Operation	Operated as base load according to the water share in the Canal.		
8.	Plant Characteristics	Generator Voltage	Units (1-2) = 11KV	
		Power Factor	Units (1-2) = 0.88	
		Frequency	50 Hz	
		Automatic Generation Control	No	
9.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length(KM)
		Rasul-Malikwal	66	38.4
		Rasul-Malikwal-II	66	38.4
		Rasul-Kharian (D/C Bundled)	132	42.0
		Rasul-Kharian (Bundled)	132	42.0

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Dargai

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

Dargai Hydel Power Station

PLANT DETAILS

1.	Location	On Upper Swat Canal in Malakand Agency near Dargai Distt. Malakand Agency.		
2.	Plant	Type	Total Capacity	No. of Units
		Run of Canal	20 MW	4
3.	Head	Maximum	Minimum	
		243 ft	239 ft	
4.	Technology	Francis Vane Turbine (Horizontally Mounted)		
5.	Penstock	No.	Length	Diameter Internal
	Total No. of Penstock	N.A		
6.	Minimum Expected Useful Life of the Generation Facility	25 Years.		
7.	Peaking/Base Operation	Runs on base load.		
8.	Plant Characteristics	Generator Voltage	Units (1-4) = 11 KV	
		Power Factor	Units (1-4) = 0.85	
		Frequency	50 Hz	
		Automatic Generation Control	No	
9.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)
		Dargai-Mardan	132	59.27
		Dargai-Jabban	66	5.51
		Dargai-Chakdara	132	30.07

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

Hydel Power Station
Chitral

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Chitral Hydel Power Station

PLANT DETAILS

1.	Location	On Lutko River, Garam Chashma Road 7 KMs East of Chitral Town		
2.	Plant	Type	Total Capacity	No. of Units
		Run of Canal	1 MW	4
3.	Head	Maximum		Minimum
		110 ft		106 ft
4.	Technology	Units 1 & 2	OSS BERGER (Cross Flow)	
		Units 3 & 4	Francis (Horizontal)	
5.	Penstock	No.	Length	Diameter
	Total No. of Penstock	N.A		
6.	Minimum Expected Useful Life of the Generation Facility	25 Years.		
7.	Peaking/Base Operation	Chitral Hydel Power House is not synchronized with National Grid directly feeds a separate 11 KV line according to considerable variation in load during routine and peak hours.		
8.	Plant Characteristics	Generator Voltage	Units (1-4) = 415 V	
		Power Factor	Units (1-4) = 0.96	
		Frequency	50 Hz	
		Automatic Generation Control	No	
9.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)
		11 KV Feeders. Feeding consumers directly Without Grid Station	-	-
			-	-
			-	-

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Kurram Garhi

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Kurram Garhi Hydel Power Station

PLANT DETAILS

1.	Location	Kurram Garhi Power Station No. 1	On River Kurram at a distance of 12 KMs in West North of Bannu City.		
		Kurram Garhi Power Station No. 2	On River Kurram at a distance of 8 KMs in West North of Bannu City.		
2.	Plant	Type	Total Capacity	No. of Units	
		Run of Canal	4MW	4	
3.	Head	Maximum	Minimum		
		60 ft	60 ft		
4.	Technology	Francis Turbine			
5.	Tunnel	No.	Length	Diameter	
	Total No. of Tunnel	-	-	At Intake	At Penstock
	No. of Power Tunnel	-	Penstock length 29.7 Meters	1650 mm	-
6.	Minimum Expected Useful Life of the Generation Facility	30 Years.			
7.	Peaking/Base Operation	Base Load.			
8.	Plant Characteristics	Generator Voltage	Units (1-4) = 11 KV		
		Power Factor	Units (1-4) = 0.80		
		Frequency	50 Hz		
		Automatic Generation Control	No		
9.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)	
		Kurram Garhi-Bannu	66	16.37	

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Gomal Zam

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Gomal Zam Hydel Power Station

PLANT DETAILS

1.	Location	Right Bank of Gomal River at Khajuri Kach in South Waziristan Agency about 60KM/ West of District Tank in Khyber Pakhtunkhwa (KPK).		
2.	Plant	Type	Total Capacity	No. of Units
		Storage	17.4 MW	2
3.	Head	Maximum	Minimum	Design
		113.0 m	74.24 m	100.0 m
4.	Technology	Vertical Francis Turbines		
5.	Tunnel	No.	Length	Diameter
		1	390 m	3 m
6.	Peak/Base Load Operation	The plant will be used for peak load (17.4 MW) as well as base load (8.7 MW) depending on the availability of water.		
7.	Expected Date of Commissioning of the Latest Unit	January 15, 2012		
8.	Minimum Expected Useful Life of the Generation Facility	50 years		
9.	Plant Characteristics	Generator Voltage	Units (1-2) = 11 KV	
		Power Factor	0.85	
		Frequency	50 Hz	
		Automatic Generation Control	Yes	
10.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)
		Gomal Zam Power House -Tank Grid Station	132	55

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Jinnah Hydel

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Jinnah Hydel Power Station

PLANT DETAILS

1.	Location	On the Indus River on the right side of the Jinnah Barrage as a bypass arrangement, approximately 5 KM downstream of Kalabagh Town in District Mianwali.		
2.	Plant	Type	Total Capacity	No. of Units
		Run of River	96 MW	08
3.	Head	Maximum		Minimum
		6.2 m		3.2 m
4.	Technology	Francis Vertical Turbine		
5.	Tunnel	No.	Length	Diameter
	Total No. of Channel	1	1800 m including Tailrace	Bed Width = 133 m
6.	Peak/Base Load Operation	Base load operation.		
7.	Expected Date of Commissioning of the Latest Unit	March 31, 2012		
8.	Minimum Expected Useful Life of the Generation Facility	50 years		
9.	Plant Characteristics	Generator Voltage		Units (1-2) = 11 KV
		Power Factor		0.90
		Frequency		50 Hz
		Automatic Generation Control		Yes
10.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)
		JHPP-I	132 KV	5 KM
		JHPP-II	132 KV	5 KM

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

Hydel Power Station
Allai Khwar

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Allai Khwar Hydel Power Station

PLANT DETAILS

1.	Location		On left bank tributary of the River Indus at Besham in Distt. Battagram in Khyber Pakhtunkhwa (KPK).			
2.	Plant		Type	Total Capacity	No. of Units	
			Storage	121 MW	2	
3.	Head		Maximum	Minimum		
			697 m	687 m		
4.	Technology		Pelton Wheel Vertical Shaft Turbines			
5.	Tunnel		No.	Length	Diameter	
	Total No. of Channel		1		At Intake	At Penstock
	(i).	Power Tunnels (Headrace)	1	2366 m	2.2 m	-
	(ii).	Irrigation Tunnels	Nil			
6.	Peak/Base Load Operation		Generally during High Flow Period, the plant will be operated for base load whereas during Low Flow Period, it will be utilized for peaking.			
7.	Expected Date of Commissioning of the Latest Unit		October 31, 2011			
8.	Minimum Expected Useful Life of the Generation Facility		50 years			
9.	Plant Characteristics		Generator Voltage	Units (1-2) = 11 KV		
			Power Factor	0.85		
			Frequency	50 Hz		
			Automatic Generation Control	Yes		
10.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)		CCT	Voltage(KV)	Length(KM)	
			AKHP-DKHP	132	50.5	
			AKHP-KKHP	132	16.5	
			AKHP-NEW MANSEHRA	220	83.3	
			NEW MANSEHRA-ISLAMABAD	220	100.5	

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Duber Khwar

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Duber Khwar Hydel Power Station

PLANT DETAILS

1	Location	On left bank tributary of the River Indus at Besham in Distt. Kohistan in KPK				
2	Plant	Type	Total Capacity	No. of Units		
		Storage	130 MW	2		
3	Head	Maximum	Minimum			
		540.5 m	531 m			
4	Technology	Pelton Wheel Vertical Shaft Turbines				
5	Tunnel		No.	Length	Diameter	
	Total No. of Channel		2		At Intake	At Penstock
	(i).	No. of Power Tunnels (Headrace)	1	4873	3.5 m	-
	(ii).	No. of Power Tunnels (Pressure)	1	1694.84	-	2.6 m
	(iii).	No. of Irrigation Tunnels	Nil			
6.	Peak/Base Load Operation	Generally during High Flow Period, the plant will be operated for base load whereas during Low Flow Period, it will be utilized for peaking.				
7.	Expected Date of Commissioning of the Latest Unit	December 31, 2012				
8.	Minimum Expected Useful Life of the Generation Facility	50 years				
9.	Plant Characteristics	Generator Voltage	Units (1-2) = 11 KV			

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

		Power Factor	0.85	
		Frequency	50 Hz	
		Automatic Generation Control	Yes	
10.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)
		DKHP-KKHP	132	32.3
		DKHP-AKHP	132	50.5
		AKHP-NEW MANSEHRA	220	83.3
		NEW MANSEHRA-ISLAMABAD	220	100.5

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Khan Khwar

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Khan Khwar Hydel Power Station

PLANT DETAILS

1.	Location		Right tributary of the River Indus at Besham in Distt. Shangla in KPK.			
2.	Plant		Type	Total Capacity	No. of Units	
			Storage	72 MW	2	
3.	Head		Maximum		Minimum	
			257 m		247 m	
4.	Technology		Francis Turbine			
5.	Tunnel		No.	Length	Diameter	
	Total No. of Tunnel		1	-	At Intake	At Penstock
	(i).	No. of Power Tunnels (Headrace)	1	4540	3.8 m	3.25m
6.	Peak/Base Load Operation		Generally during High Flow Period, the plant will be operated for base load whereas during Low Flow Period, it will be utilized for peaking.			
7.	Expected Date of Commissioning of the Latest Unit		January 31, 2011			
8.	Minimum Expected Useful Life of the Generation Facility		50 Years			
9.	Plant Characteristics		Generator Voltage		Units (1-3) = 11 KV	
			Power Factor		0.85	
			Frequency		50 Hz	

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

		Automatic Generation Control	Yes	
10.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)
		KKHP-DKHP	132	32.3
		KKHP-KKHP	132	16.5
		AKHP-NEW MANSEHRA	220	83.2
		NEW MANSEHRA-ISLAMABAD	220	100.48

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Tarbela, 4th Extension

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Tarbela Hydel Power Station 4th Extension

PLANT DETAILS

1.	Location	On Right Bank, of River Indus at Tarbela in Distt. Abbottabad, in the province of Khyber Pakhtunkhwa (KPK).			
2.	Plant	Type	Total Capacity	No. of Units	
		Storage	1410 MW	03	
3.	Head	Maximum		Minimum	
		450 ft		248.4 ft	
4.	Technology	Francis Turbines			
5.	Tunnel	No.	Length	Diameter	
	Total No. of Tunnel	1	2997 ft.	At Intake	At Penstock
				45.0 ft	36.0 ft.
6.	Expected Date of Commissioning of the Latest Unit	July 31, 2017			
7.	Minimum Expected Useful Life of the Generation Facility	35 Years			
8.	Peaking/Base Operation	Plant after construction will be operated in accordance with requirements of NPCC.			
9.	Plant Characteristics	Generator Voltage	18KV		
		Power Factor	0.9 (Lagging)		
		Frequency	50 Hz		
		Automatic Generation Control	Yes		
10.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	The powerhouse will be connected with existing Tarbela switchyard having six 220 KV and four 500 KV outgoing Transmission Lines.			

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Keyal Khwar

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Keyal Khwar Hydel Power Station

PLANT DETAILS

1.	Location		Right tributary of the River Indus at Keyal Khwar Distt. Kohistan in Khyber Pakhtunkhwa (KPK).		
2.	Plant		Type	Total Capacity	No. of Units
			Run of River	122 MW	2
3.	Gross Head		732 m		
4.	Technology		Vertical Shaft 5 Jet Pelton Turbine		
5.	Tunnel		No.	Length	Diameter
	Total No. of Tunnel		5	-	-
	(i).	Headrace Tunnel	1	7.16 Km	3.2 m
	(ii).	High Pressure Tunnel	1	155 m	2.2 m
	(iii).	Tailrace Tunnel	1	676 m	3.8 m
	(iv).	Surge Tunnel	1	355 m	3.2 m
	(v).	Ventilation Tunnel	1	716 m	3.6 m
6.	Peak/Base Load Operation		Base Load operation as per requirement of NPCC		
7.	Expected Date of Commissioning of the Latest Unit		November 30, 2017		
8.	Minimum Expected Useful Life of the Generation Facility		30-50 Years		
9.	Plant Characteristics		Generator Voltage		11 KV
			Power Factor		0.85

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

		Frequency	50 Hz	
		Automatic Generation Control	Yes	
10.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)
		Keyal-Duber-I	132	3.00
		Keyal-Duber-II	132	3.00

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Golen Gol

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Golen Gol Hydel Power Station

PLANT DETAILS

1.	Location	Golen Gol Nullah, 25 Km from Distt. Chitral in KPK.				
2.	Plant	Type	Total Capacity	No. of Units		
		Run of River	106 MW	03		
3.	Head	Gross		Rated		
		439.3 m		423.3 m		
4.	Technology	Pelton Turbines				
5.	Tunnel	No.	Length	Diameter		
	Total No. of Tunnel	3	-	Headrace	Steel Liner	
	(i). Headrace Tunnel	1	3808 m	3.7 m	2.5 m	
	(ii). Pressure Shaft	1	390 m			
	(iii). Pressure Tunnel	1	555 m			
6.	Peak/Base Load Operation	Base Load Operation Plant				
7.	Expected Date of Commissioning of the Latest Unit	November 30, 2015				
8.	Minimum Expected Useful Life of the Generation Facility	35 Years				
9.	Plant Characteristics	Generator Voltage	11 KV			
		Power Factor	0.85 (Lagging)			
		Frequency	50 Hz			
		Automatic Generation Control	Yes			
10.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	The Powerhouse will be connected with the new198 km, 132 KV double circuits Chitral-Chakdara outgoing Transmission Line.				

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Hydel Power Station
Jabban

(a). Location (location maps, site map)

(b). Plant: run of the river, storage, veir

(c). Head: minimum, maximum

(d). Technology: Francis, Pelton, etc. size, number of units

(e). Tunnel(s) if existing: length, diameter

(f). expected life

(g). Interconnection with national grid company, length of transmission line(s)

(h). Peaking/base load operation

(i). Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation

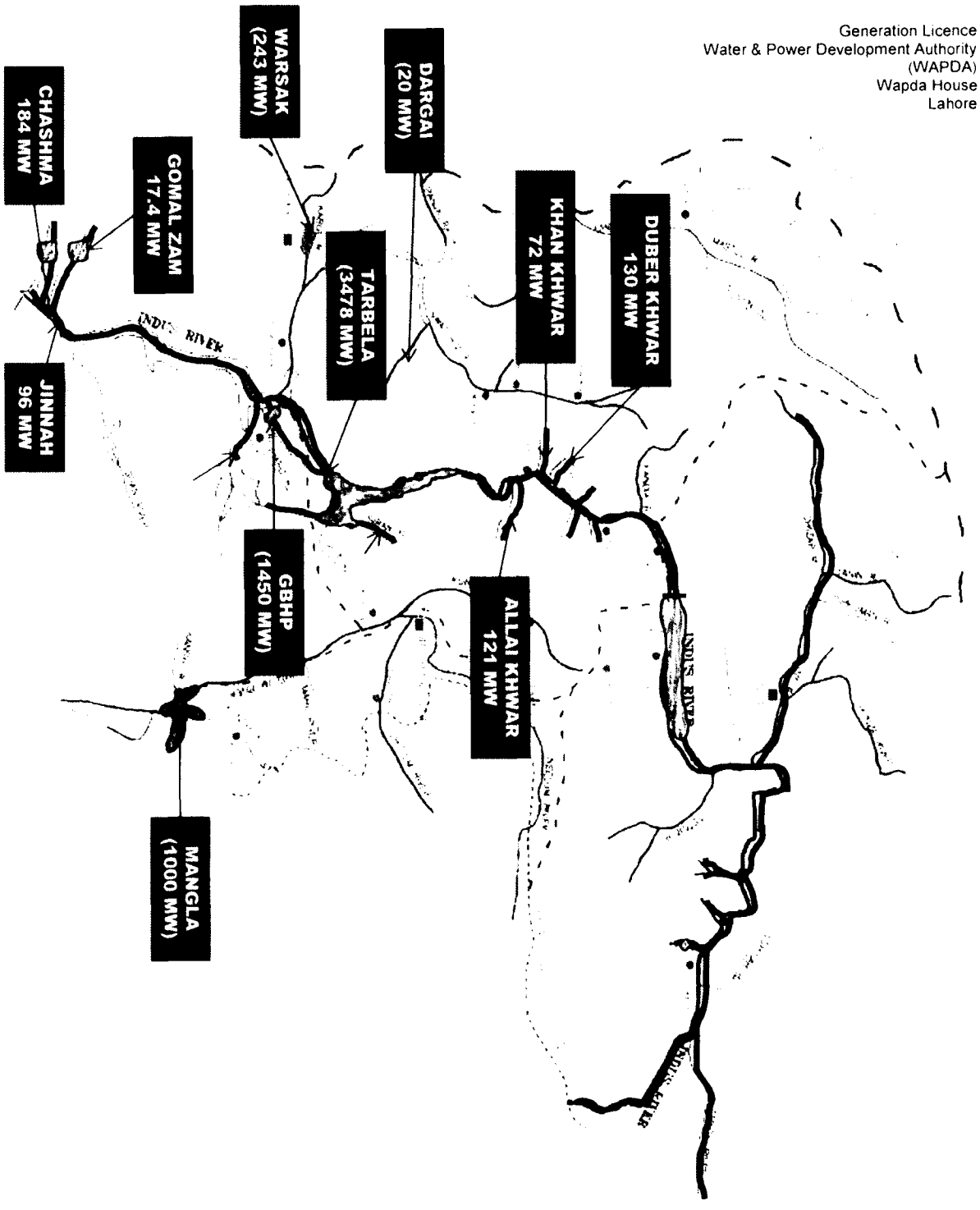
NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Jabban Hydel Power Station

PLANT DETAILS

1.	Location		On Swat River in Distt. Malakand, in KPK.		
2.	Plant		Type	Total Capacity	No. of Units
			Run of River	22 MW	04
3.	Head		76.8 m		
4.	Technology		Horizontal Francis Turbines		
5.	Tunnel		No.	Length	Diameter
	Total No. of Tunnel		2	-	-
	(i).	Power Tunnel	1	0.71 K m	12.0 ft.
	(ii).	Irrigation Tunnel	1	3.4 K m	17.5 ft.
6.	Peak/Base Load Operation		Not Applicable		
7.	Expected Date of Commissioning of the Latest Unit		October 23, 2013		
8.	Minimum Expected Useful Life of the Generation Facility		50 Years		
9.	Plant Characteristics		Generator Voltage	11 KV	
			Power Factor	0.85 (Lagging)	
			Frequency	50 Hz	
			Automatic Generation Control	Yes	
10.	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)		CCT	Voltage (KV)	Length (KM)
			Chakdara	132	19.38
			Jalala/Mardan	132	26.62

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA



SCHEDULE-II

(Modified/Revised)

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 this Schedule.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

SCHEDULE-II
(Modified/Revised)

Sr. No.	Power Station	Installed Capacity (MW)	Auxiliary Consumption (MW)	Net Capacity (MW)
1.	Hydel Power Station Tarbela	3478	-	3478
2.	Hydel Power Station Mangla	1000	-	1000
3.	Hydel Power Station Warsak	242.96	-	242.96
4.	Hydel Power Station Ghazi Brotha	1450	-	1450
5.	Hydel Power Station Chashma	184	-	184
6.	Hydel Power Station Renala	1.1	-	1.1
7.	Hydel Power Station Chichoki	13.2	-	13.2
8.	Hydel Power Station Nandipur	13.8	-	13.8
9.	Hydel Power Station Shadiwal	13.5	-	13.5
10.	Hydel Power Station Rasul	22	-	22
11.	Hydel Power Station Dargai	20	-	20.00
12.	Hydel Power Station Chitral	1	-	1.00
13.	Hydel Power Station Kurram Garhi	4	-	4.00
14.	Hydel Power Station Gomal Zam	17.00	0.70	16.30

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

15.	Hydel Power Station Jinnah Hydel	96	2	94.00
16.	Hydel Power Station Allai Khwar	121	2.5	118.50
17.	Hydel Power Station Duber Khwar	130	3.0	127.00
18.	Hydel Power Station Khan Khwar	72	1.5	70.50
19.	Hydel Power Station Tarbela, 4th Extension	1410	-	1410
20.	Hydel Power Station Keyal Khwar	128	-	128
21.	Hydel Power Station Golen Gol	108	-	108
22.	Hydel Power Station Jabban	22	-	22
Grand Total		**8547.56**	**9.7**	**8537.86**

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA