National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

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

No. NEPRA/R/LAG-03/13750-54 October 31, 2014

Chief Executive Officer
Northern Power Generation Company Limited
Thermal Power Station Muzzaffargarh,
Muzzaffargarh, Punjab

Subject: **Modification-II in Generation Licence No. GL/03/2002 — Northern Power Generation Company Limited**

Reference: Your letter No. CEO/FD/NPGCL/LPM/405 dated February 02, 2014.

It is intimated that the Authority has approved "Licensee Proposed Modification" in Generation Licence No. GL/03/2002 (issued on July 01, 2002) in respect of Northern Power Generation Company Limited (NPGCL) 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 in the Generation Licence of NPGCL along with Modification-II in the Generation Licence No. GL/03/2002, as approved by the Authority.

Encl:/As above

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

(Syed Safeer Hussain)

Copy to:

1. Secretary, Ministry of Water and Power, Government of Pakistan, Islamabad
2. Secretary, Ministry of Finance, Government of Pakistan, Islamabad
3. Chief Executive Officer, NTDC, 414-WAPDA House, Lahore
4. Chief Operating Officer, CPPA, 107-WAPDA House, Lahore
5. Director General, Pakistan Environmental Protection Agency, Plot No. 41, Street No. 6, H-8/2, Islamabad.

National Electric Power Regulatory Authority (NEPRA)

Determination of Authority in the Matter of Licensee Proposed Modification (LPM) of Northern Power Generation Company Limited

October 13, 2014
Reference/Case No. LAG-03

(A). Background

(i). The Authority had granted a Generation Licence (No. GL/03/2002, dated July 01, 2002 to Northern Power Generation Company Limited (NPGCL/GENCO-III) with a cumulative Installed Capacity of 1921.00 MW for its four (04) distinctly located Generation Facilities at Thermal Power Station Muzaffargarh (TPS Muzaffargarh), Natural Gas Power Station, Multan (NGPS Multan), Steam Turbine Power Station Faisalabad (SPS Faisalabad) and Gas Turbine Power Station, Faisalabad (GTPS Faisalabad).

(ii). TPS Muzaffargarh of NPGCL has an installed capacity of 1350.00 MW, consisting of six (06) Conventional Steam Units (3 x 210.00 MW + 1 x 320.00 MW + 2 x 200.00 MW), installed between 1993 and 1997. NGPS Multan with a total installed capacity of 195.00 MW, comprising of 3 x 65 MW Conventional Steam Turbines was set up during 1960 and 1963. SPS Faisalabad comprised of two (02) Steam Turbine Units of 66.00 MW each, commissioned during the year 1967. Whereas, GTPS Faisalabad of NPGCL has an Installed Capacity of 244.00 MW, consisting of a total of Nine (09) units set up during the period from 1975 to 1994.

(iii). Later on, the Authority retired/excluded the three units of NGPS Multan i.e. Unit No. 1, 3 & 4 each of 65.00 MW) from the Generation Licence of NPGCL which had completed their useful lives (set up during the period from 1960-63) and were of lower efficiency, through its decision dated May

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29, 2013 and the same was communicated to NPGCL through determination No.NEPRA/R/LAG-03/3943-49, dated April 18, 2014..

(B). Communication of LPM

(i). NPGCL through its correspondence of February 03, 2014 communicated an LPM in terms of Regulation 10 of NEPRA Licensing (Application & Modification Procedure) Regulations, 1999 (the Regulations) requesting addition of a New Power Plant being set up at Nandipur, District Gujranwala, in its Generation Licence.

(ii). NPGCL in the "Text of the Proposed Modification" submitted that Nandipur Power Plant having three Gas Turbines, Three HRSG and one Steam Turbine unit may be added in Schedule I & II of its existing Generation Licence. Regarding "Statement of the Reasons in Support of the Modification", NPGCL informed that currently there is acute power shortage in the country which is badly affecting economic growth and prospects for job creation. The country has a requirement to generate additional power to feed into the National Grid. The government is pursuing both large and small hydropower projects to utilize domestic resources; however, hydropower projects have longer gestation period as well as high capital cost. In this scenario, to cater for the ever-growing electric energy requirements & deficit particularly within the load centers of GEPCO and LESCO, it was envisaged to embark upon installation of 425 Combined Cycle Power Plant (CCPP) at Nandipur.

(iii). 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", NPGCL submitted that economic analyses show that the electricity generation cost of 425 MW on Furnace Oil (FO) is Rs. 14.78/KWh and 525 MW on Natural Gas (NG) is Rs. 6.50/KWh assuming a 60% plant factor. The Economic Internal Rate Of Return (EIRR) on FO is 8.96% and on NG + FO is 12.26%. The Financial Internal Rate Of Return (FIRR) on FO is 6.3% and on NG + FO is 9.2%. The plant will generate 2,160 MKWhs on FO and 2,630

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MKWhs on NG. Annual Recurring charges (Fuel + O&M) will be Rs. 31,935 Million on FO and Rs. 16,659 Million on NG.

(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 NPGCL, the Registrar accepted the LPM for further processing as stipulated in the Regulations.

(ii). The Registrar published the communicated LPM on March 27, 2014 in one English and one Urdu daily newspapers, seeking comments of general public and other stakeholders. Further, apart from the notice in the press, separate notices were also sent to Individual Experts, Government Ministries/Department and representative organization etc. inviting their views and comments in the matter.

(D). Comments of Stakeholders

(i). In response to the above, the Authority received comments from two (02) stakeholders. These included Mari Petroleum Company Limited (MPCL) and Ministry of Petroleum & Natural Resources (MoP&NR). The salient points of the comments offered by the above mentioned stakeholders are summarized in the following paragraphs: -

(a). MPCL in its comments stated that it does not have any Gas Supply Agreement with NPGCL. Therefore, the notice relating to submitting comments is not applicable.

(b). MoP&NR commented that it has not committed/made any NG allocation for Nandipur Power Project as yet. Form allocation of NG to this plant has been linked with the availability of imported NG based on Liquefied Natural Gas (LNG). Further, the gas will be provided at delivered Re-

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Gasified LNG (RLNG) price and not at weighted average cost of Natural Gas.

(ii). The Authority examined the above comments of the stakeholders and considered it appropriate seeking perspective of NPGCL on the comments/observations of MoP&NR.

(iii). NPGCL in its rejoinder submitted that the ECNEC approved the revised PC-I of Nandipur Power Project with the inclusion of scheme for conversion of Nandipur Gas Turbines to gas fuel in anticipation of its availability in future. In line with the above, MoP&NR committed to provide gas and even identified the imported LNG as the source for supply to Nandipur Power Plant. Although, at present, no formal commitment has been made by the Ministry but the firm allocation of gas to Project has been pledged and linked only with the availability of the same through imported LNG. Further, the pricing of the prospective gas supplies has been confirmed to be at delivered RLNG. In view of the above, the scheme of operating of the Project on NG is not only approved by the highest forum of GoP but the commitment and firm allocation of the gas by the relevant ministry is pending for want of availability of the same.

(iv). In view of the above, it was considered appropriate to process the communicated LPM as stipulated in the Regulations and the NEPRA Licensing (Generation) Rules, 2000 (the Rules).

(E). Approval of LPM

(i). The importance of electricity/electric power 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.

(ii). In view of the above, the Authority contemplates that the initiative of NPGCL for setting up of a Generation Facility at Nandipur is very vital and

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needs to be encouraged. This will help in overcoming the severe shortage of electricity in the country and will trigger Industrial growth thereby helping in raising the GDP of the country which is on the decline due to shortage of electricity. Therefore, the Authority hereby approves the LPM, in the Generation Licence of NPGCL pertaining to the said Nandipur (Natural Gas/Residual Furnace Oil Power Plant/Units) thereby increasing the total Installed Capacity of NPGCL to 2291.65 MW from existing 1726.00 MW.

(iii). 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 responsibility of the Authority. In the particular case, NPGCL has filed a Tariff Petition and the same is under consideration of the Authority. Pending the approval of the Tariff, the Authority directs NPGCL to charge only such tariff which has been determined, approved or specified by the Authority in terms of Rule-6 of the Rules.

(iv). The Generation Facility of NPGCL for which Licence has been sought, is a CCPP. Further, NPGCL has obtained necessary NOC from the Environmental Protection Agency of Govt. of Punjab (EPA, Punjab) for its CCPP. The Authority has considered the submission of NPGCL and has made it obligatory in terms of Article-9 of the its Generation Licence to comply with the required rules and regulation on environment. Further, the Authority directs NPGCL to submit a quarterly report on environment confirming that the operation of its different generation facilities including the forthcoming Nandipur Power Plants are compliant with required Environmental Standards of the EPA, Punjab.

(v). According to Rule 5(1) of the Rules, except where an applicant for a Generation Licence consents to a shorter term, the term of a Generation Licence shall commensurate with the maximum expected useful life of the units comprised in a generation facility. The Authority at the time of the grant of the Original Generation Licence to NPGCL had fixed the term of the generation facility to twenty five (25) years based on the remaining useful life

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of the latest installed Unit. With the proposed installation of the new CCPP at Nandipur, which will have a useful life of thirty (30) years from its Commercial Operation Date (COD), the Authority hereby re-fixes the term of the Generation Licence i.e. upto the year 2044 as first Gas Turbine of Nandipur CCPP has already been commissioned. The Authority observes that the useful life of any Power Plant heavily depends on the way it is operated and maintained. Previously, due to lack of proper maintenance, the performance of Power Plants in the Public Sector (i.e. GENCOs) have not been remarkable at all. Based, on the previous experience, the Authority directs NPGCL to engage third party Contractor for the Operation and Maintenance (O&M) of the Nandipur CCPP.

(vi). In consideration of the above, the already granted Generation Licence (No. GL/03/2002, dated July 01, 2002) in the name of NPGCL is hereby modified. The Face Sheet indicating the required changes alongwith Revised/Modified Schedule-I & II of the Generation Licence are attached as Annexure to this determination. The approval of LPM will be subject to the provisions contained in the NEPRA Act and relevant rules framed there under.

Authority

Maj. (R) Haroon Rashid
Member

Khawaja Muhammad Naeem
Member

Habibullah Khilji
Member/Vice Chairman

15/10/2014

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National Electric Power Regulatory Authority (NEPRA)

Islamabad – Pakistan

GENERATION LICENCE

GL/03/2002

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 Northern Power Generation Company/NPGCL/GENCO-III (issued on July 01, 2002, Modification-I dated April 18, 2014 and expiring on June 30, 2027), to the extent of changes mentioned as here under:-

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

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

This **Modification-II** is given under my hand on this 31 ST of **October Two Thousand** & **Fourteen**

Registrar

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SCHEDULE-I
(Revised/Modified)
Modification-II

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.

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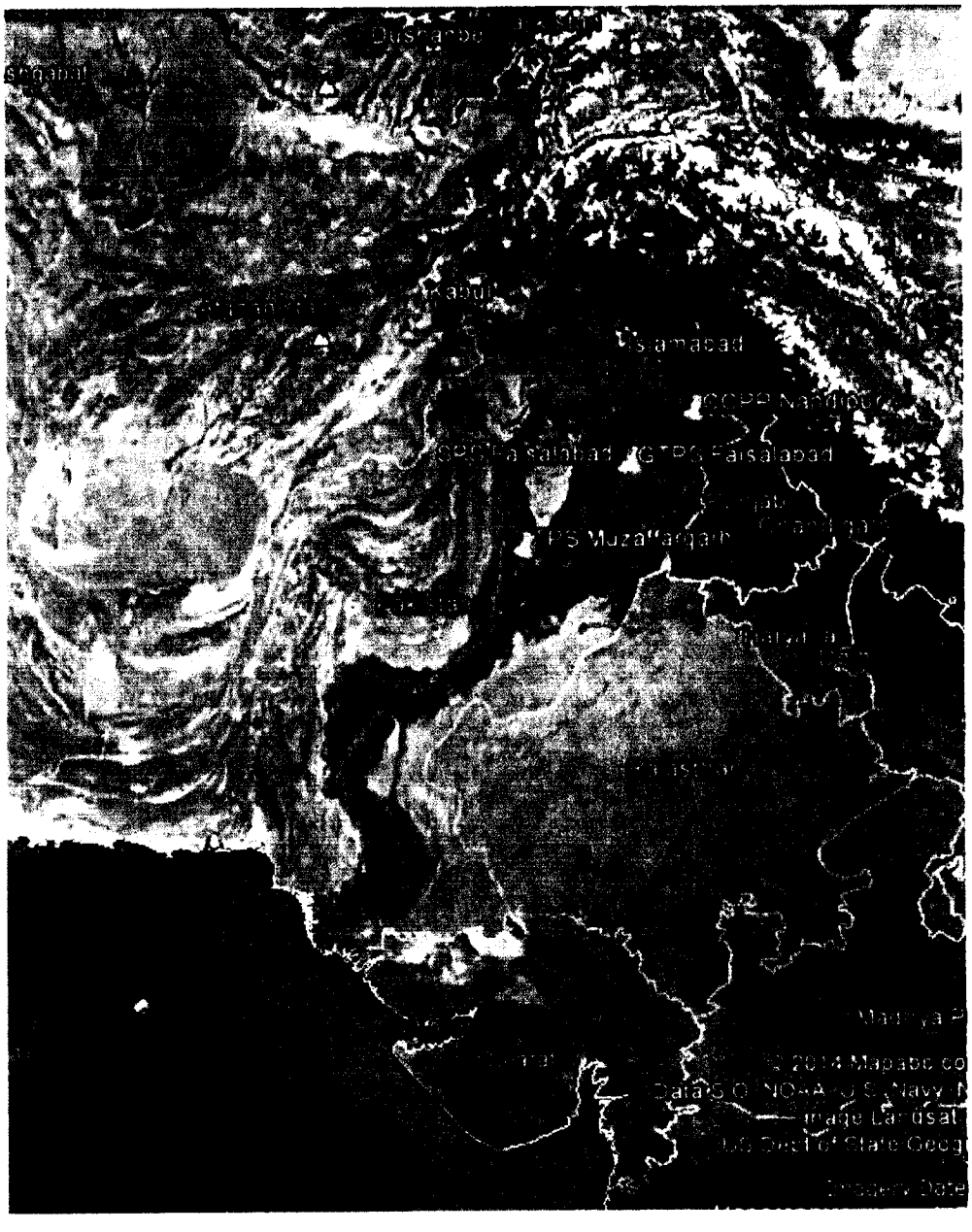

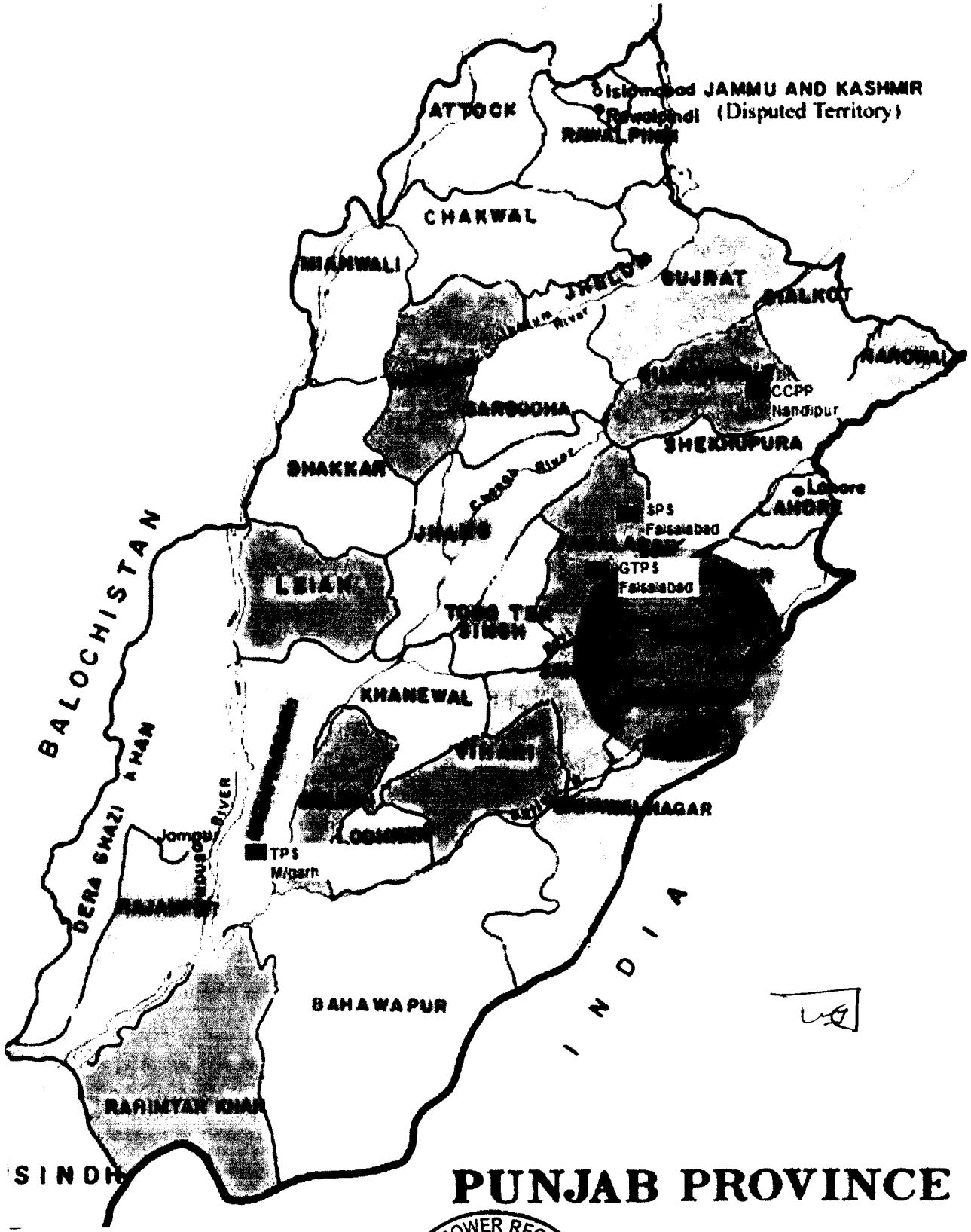

PUNJAB PROVINCE

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
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General Information
About the Company/Licensee

(i).	Name of the Company/ Licensee	Northern Power Generation Company Limited (NPGCL)/GENCO-III			
(ii).	Registered /Business Office	Thermal Power Station Muzaffargarh (TPS Muzaffargarh), Punjab			
(iii).	Location the of Plants	Plant-I	Plant-II	Plant-III	Plant-IV
		TPS Muzaffargarh	Gas Turbine Power Station Faisalabad (GTPS Faisalabad)	Steam Turbine Power Station Faisalabad (SPS Faisalabad)	Combined Cycle Power Station at Nandipur (Nandipur CCPP)
(iv).	Type of the Generation Facilities	Thermal Power Generation			

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Details of Generation Facility at Plant-I/ TPS Muzaffargarh

(A). Plant Configuration

(i).	Plant Size/ Installed Capacity (Gross ISO)	1350 MW					
(ii).	Type of Technology	Conventional Steam Turbine Thermal Power Plant					
(iii).	Number of Units/Size (MW)	Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V	Unit-VI
		210 MW Steam Turbine	210 MW Steam Turbine	210 MW Steam Turbine	320 MW Steam Turbine	200 MW Steam Turbine	200 MW Steam Turbine
(iv).	Unit Make & Model	Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V	Unit-VI
		T.P.E USSR	T.P.E USSR	T.P.E USSR	CMEC China	CMEC China	CMEC China
(v).	Commercial Operation date (of each Unit)	Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V	Unit-VI
		Sep. 1993	Mar. 1994	Feb. 1995	Dec. 1997	Dec. 1995	Dec. 1995
(vi).	Expected Useful Life of the Generation Facility/Plant-I from Commercial Operation Date (of each Unit)	Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V	Unit-VI
		39 Years	38 Years	37 Years	35 Years	37 Years	37 Years
(vii).	Expected Useful Life of the Generation Facility/Plant-I (Each Unit) at the time of Grant of Original Generation Licence	Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V	Unit-VI
		30 Years	30 Years	30 Years	30 Years	30 Years	30 Years

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(viii).	Expected Useful Life of the Generation Facility/Plant-I (Each Unit) at the time of Modification-I dated April 16, 2014	Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V	Unit-VI
		19 Years	19 Years	19 Years	19 Years	19 Years	19 Years
(ix).	Expected Useful Life of the Generation Facility/Plant-I (Each Unit) at the time of this Modification-II in Generation Licence (dated October___, 2014)	Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V	Unit-VI
		19 Years	19 Years	19 Years	19 Years	19 Years	19 Years

(B). Fuel Details

(i).	Primary Fuel	Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V	Unit-VI
		Furnace Oil					
(ii).	Alternative Fuel	Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V	Unit-VI
		Natural Gas					
(iii).	Start-Up Fuel	Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V	Unit-VI
		Natural Gas / HSD					
(iv).	Fuel Source for each of the above (i.e. Imported/ Indigenous)	Imported/Indigenous					
(v).	Fuel Supplier for each of the above	Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V	Unit-VI
		PSO / Shell & SNGPL					

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(vi).	Supply Arrangement for each of the above	Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V	Unit-VI
		Railway Wagons / Tankers / Pipelines					
(vii).	No of Storage Tanks	Primary Fuel		Alternative Fuel		Start-Up Fuel	
		11		N/A		2	
(viii).	Storage Capacity of each Tank	Primary Fuel		Alternative Fuel		Start-Up Fuel	
		6*18500 MT 3*25000 MT 2*18500 MT		N/A		2*1000 MT	
(ix).	Gross Storage	Primary Fuel		Alternative Fuel		Start-Up Fuel	
		223000 M.Ton		N/A		2000 M.Ton	

(C). Emission/Effluents Values

(i).	SO_x (mg/Nm^3)	164 M.Ton/Day
(ii).	NO_x (mg/Nm^3)	55 M.Ton/Day
(iii).	CO_2	7988 M.Ton/Day
(iv).	Effluents	525 M.Ton/Day
(v).	CO (mg/Nm^3)	Negligible
(vi).	PM_{10}	6.4 M.Ton/Day

(D). Cooling System

(i).	Cooling Water Source/Cycle	Tube Wells

(E). Plant Characteristics

		Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V	Unit-VI
(i).	Generation Voltage (KV)	15.75	15.75	15.75	15.75	15.75	15.75
(ii).	Frequency (HZ)	50	50	50	50	50	50
(iii).	Power Factor	0.85	0.85	0.85	0.85	0.85	0.85

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(iv).	Automatic Generation Control (AGC) (MW control is the general practice)	-	-	-	-	-	-
(v).	Ramping Rate	-	-	-	-	-	-
(vi).	Time required to Synchronize to Grid (Hrs.)	2-6	2-6	2-6	3-4	3-5	3-5

(F). Interconnection Arrangement

(i).	Interconnection & Transmission Arrangement	The Generation Facility/TPS Muzaffargarh has its own 220KV Grid Station in the premises of Power Plant.

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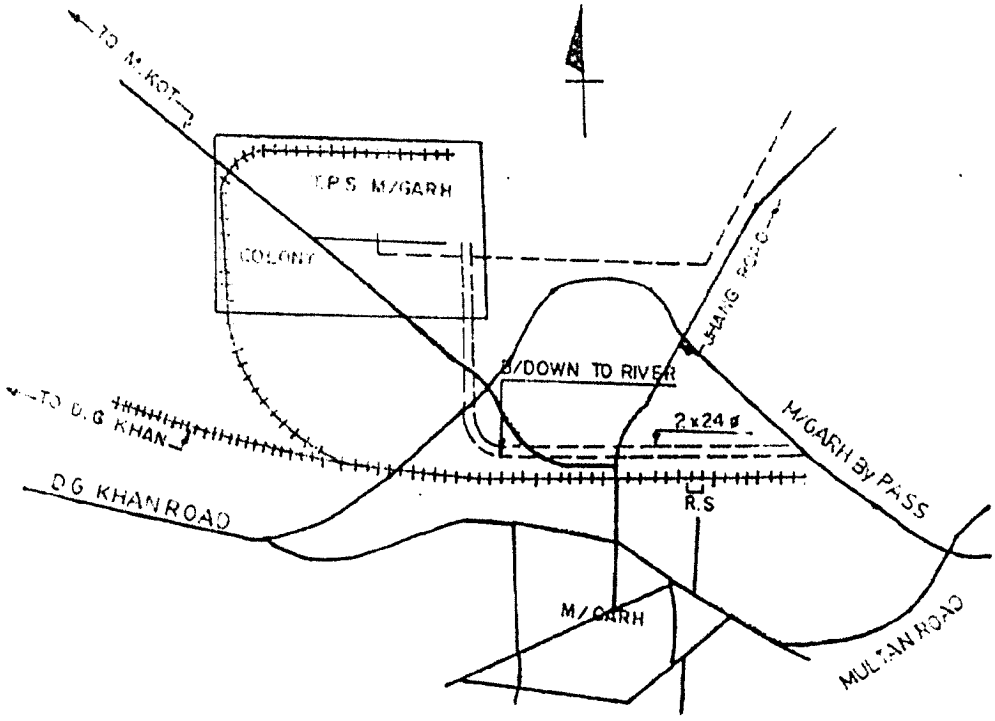
SITE LOCATION PLAN (TPS MZG)

WATER PIPE LINE - - - - - - - -

RAILWAY +++++++++

ROAD ————



AREA OF ACQUIRED LAND	=	**1150 ACRES**
AREA OF POWER HOUSE	=	325 ACRES
AREA OF 500 Kv SUBSTATION	=	33 ACRES
AREA OF OPEN LAND	=	514 ACRES
AREA OF COLONY	=	262 ACRES
AREA OF TUBE-WELL SITE	=	16 ACRES
GROUND LEVEL AT POWER HOUSE	=	**405.08 FT**
GROUND LEVEL AT COLONY AREA		
PHASE-I	=	393.72 FT
PHASE-II		394.70 FT
ELEVATION OF RIVER PROTECTION BUND		
1st DEFENCE	=	400.76 FT
2nd DEFENCE	=	399.11 FT
WORST FLOOD LEVEL IN 1976	=	393.11 FT

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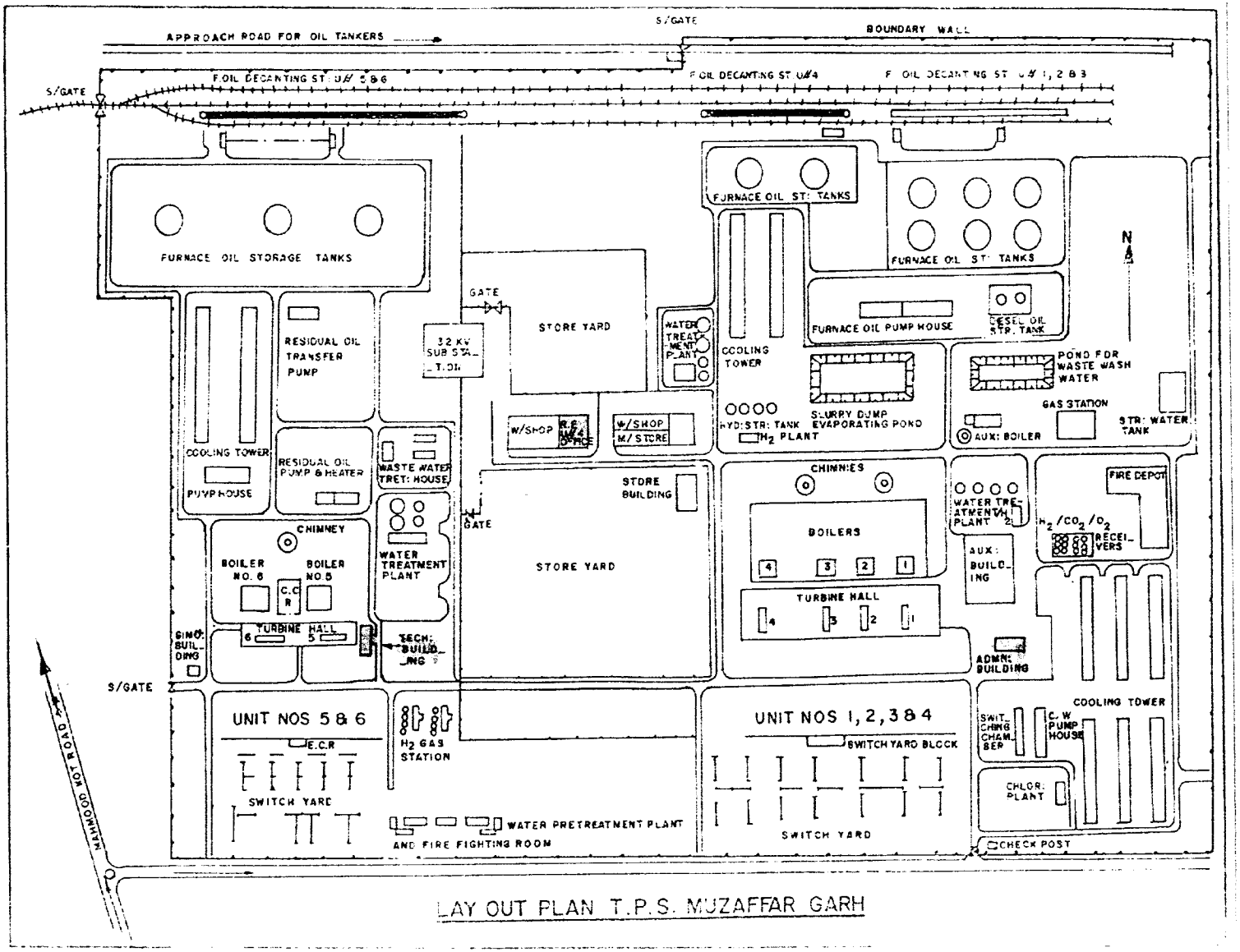

LAY OUT PLAN T.P.S. MUZAFFAR GARH

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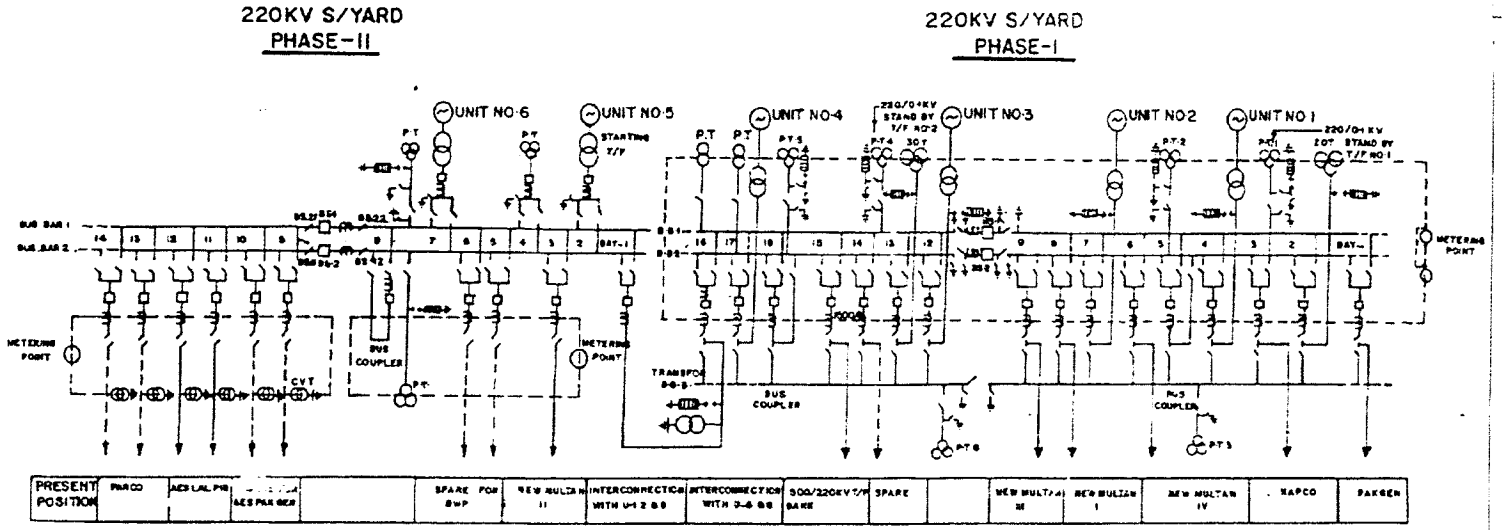
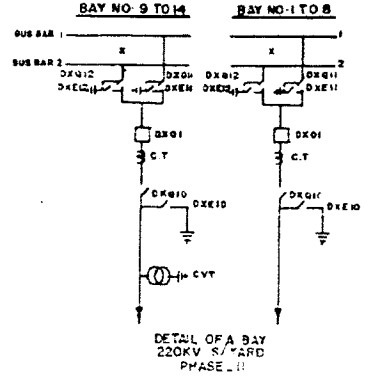
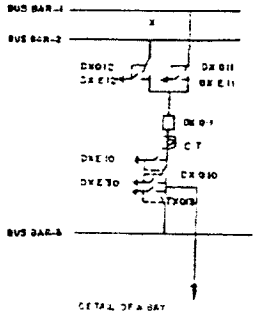




DETAIL OF A BAY
220KV S/YARD
PHASE_II



X	BAY NO
G1	BREAKER
G11	ISOLATER CONNECTED TO BB-I
G12	ISOLATER CONNECTED TO BB-II
G13	ISOLATER CONNECTED TO TRANSFR BUS
E	EARTH SWITCH

C.T RATIO FOR C.T,S INSTALLED AT PHASE-I

BAY NO,S	C.T RATIO
1 & 9	1200/5
2 TO 8 & 13	1200/5

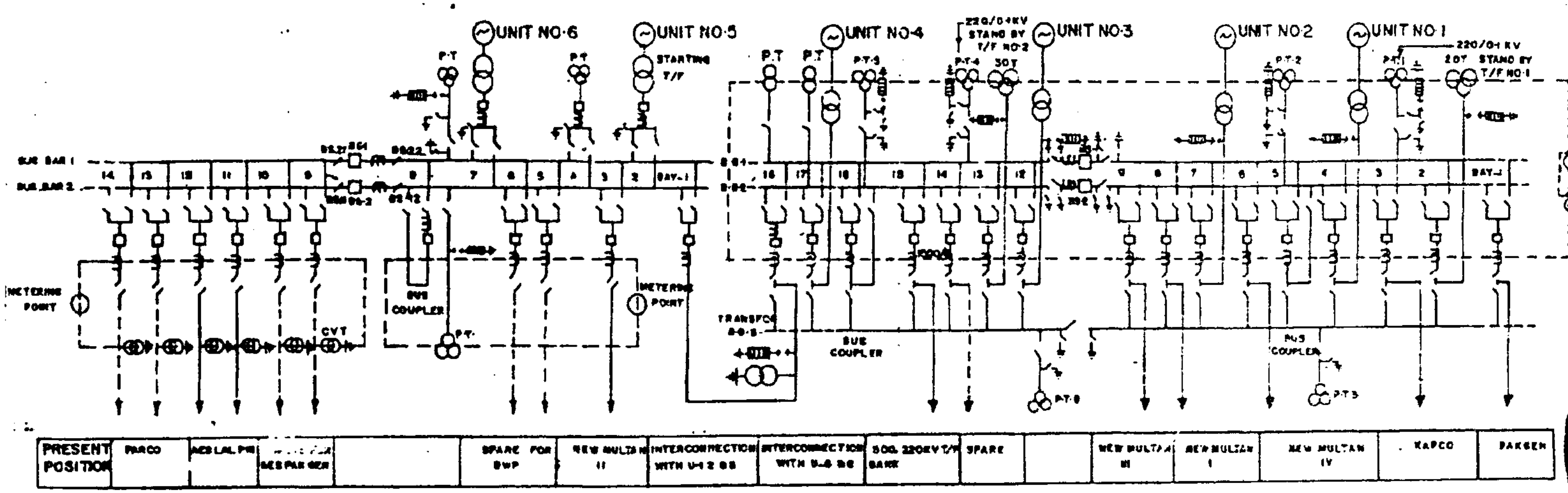
C.T. RATIO FOR CT,S INSTALLED AT PHASE_II

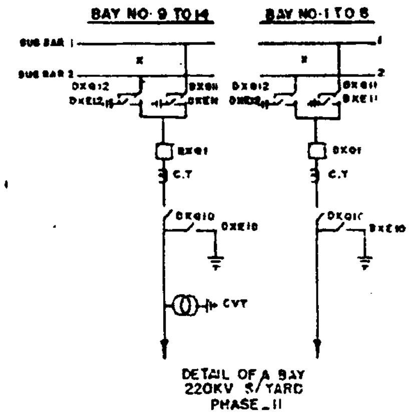
BAY NO,S	C.T. RATIO
1,3,5,6,8	1200/5
9 TO 14	2400|1200-600/5

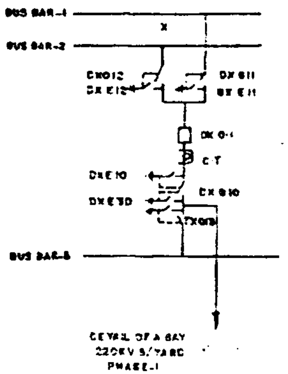
	GENERATOR
	UNIT TRANSFORMER
	STAND BY TRANSFORMER
	POTENTIAL TRANSFORMER
	CIRCUIT BREAKER
3	CURRENT TRANSFORMER
	LIGHTENING ARRESTOR
	ISOLATOR
	EARTHING KNIFE SWITCH

NORTHERN POWER GENERATION COMPANY LTD
(A SUBSIDIARY COMPANY OF WAPDA)
THERMAL POWER STATION MUZAFFARGARH

220KV SUB STATION SINGLE LINE DIAGRAM







X	BAY NO
Q1	BREAKER
Q11	ISOLATER CONNECTED TO BB-1
Q12	ISOLATER CONNECTED TO B-B-II
Q13	ISOLATER CONNECTED TO TRANSFER BUS
[symbol]	EARTH SWITCH

C.T. RATIO FOR C.T,S INSTALLED AT PHASE-I

BAY NO,S	C.T. RATIO
1 & 9	1200/5
2 TO 8 & 13	1300/5

C.T. RATIO FOR CT,S INSTALLED AT PHASE_II

BAY NO,S	C.T. RATIO
1,3,5,6,8	1200/5
9 TO 14	2400:1200:600/5

[symbol]	GENERATOR
[symbol]	UNIT TRANSFORMER
[symbol]	STAND BY TRANSFORMER
[symbol]	POTENTIAL TRANSFORMER
[symbol]	CIRCUIT BREAKER
[symbol]	CURRENT TRANSFORMER
[symbol]	LIGHTENING ARRESTOR
[symbol]	ISOLATOR
[symbol]	EARTHING KNIFE SWITCH

NORTHERN POWER GENERATION COMPANY LTD
(A SUBSIDIARY COMPANY OF WAPDA)
THERMAL POWER STATION MUZAFFARGARH

220KV SUB STATION SINGLE LINE DIAGRAM

DRAWN AND TRACED: MUHAMMAD RASHEED
DATE: [illegible]
Jr. Eng. (E)
Sr. Eng. (E)

Details of Generation Facility at Plant-II/ GTPS Faisalabad

(A). Plant Configuration

(i).	Plant Size/ Installed Capacity (Gross ISO)	244 MW								
(ii).	Type of Technology	Thermal Power Plant/Gas Turbine/G.T. and Steam Turbine/S.T. (Combined Cycle Power Plant-CCPP)								
(iii).	Number of Units/Size (MW)	Unit - I	Unit - II	Unit - III	Unit - IV	Unit - V	Unit - VI	Unit - VII	Unit - VIII	Unit - IX
		25 MW G.T.	25 MW G.T.	25 MW G.T.	25 MW G.T.	25 MW G.T.	25 MW G.T.	25 MW G.T.	25 MW G.T.	44 MW S.T.
(iv).	Unit Make & Model	Unit - I	Unit - II	Unit - III	Unit - IV	Unit - V	Unit - VI	Unit - VII	Unit - VIII	Unit - IX
		AEG Kains Germ-any	AEG Kains Germ-any	AEG Kains Germ-any	AEG Kains Germ-any	AEG Kains Germ-any	AEG Kains Germ-any	AEG Kains Germ -any	AEG Kains Germ -any	HPEEC China
(v).	Commerci-al Operation date (of each Unit)	Unit - I	Unit - II	Unit - III	Unit - IV	Unit - V	Unit - VI	Unit - VII	Unit - VIII	Unit - IX
		Mar 1975	Mar 1975	Mar 1975	Mar 1975	July 1975	July 1975	July 1975	Nov 1975	Dec 1975
(vi).	Expected Useful Life of the Generation Facility/Plan t-II from Commerci-al Operation Date (of each Unit)	Unit - I	Unit - II	Unit - III	Unit - IV	Unit - V	Unit - VI	Unit - VII	Unit - VIII	Unit - IX
		37 Years	37 Years	37 Years	37 Years	37 Years	37 Years	37 Years	37 Years	37 Years

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(vii).	Expected Useful Life of the Generation Facility/Pl-ant-II (Each Unit) at the time of Grant of Original Generation Licence	Unit - I	Unit - II	Unit - III	Unit - IV	Unit - V	Unit - VI	Unit - VII	Unit - VIII	Unit - IX
		10 Yea-rs	10 Yea-rs	10 Yea-rs	10 Yea-rs	10 Yea-rs	10 Yea-rs	10 Yea-rs	10 Ye-ars	10 Yea-rs
(viii).	†Expected Useful Life of the Generation Facility/Pla-nt-II (Each Unit) at the time of Modificat-ion-I in Generation Licence dated April 16, 2014)	Unit - I	Unit - II	Unit - III	Unit - IV	Unit - V	Unit - VI	Unit - VII	Unit - VIII	Unit - IX
		00 Yea-rs	00 Yea-rs	00 Yea-rs	00 Yea-rs	00 Yea-rs	00 Yea-rs	00 Yea-rs	00 Ye-ars	00 Yea-rs
(ix).	‡Expected Useful Life of the Generation Facility/Pla-nt-II (Each Unit) at the time of this Modificat-ion-II in Generation Licence (dated October__, 2014)	Unit - I	Unit - II	Unit - III	Unit - IV	Unit - V	Unit - VI	Unit - VII	Unit - VIII	Unit - IX
		00 Yea-rs	00 Yea-rs	00 Yea-rs	00 Yea-rs	00 Yea-rs	00 Yea-rs	00 Yea-rs	00 Ye-ars	00 Yea-rs

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† Plant-II/GTPS Faisalabad has completed its designed life. The Authority will decide the matter of its operation beyond the designed life separately
‡ Plant-II/GTPS Faisalabad has completed its designed life. The Authority will decide the matter of its operation beyond the designed life separately

(B). Fuel Details

(i).	Primary Fuel	Unit - I	Unit - II	Unit - III	Unit - IV	Unit - V	Unit - VI	Unit - VII	Unit - VIII	Unit - IX
		Natural Gas								
(ii).	Alternative Fuel	Unit - I	Unit - II	Unit - III	Unit - IV	Unit - V	Unit - VI	Unit - VII	Unit - VIII	Unit - IX
		HSD								
(iii).	Start-Up Fuel	Unit - I	Unit - II	Unit - III	Unit - IV	Unit - V	Unit - VI	Unit - VII	Unit - VIII	Unit - IX
		Natural Gas								
(iv).	Fuel Source for each of the above (i.e. Imported/ Indigenous)	Unit - I	Unit - II	Unit - III	Unit - IV	Unit - V	Unit - VI	Unit - VII	Unit - VIII	Unit - IX
		Indigenous/Imported								
(v).	Fuel Supplier for each of the above	Primary Fuel			Alternative Fuel			Start-Up Fuel		
		SNGPL			PSO & Shell			SNGPL		
(vi).	Supply Arrangement for each of the above	Primary Fuel			Alternative Fuel			Start-Up Fuel		
		Pipe Lines			Tankers			Pipe Lines		
(vii).	No of Storage Tanks	Primary Fuel			Alternative Fuel			Start-Up Fuel		
		N/A			02 Nos main HSD tanks & 04 Nos daily HSD tanks			------		
(viii).	Storage Capacity of each Tank	Primary Fuel			Alternative Fuel			Start-Up Fuel		
		N/A			-			-		
(ix).	Gross Storage	Primary Fuel			Alternative Fuel			Start-Up Fuel		

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		N/A	6.2 Million Liters	-

(C). Emission/Effluents Values

(i).	SO_x (mg/Nm^3)	0 Tons/Day
(ii).	NO_x (mg/Nm^3)	1 Tons/Day
(iii).	CO_2	935 Tons/Day
(iv).	Effluents	-
(v).	CO (mg/Nm^3)	Negligible
(vi).	PM_{10}	Negligible

(D). Cooling System

(i).	Cooling Water Source/ Cycle	Canal water (Closed Cycle)/Tube well Water

(E). Plant Characteristics

		Unit - I	Unit - II	Unit - III	Unit - IV	Unit - V	Unit - VI	Unit - VII	Unit - VIII	Unit - IX
(i).	Generation Voltage	10.5 KV	10.5 KV	10.5 KV	10.5 KV	10.5 KV	10.5 KV	10.5 KV	10.5 KV	10.5 KV
(ii).	Frequency	50 HZ	50 HZ	50 HZ	50 HZ	50 HZ	50 HZ	50 HZ	50 HZ	50 HZ
(iii).	Power Factor	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
(iv).	Automatic Generation Control (AGC) (MW control is the general practice)	--	--	--	--	--	--	--	--	--

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(v).	Ramping Rate	1 MW/ Min	1 MW/ Min	1 MW/ Min	1 MW/ Min	1 MW/ Min	1 MW/ Min	1 MW/ Min	1 MW/ Min	1 MW/ Min
(vi).	Time required from hot start upto Synchro-nization to Grid	5-8 min	5-8 min	5-8 min	5-8 min	5-8 min	5-8 min	5-8 min	5-8 min	4 hours

(F). Interconnection Arrangement

(i).	Interconnection & Transmission Arrangement	This Station has 132 KV Transmission lines NBD-I and NBD-II, JDL-I and JDL-II. NBD-I and NBD-II are connected to 220 KV Nishatabad Grid, Faisalabad. JDL-I is connected with the 132 KV old thermal Grid Station and JDL-II is connected to 220 KV Grid Jaranwalla Road. The 220 KV Nishatabad Grid Station is located about 2 KM away old Thermal Grid to 3 KM away and Jaranwala Road is 10 KM away from this Power Station.

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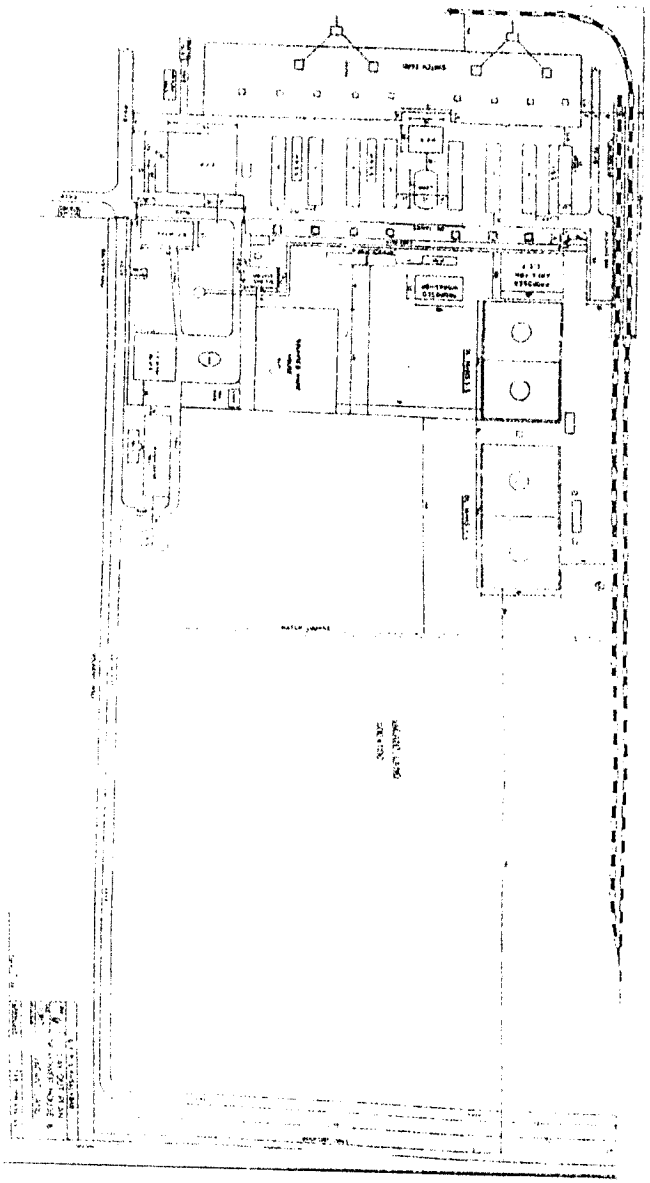

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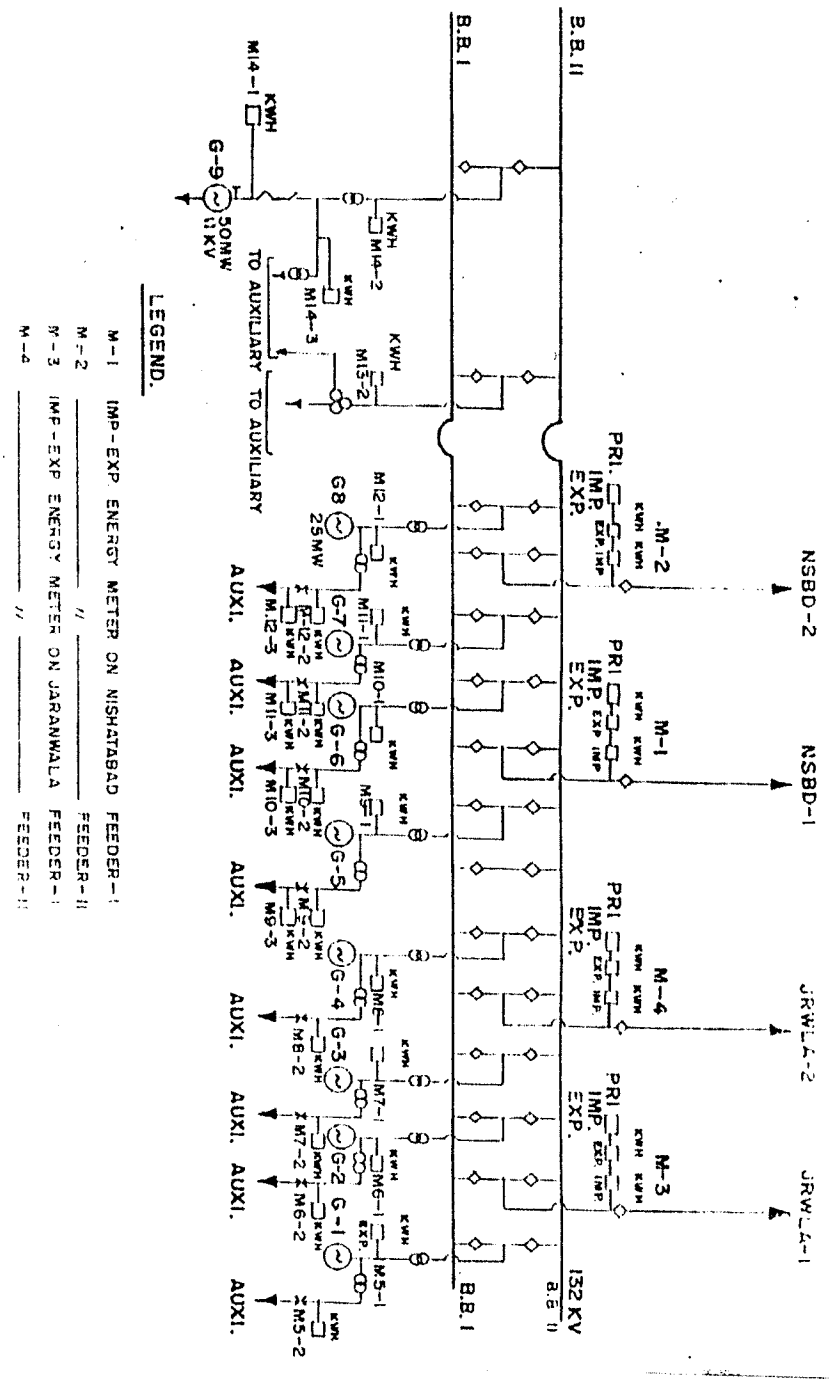

Detail of Generation Facility at Plant-III/ SPS Faisalabad

(A). Plant Configuration

(i).	Plant Size Installed Capacity (Gross ISO)	132 MW	
(ii).	Type of Technology	Conventional Steam Turbine Thermal Power Plant	
(iii).	Number of Units/Size (MW)	Unit-I	Unit-II
		66 MW Steam Turbine	66 MW Steam Turbine
(iv).	Unit Make & Model	Unit-I	Unit-II
		Westing House USA	Westing House USA
(v).	Commissioning/ Commercial Operation date (of each Unit)	Unit-I	Unit-II
		June 1967	November 1967
(vi).	Expected Useful Life of the Generation Facility/Plant-III from Commercial Operation Date (of each Unit)	Unit-I	Unit-II
		45 Years	45 Years
(vii).	Expected Useful Life of the Generation Facility/Plant-III (Each Unit) at the time of Grant of Original Generation Licence	Unit-I	Unit-II
		10 Years	10 Years

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(viii).	§Expected Useful Life of the Generation Facility/Plant-III (Each Unit) at the time of Modification-I in Generation Licence dated April 16, 2014)	Unit-I	Unit-II
		00Years	00 Years
(ix).	**Expected Useful Life of the Generation Facility/Plant-III (Each Unit) at the time of this Modification-II in Generation Licence (dated October__, 2014))	Unit-I	Unit-II
		00Years	00 Years

(B). Fuel Details

(i).	Primary Fuel	Unit-I	Unit-II
		Natural Gas	
(ii).	Alternative Fuel	Unit-I	Unit-II
		Furnace Oil	
(iii).	Start-Up Fuel	Unit-I	Unit-II
		Natural Gas	
(iv).	Fuel Source for each of the above (i.e. Imported/ Indigenous)	Primary Fuel	Alternative Fuel
		Indigenous	Indigenous/Imported
(v).	Fuel Supplier for each of the above	Primary Fuel	Alternative Fuel
		SNGPL	PSO & Shell
(vi).	Supply Arrangement for each of the above	Primary Fuel	Alternative Fuel
		Pipelines	Train / Tank Lorries

§ Plant-III/SPS Faisalabad has completed its designed life. The Authority will decide the matter of its operation beyond the designed life separately.

** Plant-III/SPS Faisalabad has completed its designed life. The Authority will decide the matter of its operation beyond the designed life separately.

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(vii).	No of Storage Tanks	Primary Fuel	Alternative Fuel
		N/A	5
(viii).	Storage Capacity of each Tank	Primary Fuel	Alternative Fuel
		N/A	Tank 1 & 2 = 2217 MT Each Tank 3 & 4 = 2760 MT Each Tank 5 = 5349 MT
(ix).	Gross Storage	Primary Fuel	Alternative Fuel
		N/A	15303 MT

(C). Emission/Effluents Values

(i).	SO_x (mg/Nm^3)	-
(ii).	NO_x (mg/Nm^3)	224
(iii).	CO_2	10%
(iv).	Effluents	-
(v).	CO (mg/Nm^3)	9
(vi).	PM_{10}	-

(D). Cooling System

(i).	Cooling Water Source/Cycle	Canal Water and Tube wells (Closed Cycle Cooling Tower)

(E). Plant Characteristics

		Unit-I	Unit-II
(i).	Generation Voltage	11 KV	11 KV
(ii).	Frequency	50 HZ	50 HZ

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(iii).	Power Factor	0.85	0.85
(iv).	Automatic Generation Control (AGC) (MW control is the general practice)	Nil	Nil
(v).	Ramping Rate	01 MW/Min	01 MW/Min
(vi).	Time required from hot start upto Synchronization to Grid	04 Hours	04 Hours

(F). Interconnection Arrangement

(i).	Interconnection & Transmission Arrangement	Connected with 220 KV Nishatabad Grid Station about 02 KM from Power station

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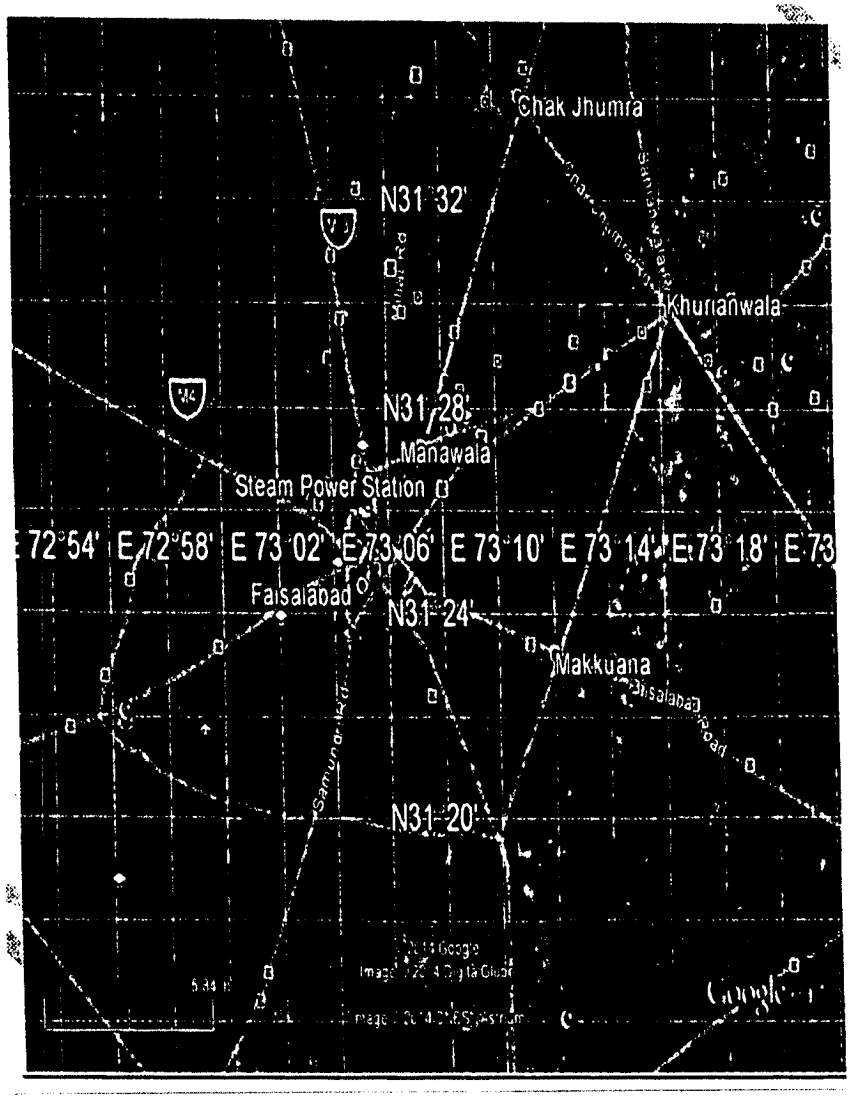

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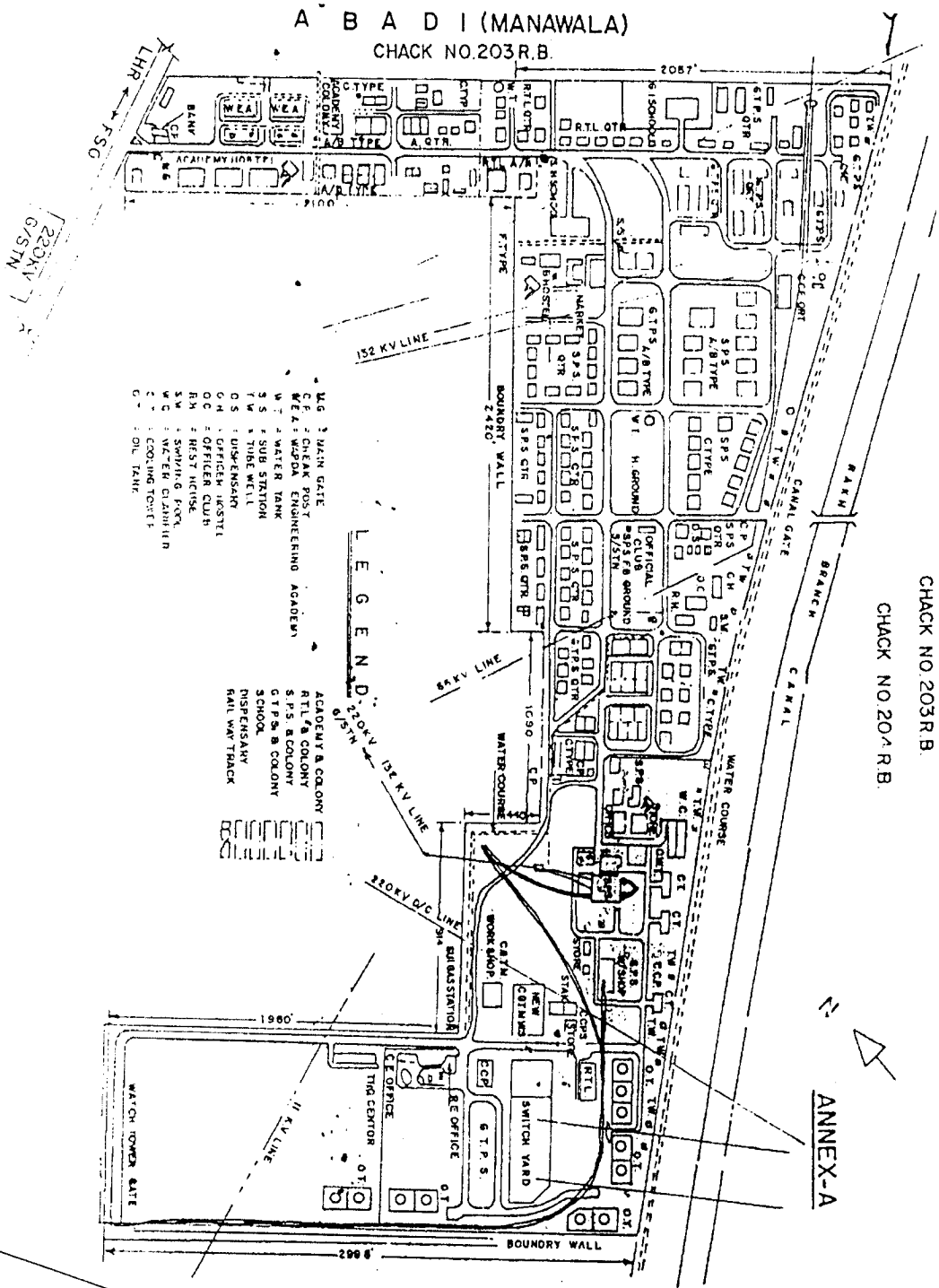
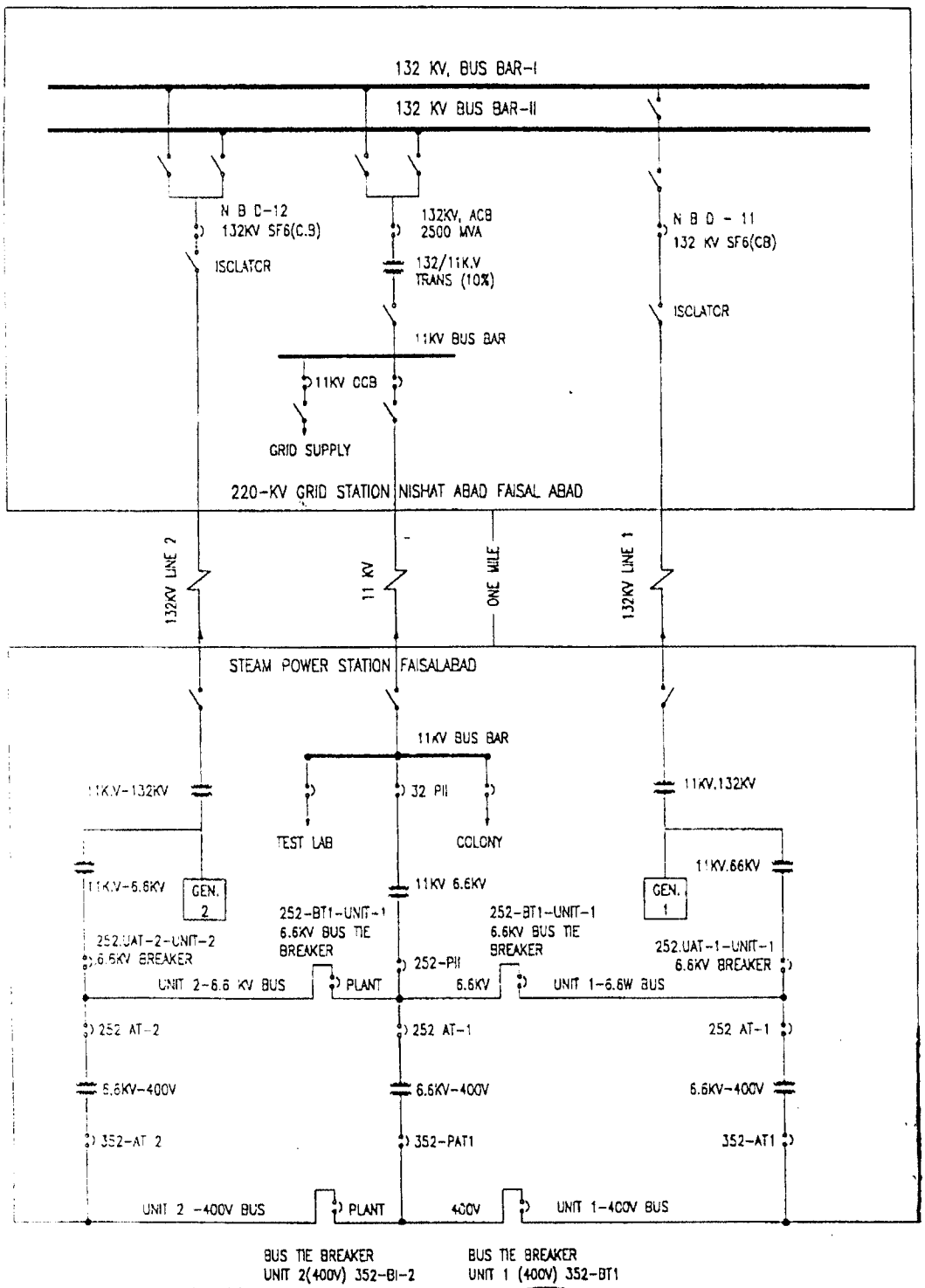


ELECTRICAL SINGLE LINE DIAGRAM
S.P.S. FAISALABAD



Details of Generation Facility at Plant-IV/ CCPP Nandipur

(A). Plant Configuration

(i).	Plant Size/ Installed Capacity (Gross ISO)	Natural Gas		Furnace Oil	
		565.65 MW		473.99 MW	
(ii).	Type of Technology	Combined Cycle Power Plant (CCPP)			
(iii).	Number of Units/Size (MW)	Unit-I	Unit-II	Unit-III	Unit-IV
		122.1 MW Gas Turbine	122.1 MW Gas Turbine	122.1 MW Gas Turbine	199.35 MW Steam Turbine
(iv).	Unit Make & Model	Unit-I	Unit-II	Unit-III	Unit-IV
		General Electric/G.E. PG 9171E (Frame 9E)	G.E./PG 9171E (Frame 9E)	G.E./PG 9171E (Frame 9E)	Dong Fong Electric Company Limited, China.
(v).	Commercial Operation Date (of each Unit)	Unit-I	Unit-II	Unit-III	Unit-IV
		May 2014	July 2014	September 2014	December 2014
(vi).	Expected Useful Life of the Generation Facility/Plant-IV from Commercial Operation Date (of each Unit)	Unit-I	Unit-II	Unit-III	Unit-IV
		25 Years	25 Years	25 Years	25 Years

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(vii).	Expected Useful Life of the Generation Facility/Plant-IV (Each Unit) at the time of Grant of Original Generation Licence	Unit-I	Unit-II	Unit-III	Unit-IV
		Not Installed	Not Installed	Not Installed	Not Installed
(viii).	Expected Useful Life of the Generation Facility/Plant-IV (Each Unit) at the time of Modification-I in Generation Licence dated April 16, 2014)	Unit-I	Unit-II	Unit-III	Unit-IV
		Not Installed	Not Installed	Not Installed	Not Installed
(ix).	Expected Useful Life of the Generation Facility/Plant-IV (Each Unit) at the time of this Modification-II in Generation Licence (dated October__, 2014)	Unit-I	Unit-II	Unit-III	Unit-IV
		30 Years	30 Years	30 Years	30 Years

(G). Fuel Details

(i).	Primary Fuel	Furnace Oil (FO)

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(ii).	Alternative Fuel	Natural Gas (NG)		
(iii).	Start-Up Fuel	High Speed Diesel Oil (HSD)		
(iv).	Fuel Source for each of the above (i.e. Imported/ Indigenous)	Indigenous/Imported		
(v).	Fuel Supplier for each of the above	Primary Fuel	Alternative Fuel	Start-Up Fuel
		PSO/Shell/Total	SNGPL	PSO/Shell/Total
(vi).	Supply Arrangement for each of the above	Primary Fuel	Alternative Fuel	Start-Up Fuel
		Oil Tankers	Pipeline	Oil TAnkers
(vii).	No of Storage Tanks	Primary Fuel	Alternative Fuel	Start-Up Fuel
		8	Not Applicable	2
(viii).	Storage Capacity of each Tank	Primary Fuel	Alternative Fuel	Start-Up Fuel
		10,000 Metric Tons	Not Applicable	10,000 Metric Tons
(ix).	Gross Storage	Primary Fuel	Alternative Fuel	Start-Up Fuel
		80,000 Metric Tons	Not Applicable	20,000 Metric Tons

(H). Emission/Effluents Values

		Primary Fuel	Alternative Fuel	Start-Up Fuel
(i).	SO_x (mg/Nm^3)	146.6 MT/day	< 1% Very Low	Not Applicable
(ii).	NO_x (mg/Nm^3)	200 PPM	Very Low	-Do-
(iii).	CO (mg/Nm^3)	Very Low	Very Low	-Do-

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(iv).	PM_{10}	Very Low	Very Low	-Do-

(I). Cooling System

(i).	Cooling Water Source/ Cycle	Canal water (Closed Cycle)/Tube well Water

(J). Plant Characteristics

		Unit-I	Unit-II	Unit-III	Unit-IV
(i).	Generation Voltage	15KV	15KV	15 KV	15 KV
(ii).	Frequency	50 HZ	50 HZ	50 HZ	50 HZ
(iii).	Power Factor	0.85Lagging	0.85Lagging	0.85Lagging	0.85Lagging
(iv).	Automatic Generation Control (AGC) (MW control is the general practice)	Yes	Yes	Yes	Yes
(v).	Ramping Rate	To be Provided Later	To be Provided Later	To be Provided Later	To be Provided Later
(vi).	Time required from hot start upto Synchro-nization to Grid	-Do-	-Do-	-Do-	-Do-

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(K). Interconnection Arrangement

(i).	Interconnection & Transmission Arrangement	The Power generated from the Power Plant shall be dispersed to power system directly within GEPCO load center at 132kV voltage level through six circuits comprising three transmission lines as follows:- (a). A 132kV Double Circuit (D/C) transmission line, approx. 33 KMs long on twin bundle Rail Conductor from Nandipur CCPP to Sahowala 220/132 kV substation; (b). A 132 kV D/C transmission line, approx 7 KMs long on Rail conductor from Nandipur CCPP to Gujranwala-Sialkot road 132 kV substation (Aroop). (c). A 132 kV D/C transmission line, approximately 6.5 KMs long on Rail conductor for looping In/Out of one circuit of the existing Gujranwala Pasrur Road-Gujranwala Sialkot road 132 kV D/C transmission line at Nandipur CCPP.

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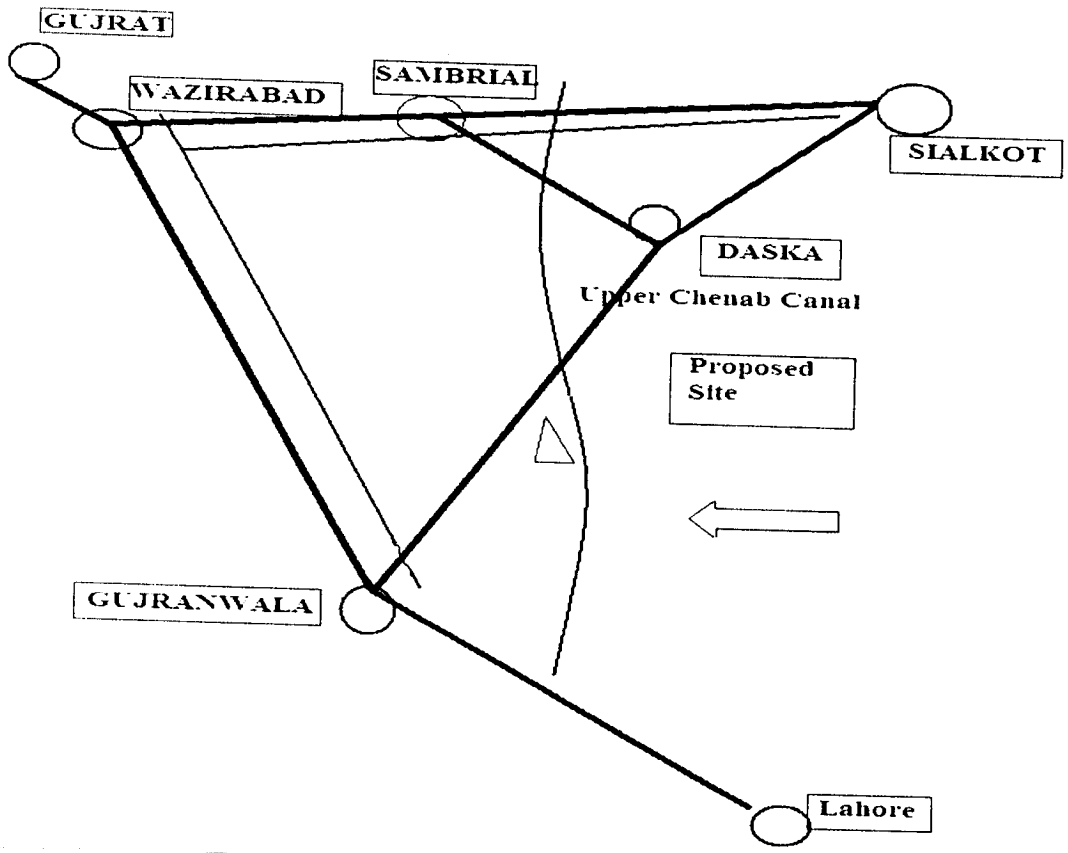

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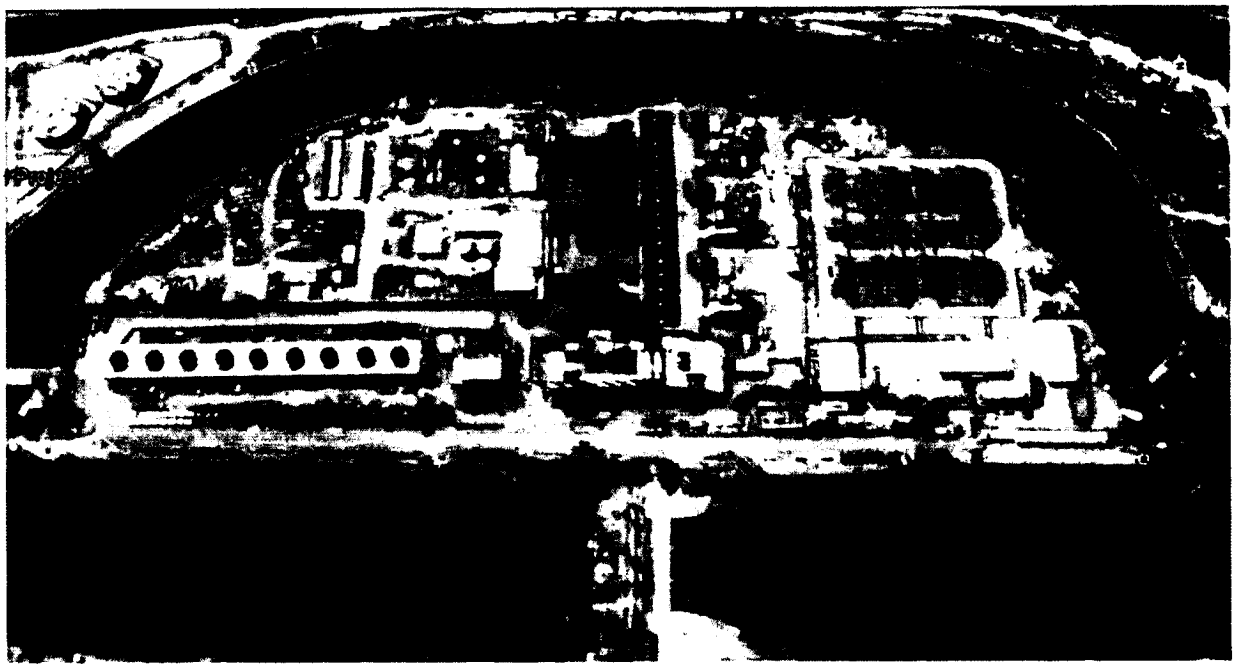

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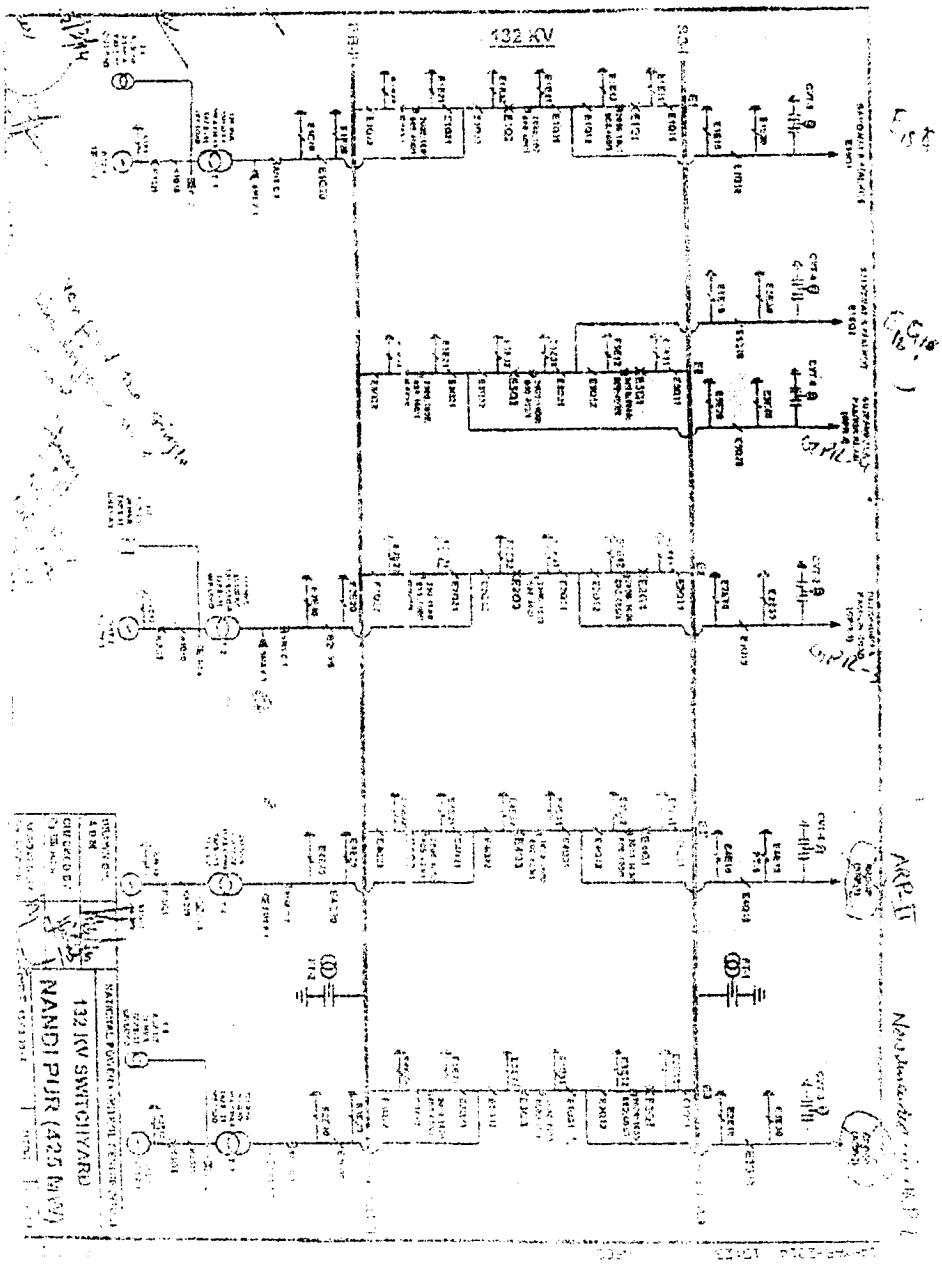

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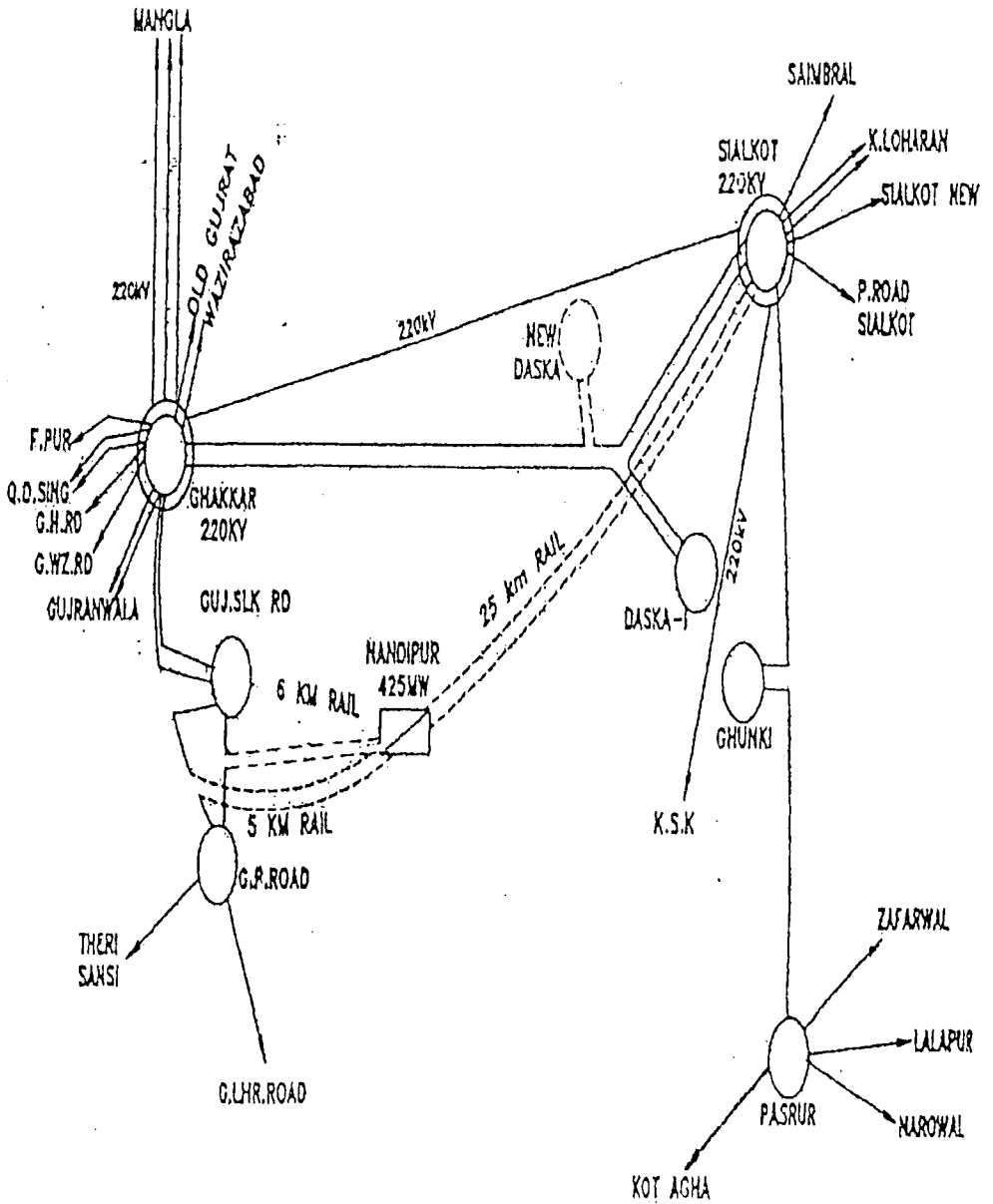
Interconnection Scheme

(Based on enhanced capacities of the Nandipur CCPP)



NOTE:

DOTTED LINES INDICATE SCOPE OF PROPOSED
INTERCONNECTION SCHEME FOR NANDIPUR THERMALPOWER PLANT

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SCHEDULE-II
(Revised/Modified)
Modification-II

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

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SCHEDULE-II

Power Station	Unit Detail	Installed Capacity (MW)	De-Rated Capacity (MW)		Net Capacity after Auxiliary Consumption (MW	
Thermal Power Station (TPS) Muzaffargarh/ Plant-I	Unit-1	210	Unit-1	200	Unit-1	188
	Unit-2	210	Unit-2	200	Unit-2	188
	Unit-3	210	Unit-3	200	Unit-3	188
	Unit-4	320	Unit-4	300	Unit-4	276
	Unit-5	200	Unit-5	200	Unit-5	182
	Unit-6	200	Unit-6	200	Unit-6	182
	Sub-Total-I	**1350**	**-**	**1300**	**-**	**1204**
Gas Turbine Power Station (GTPS) Faisalabad/ Plant-II	Unit:1-7	(25 x 7) = 175	Unit:1-7	136.67	Unit:1-7	133
	Unit- 8	25	Unit- 8	19	Unit- 8	18.81
	Unit-9	44	Unit-9	38	Unit-9	35.72
	Sub-Total-II	**244**	**-**	**193.67**	**-**	**187.53**
Steam Power Station (SPS) Faisalabad/ Plant-III	Unit-1	66	Unit-1	50	Unit-1	49.83
	Unit-2	66	Unit-2	50	Unit-2	49.83
	Sub-Total-III	**132**	**-**	**100**	**-**	**99.66**
CCPP Nandipur/ Plant-IV	Unit:1-3	366.30	Unit:1-3	331.8	Unit:1-3	321.53
	Unit- 4	199.35	Unit- 4	194.49	Unit- 4	188.47
	[1]**Sub-Total-IV**	**565.65**	**-**	**526.29**		**510.00**
Grand Total (Sub-Total-I, Sub-Total-II, Sub-Total-III & Sub-Total-IV)		**2291.65**	**-**	**2119.96**	**-**	**2001.19**

[1] Based on Natural Gas based Operation

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