CHAPTER 2 : GENERAL PROJECT INFORMATION

1.0 PROJECT INFORMATION

1.1	Owner	:	**UTTAR PRADESH RAJYA VIDYUT UTPADAN NIGAM LIMITED, LUCKNOW**	
1.2	Project Title	:	Panki Thermal Power Station (1x660MW)	
1.3	Owner's Engineer	:	**DEVELOPMENT CONSULTANTS PVT. LTD**	
1.4	Project Site Location	:	Place	Panki
			District	Kanpur
			State	Uttar Pradesh
			Country	India
1.5	Latitude & Longitude of project site	:	North	N26^{0}28'20"
			East	E 80^{0}14'32"
1.6	Nearest Railway Station	:	Panki	5 km
1.7	Nearest Town	:	Kanpur	16km
1.8	Nearest Highway	:	National Highway - 25	
1.9	Nearest Airport	:	Kanpur	25 km
			Lucknow	80 Km
1.10	Nearest Commercial Airport	:	Delhi	140 km
1.11	Nearest Water Body	:	Lower Ganga Canal, adjacent to site	
1.12	Land	:	Land is in possession of UPRVUNL.	
1.13	Station Graded Level Elevation from Mean sea level (MSL)	:	Plant FGL → RL(+) 126.0M → El(-) 0.500M Plant FFL → RL(+) 126.5M → El(+/-) 0.000M	
1.14	Water			
1.14.1	Nearest Water Source	:	Lower Ganga Canal system running adjacent for project site	
1.14.2	Water Requirement for station	:	~ 1927 m^3/hr considering closed cooling cycle with NDCT. Additional 700m^3/hr for ash slurry preparation during emergency ash disposal to ash dyke.	
1.14.3	Raw Water Analysis from Upper Ganga Canal	:	Refer Appendix - I	
1.15	Site Ambient Condition			
1.15.1	Monthly mean (DBT)	:	Maximum	44.4 °C
		:	Minimum	3.8 °C
1.15.2	Extreme Recorded (DBT)	:	Maximum	47.3 °C
			Minimum	-0.9 °C
1.15.3	Monthly mean (WBT)	:	Maximum Minimum	27.3 °C 9.2 °C
1.15.4	Relative Humidity	:	Maximum	84 %
			Minimum	28 %
1.15.5	Average relative humidity		Annual Average	65 %
1.15.6	Rainfall	:	Annual average	832.6 mm

			Heaviest fall recorded in 24 hrs	247.4 mm
1.15.7	Basic Wind Speed	:	47.00 m/s	As per IS: 875 part – III
			For wind resistance design of structure & equipment refer relevant civil section	
1.15.8	Climatic condition	:	For detailed information refer attached Climatological data as published by IMD for Kanpur station.	
1.16	Seismic data	:	Zone – III	As per IS: 1893
			For earthquake resistance design of structure & equipment refer relevant civil section	
1.17	Fuel Data			
1.17.1	Coal Source	:	Coal requirement for this stage of the project is estimated as 2.99 million tones/annum considering 660 MW capacity, GCV of blended coal 4030 kcal/kg, Heat Rate as 2317 kcal/kwh and 90% PLF as per CERC operative norms effective from 1/4/2009.	
1.17.2	Coal Transportation	:	Thru BOXN wagons of Indian Railways System	
1.17.3	Coal Analysis	:	Refer Appendix – II	
1.17.4	Support Fuel (HFO / LDO) transportation	:	Support fuel will be transported by road tankers or by Railway system. Start-up / support fuel for the proposed project will be LDO/HFO.	
1.17.5	Support Fuel (HFO / LDO) analysis	:	Refer Appendix - II	

Appendix – I: Raw Water Analysis (Source - Lower Ganga Canal)

S. No.	Description	Unit	Parameter
1	Physical characteristics		
	pH at 25^{0}C	-	8.00
	Turbidity	Silica Scale	500
	Total Suspended solids	ppm	250
	Total Dissolved solids	ppm	241
	Colour	Hazen	< 5
2	Cations		
	Calcium Hardness	ppm as $CaCO_3$	80
	Magnesium Hardness	ppm as $CaCO_3$	40
	Sodium + Potassium	ppm as $CaCO_3$	36
	Iron	ppm as $CaCO_3$	1.5
	Total Cations	ppm as $CaCO_3$	157.5
3	Anions		
	Bicarbonate	ppm as $CaCO_3$	100
	Carbonate	ppm as $CaCO_3$	0.95

S. No.	Description	Unit	Parameter
	Hydroxyl	ppm as $CaCO_3$	0.05
	Chlorides	ppm as $CaCO_3$	20
	Sulphate	ppm as $CaCO_3$	36
	Nitrate	ppm as $CaCO_3$	0.5
	Total Anions	ppm as $CaCO_3$	157.5
4	Carbon Di-oxide as CO_2	ppm	1.97
5	Dissolved Silica	ppm as SiO_2	10.0
6	Colloidal Silica	ppm as SiO_2	0.5
7	Organic Matter	ppm as O2	4.0

Appendix – II : Coal Quality Parameter

Sl.No.	Particulars	Unit	Performance / Design Fuel	Worst Fuel	Best Fuel
1.0.	**Proximate Analysis (As Received Basis)**	**By Weight**			
1.1.	Moisture	%	10.5	12	12
1.2.	Ash	%	35	43	32
1.3.	Volatile Matter	%	26	19	27
1.4.	Fixed Carbon	%	28.5	26	29
1.5.	**Total**	%	**100**	**100**	**100**
1.6.	**Gross Calorific Value**	**kcal/kg**	**3700**	**3200**	**4200**
2.0.	**Ultimate Analysis (As Received Basis)**				
2.1.	Moisture	%	10.5	12	12
2.2.	Ash	%	35	43	32
2.3.	Carbon	%	42	33.5	44
2.4.	Hydrogen	%	2.0	2.4	2.77
2.5.	Nitrogen	%	1.6	1.3	1.5
2.6.	Sulfur	%	0.46	0.45	0.5
2.7.	Oxygen	%	8.44	7.35	7.23
2.8.	**Total**	%	**100**	**100**	**100**
3.0.	**Hard Groove Index**		**53**	**50**	**55**
4.0.	**Ash Fusion Range**				
a)	Initial Deformation Temperature	^0C	1200	1154	1165
b)	Hemispherical Temperature	^0C	1350	1300	>1350

Sl.No.	Particulars	Unit	Performance / Design Fuel	Worst Fuel	Best Fuel
c)	Fusion Temperature	^{0}C	>1400	>1400	>1400

Source: Saharpur Jamarpani Coal Mine, Jharkhand

Imported Coal

Sl. No.	Item	Unit	Design Coal
1.	Gross heating Value	Kcal/kg	5500

Source: *Indonesia / South African coal*

Appendix – III : Light Diesel Oil (LDO)
As per IS: 1460-2000

S.No.	Property	Unit	Value
1.0	Ash content (max)	% by mass	0.02
2.0	Carbon residue (Rams Bottom) max	% by mass	0.2
3.0	Cetane number (Min)	-	-
4.0	Pour Point (max) a) Winter b) Summer	°C	 12 21
5.0	Flash Point (min) a) Abel b) Pensky0Martens	°C	 -- 68
6.0	Kinematic Viscosity at 38 deg	Cst	2.5 to 15.7
7.0	Sediments (max)	% by mass	0.1
8.0	Sulphur Content (max)	% by mass	1.8
9.0	Water Content (max)	% by volume	---
10.0	Gross Calorific Value (GCV), approx	kCal/kg	10,000
11.0	Density at 15°C	Kg/m^3	850 to 870

Appendix – IV : Heavy Fuel Oil (HFO)
As per IS: 1593-1982

S.No.	Property	Unit	Value
1.0	Viscosity at 50 °C	Cst	370
2.0	Density at 15°C (approx)	Kg/m^3	890 to 950
3.0	Flash Point (min)	°C	66
4.0	Pour Point (max)	°C	20
5.0	Water Content (max)	% by volume	1
6.0	Sediments (max)	% by weight	0.25
7.0	Sulphur Content (max)	% by weight	4.5
8.0	Ash content (max)	% by weight	0.1
9.0	Gross Calorific Value (GCV), approx	kCal/kg	10,000

2.0 Access to Site

The nearest town Kanpur is about 16 km from site. It is easily accessible by Railway/Road.

Dedicated railway link is available for the transportation of coal and fuel oil for the power plant. No problem is envisaged in accessibility and transportation of heavy equipment to site by road or rail.

3.0 Plant Rating, Capacity, Availability, PLF

Plant continuous rating will be 660 MW at generator terminals based on the following site conditions.

- Ambient air temperature
- Condenser cooling water inlet temperature of 33°C and 10°C temperature rise across the condenser.
- Generator power factor of 0.85 (zero point eight-five).
- Fuel specification as given elsewhere.
- Design temperature for electrical equipment is 50°C.

The VWO capacity of the steam turbine 660 MW will be 105% or 693 MW and the Boiler maximum Continuous Rating (MCR) will be established to match the steam requirement at VWO conditions. The capacity of the unit is selected so as to deliver the rated output even after ageing that will occur between overhauls, as a result of deposition of salts in turbine blades, wear and tear etc.

4.0 Power Evacuation

The power generated from the proposed project will be evacuated over the 400 KV through a 400 KV open switchyard. Further to Switchyard distribution will be by UPTRANSCO. Interconnection of proposed 400 KV Switchyard with existing 220 kV switchyard shall be done as specified elsewhere in specification.

जलवायवी सारणी
CLIMATOLOGICAL TABLE

स्टेशन :कानपुर (ए)
STATION :Kanpur (A)

अक्षांश LAT 26°26′ N देशांतर LONG 80°22′ E समुद्री तल माध्य से ऊँचाई HEIGHT ABOVE M. S. L. मीटर 126 METRES

1951 से 1976 तक के प्रेक्षणों पर आधारित
BASED ON OBSERVATIONS FROM 1951 TO 1976

माह MONTH		स्टेशन का सतह दाब STATION LEVEL PRESSURE एच. पी. ए. hPa	वायु तापमान AIR TEMPERATURE माध्य MEAN: शुष्क बल्ब DRY BULB डि.सें. °C	नम बल्ब WET BULB डि.सें. °C	दैनिक अधिकतम DAILY MAX डि.सें. °C	दैनिक न्यूनतम DAILY MIN डि.सें. °C	माह में उच्चतम HIGHEST IN THE MONTH डि.सें. °C	माह में निम्नतम LOWEST IN THE MONTH डि.सें. °C	चरम EXTREMES: उच्चतम HIGHEST डि.सें. °C	दिनांक और वर्ष DATE AND YEAR	निम्नतम LOWEST डि.सें. °C	दिनांक और वर्ष DATE AND YEAR	आर्द्रता HUMIDITY: सापेक्ष आर्द्रता RELATIVE HUMIDITY प्रतिशत %	वाष्प दाब VAPOUR PRESSURE एच.पी.ए. hPa	मेघ की मात्रा CLOUD AMOUNT: समस्त मेघ ALL CLOUDS आकाश के अष्टमांश Oktas of sky	निम्न मेघ LOW CLOUDS आकाश के अष्टमांश Oktas of sky	वर्षा RAINFALL: मासिक योग MONTHLY TOTAL मि.मि. mm	वर्षा के दिनोंकी संख्या NO. OF RAINY DAYS	वर्षासहित सबसे नम महीने का योग TOTAL IN WETTEST MONTH WITH YEAR मि.मि. mm	वर्षासहित शुष्कतम महीने का योग TOTAL IN DRIEST MONTH WITH YEAR मि.मि. mm	24 घंटोंकी सबसे भारी वर्षा HEAVIEST FALL IN 24 HOURS मि.मि. mm	दिनांक और वर्ष DATE AND YEAR	माध्य पवन गति MEAN WIND SPEED कि.मी. प्र. घं. Kmph
जनवरी JAN	I	1002.8	11.3	9.5	22.7	8.5	27.1	4.4	31.1	21 1939	1.7	14 @ 1967	79	10.5	1.8	0.6	21.1	1.5	74.7 1948	0.0	48.5	04 1893	8.0
	II	1000.2	20.1	14.2									50	11.5	1.8	0.5							
फरवरी FEB	I	1000.2	15.0	11.7	26.4	11.3	31.9	6.7	35.6	28 1930	0.6	02 1905	66	11.1	1.4	0.4	12.5	1.0	97.5 1928	0.0	59.2	20 1942	9.9
	II	997.4	24.6	16.0									38	11.3	1.6	0.3							
मार्च MAR	I	997.4	21.5	15.6	32.5	16.6	38.2	11.1	42.8	27 1941	7.2	07 1945	52	13.0	1.6	0.3	6.2	0.7	77.2 1944	0.0	61.7	30 1944	11.3
	II	993.9	30.9	19.0									29	12.3	1.8	0.4							
अप्रैल APR	I	993.6	28.5	18.8	38.3	22.0	42.5	16.7	45.6	30 1938	11.1	03 1905	37	14.1	1.3	0.3	4.5	0.5	94.2 1909	0.0	25.9	09 1928	12.2
	II	989.8	36.6	21.4									23	12.9	1.7	0.4							
मई MAY	I	988.9	32.4	21.8	41.4	26.5	45.0	21.7	47.2	30 1941	17.8	03 1909	37	17.3	1.1	0.4	9.8	0.8	47.2 1969	0.0	40.0	12 1969	12.7
	II	985.2	39.7	23.3									22	14.9	1.2	0.4							
जून JUN	I	985.1	32.4	24.8	40.1	28.7	44.8	23.8	47.3	09 1966	20.6	03 1922	54	24.9	3.5	1.2	65.4	3.3	378.7 1916	6.0 1969	133.3	10 1916	13.4
	II	981.5	37.7	25.7									39	22.9	3.5	1.3							
जुलाई JUL	I	984.8	29.0	26.2	34.3	26.7	39.8	23.8	45.0	10 1903	21.7	28 1948	80	31.8	5.9	3.2	229.8	12.0	704.1 1924	36.6 1970	181.0	25 1965	11.2
	II	982.1	31.9	26.8									68	31.2	6.1	3.1							
अगस्त AUG	I	986.5	27.9	26.1	32.2	25.9	35.6	23.7	40.6	01 1903	21.7	25 1948	87	32.5	6.2	4.0	289.5	13.3	664.2 1921	40.0 1965	235.2	31 1915	9.6
	II	984.3	30.0	26.8									77	32.5	5.9	3.6							
सितम्बर SEP	I	990.5	27.8	25.2	33.0	24.9	35.8	22.2	40.0	02 1932	16.1	27 1896	81	29.9	4.0	2.3	124.4	6.5	527.6 1915	5.2 1966	242.8	16 1970	9.2
	II	987.3	30.5	25.7									68	29.5	4.1	2.2							
अक्तूबर OCT	I	996.7	25.0	21.0	32.7	20.2	35.6	15.4	40.6	03 1896	11.1	30 1895	69	21.5	1.4	0.8	60.7	2.1	335.3 1955	0.0	136.1	05 1894	6.4
	II	993.6	29.5	22.5									54	21.2	1.6	0.8							
नवम्बर NOV	I	1001.4	18.3	14.5	29.0	13.2	32.7	8.8	36.1	04 1940	5.0	19 1948	65	13.6	0.8	0.3	1.0	0.2	92.2 1894	0.0	59.2	19 1911	5.3
	II	998.4	25.1	17.8									46	14.6	0.9	0.2							
दिसम्बर DEC	I	1003.1	12.6	10.3	24.2	8.9	28.1	4.8	31.3	15 1959	-0.9	27 1961	76	10.8	1.3	0.3	7.7	0.7	82.6 1967	0.0	40.6	25 1950	6.0
	II	1000.4	20.8	14.8									50	11.8	1.4	0.2							
वार्षिक योग या माध्य ANNUAL TOTAL OR MEAN	I	994.3	23.5	18.8	32.2	19.5	45.6	3.7	47.3		-0.9		65	19.3	2.5	1.2	832.6	42.6	1567.2 1955	420.6 1918	242.8		9.6
	II	991.2	29.8	21.2									47	18.9	2.6	1.1							
वर्षोंकी सं NUMBER OF YEARS	I	23	23	23	24	24	24	24	90		90		23	23	23	13	25	25	85	85	85		22
	II	23	23	23									23	23	23	13							

जलवायवी सारणी
CLIMATOLOGICAL TABLE

स्टेशन :कानपुर (ए)
STATION : Kanpur (A)

माह / MONTH	मौसम परिघटना / WEATHER PHENOMENA: के साथ दिनों की संख्या / No. OF DAYS WITH: PPT 0.3mm or more	HAIL	THUNDER	FOG	DUST STORM	SQUALL	पवन / WIND: पवन की गति के साथ दिनों की संख्या (कि. मी. प्र. घं.) / No. OF DAYS WITH WIND SPEED (Km. p. h.): 62 या अधिक / 62 or more	20-61	1-19	0	पवन की दिशा के दिनों की संख्या का प्रतिशत / PERCENTAGE No. OF DAYS WIND FROM: उ / N	उपू / NE	पू / E	दपू / SE	द / S	दप / SW	प / W	उप / NW	शांत / CALM	मेघ / CLOUD: मेघ मात्रा (सभी मेघ) सहित दिनों की संख्या – अष्टमांश / No. OF DAYS WITH CLOUD AMOUNT (ALL CLOUDS) OKTAS: 0	से-2 / T-2	3-5	6-7	8	निम्न स्तरी मेघ मात्रा सहित दिनों की संख्या – अष्टमांश / No. OF DAYS WITH LOW CLOUD AMOUNT OKTAS: 0	से-2 / T-2	3-5	6-7	8	कुहरा / FOG 8	दृश्यता / VISIBILITY: दृश्यता सहित दिनों की संख्या / No. OF DAYS WITH VISIBILITY: 1 कि.मी. तक / UP TO 1 Km	1 – 4 कि.मी. / 1-4 Kms	4 – 10 कि.मी. / 4-10 Kms	10 – 20 कि.मी. / 10-20 Kms	20 कि.मी. से अधिक / OVER 20 Kms
जनवरी I	2.4	0.1	0.4	3.2	0.1	0.0	0	0	22	9	6	5	13	3	2	9	29	8	25	18	4	3	3	3	25	2	2	0	1	1	1.5	11.1	14.4	3.8	0.2
JAN II							0	0	24	7	11	7	11	2	1	2	39	13	14	18	5	3	3	2	26	2	2	0	1	0	0.0	1.9	20.9	7.4	0.8
फरवरी I	2.0	0.0	0.7	1.0	0.1	0.0	0	0	22	6	6	5	12	3	2	11	36	7	18	19	3	3	2	1	24	1	2	1	0	0	0.9	6.3	16.0	4.8	0.0
FEB II							0	1	24	3	9	6	8	1	1	4	46	17	8	17	3	4	3	1	25	2	1	0	0	0	0.0	0.8	19.7	7.5	0.0
मार्च I	1.4	0.0	1.1	0.1	0.4	0.3	0	0	27	4	6	5	10	4	4	14	36	10	11	19	4	4	3	1	28	1	1	1	0	0	0.0	6.2	19.6	5.2	0.0
MAR II							0	2	28	1	9	4	6	1	1	2	50	23	4	18	4	4	4	1	27	2	2	0	0	0	0.0	1.9	21.1	8.0	0.0
अप्रैल I	1.0	0.0	0.9	0.0	0.6	0.0	0	1	26	3	5	5	13	6	6	10	35	13	7	19	4	4	2	1	26	2	2	0	0	0	0.1	4.1	18.8	7.0	0.0
APR II							0	2	26	2	10	5	7	1	1	4	42	28	2	18	4	4	3	1	26	2	2	0	0	0	0.1	3.5	19.6	6.8	0.0
मई I	1.4	0.0	1.8	0.1	1.9	0.0	0	1	28	2	7	6	20	7	5	7	31	12	5	21	3	5	1	1	27	2	2	0	0	0	0.1	6.1	17.6	7.2	0.0
MAY II							0	2	28	1	11	8	10	2	1	3	37	28	0	21	4	4	2	0	26	3	2	0	0	0	0.5	4.1	18.9	7.5	0.0
जून I	5.2	0.0	2.8	0.0	1.6	0.0	0	2	26	2	5	8	27	9	4	7	28	9	3	11	3	5	7	4	17	4	6	2	1	0	0.1	5.1	19.1	5.7	0.0
JUN II							0	3	25	2	12	10	19	4	3	4	25	20	3	11	3	7	6	3	16	6	6	1	1	0	0.1	6.4	17.2	6.3	0.0
जुलाई I	15.1	0.0	2.1	0.0	0.0	0.0	0	1	29	1	4	6	33	9	9	14	18	3	4	1	2	7	10	11	8	4	11	5	3	0	0.1	2.4	21.8	6.7	0.0
JUL II							0	1	28	2	9	10	30	7	6	8	17	9	4	1	1	8	12	9	5	7	13	4	2	0	0.1	1.9	22.1	6.9	0.0
अगस्त I	17.1	0.0	1.8	0.0	0.0	0.0	0	0	28	3	4	7	32	12	6	11	20	2	6	0	2	6	10	13	4	5	12	6	4	0	0.3	2.7	19.3	8.7	0.0
AUG II							0	0	27	4	8	7	26	9	5	11	22	4	8	1	1	7	13	9	3	7	14	4	3	0	0.1	2.1	19.3	9.5	0.0
सितम्बर I	9.3	0.0	2.2	0.1	0.0	0.0	0	1	27	2	5	8	26	7	5	8	27	5	9	6	4	7	8	5	11	6	7	4	2	0	0.1	2.2	18.1	9.6	0.0
SEP II							0	0	27	3	15	10	21	4	5	4	23	7	11	5	4	9	8	4	9	9	9	2	1	0	0.1	1.3	18.9	9.7	0.0
अक्तूबर I	2.8	0.0	1.1	0.2	0.1	0.0	0	0	24	7	6	6	16	4	4	10	28	5	21	20	4	2	2	3	25	2	2	1	1	0	0.1	3.7	19.4	7.8	0.0
OCT II							0	0	22	9	18	7	11	1	1	2	20	10	30	18	5	4	2	2	22	4	3	1	1	0	0.1	0.9	19.8	10.2	0.0
नवम्बर I	0.3	0.0	0.1	0.1	0.1	0.0	0	0	19	11	6	4	7	2	2	7	27	7	38	23	3	2	1	1	28	1	1	0	0	0	0.3	9.8	14.6	5.3	0.0
NOV II							0	0	17	13	15	4	3	0	0	2	20	10	46	22	4	2	1	1	28	1	1	0	0	0	0.0	1.6	19.9	8.5	0.0
दिसम्बर I	1.0	0.0	0.1	2.4	0.0	0.0	0	0	18	13	6	5	8	1	1	6	29	7	37	23	3	2	2	1	28	1	1	0	0	1	2.3	11.2	13.9	3.6	0.0
DEC II							0	0	21	10	13	4	6	1	0	2	33	9	32	21	4	3	2	1	29	1	1	0	0	0	0.1	2.9	22.6	5.4	0.0
वार्षिक योग या माध्य I	59.0	0.1	15.1	7.2	4.9	0.3	0	6	296	63	6	6	18	6	4	10	29	7	14	180	39	50	51	45	251	31	49	20	12	2	5.9	70.9	212.6	75.4	0.2
ANNUAL TOTAL OR MEAN II							0	11	297	57	12	7	13	3	2	4	31	15	13	171	42	59	59	34	242	46	56	12	9	0	1.2	29.3	240.0	93.7	0.8
वर्षों की सं. I				20				17							22							18						18					18			
NUMBER OF YEARS II								17							22							18						18					18			