

SECTION – 5

**GENERATION CAPACITY
OF
NORTHERN REGION**

5.1 DETAILS OF INSTALLED AND EFFECTIVE CAPACITY IN NORTHERN REGION AS ON 31.03.2001

-	<u>STATION</u>	<u>INSTALLED CAPACITY</u> <u>(MW)</u>		<u>EFFECTIVE CAPACITY</u>	
1	CENTRAL SECTOR				
A	NTPC				
(a)	Badarpur TPS	3x100+2x210	= 720.00	3x95+2x210	= 705.00
(b)	Singrauli STPS	5x200+2x500	= 2000.00	5x200+2x500	= 2000.00
(c)	Rihand STPS	2x500	= 1000.00	2x500	= 1000.00
(d)	Dadri NCTPS	4x210	= 840.00	4x210	= 840.00
(e)	Unchahar -I TPS	2x210	= 420.00	2x210	= 420.00
(f)	Unchahar -II TPS	2x210	= 420.00	2x210	= 420.00
(g)	Tanda TPS	4x110	= 440.00	4x110	= 440.00
(h)	Anta GPS	3x88.71+1x153.20	= 419.33	3x88.71+1x153.20	= 419.33
(i)	Auraiya GPS	4x111.19+2x109.30	= 663.36	4x111.19+2x109.30	= 663.36
(j)	Dadri GPS	4x130.19+2x154.51	= 829.78	4x130.19+2x154.51	= 829.78
(k)	Faridabad GPS	2x137.75+1x156.07	= 431.57	2x137.75+1x156.07	= 431.57
	Sub-Total		<u>8184.04</u>		<u>8169.04</u>
B	NHPC				
(a)	Bairasiul	3x60	= 180.00	3x60	= 180.00
(b)	Salal Stage - I	3x115	= 345.00	3x115	= 345.00
(c)	Salal Stage - II	3x115	= 345.00	3x115	= 345.00
(d)	Tanakpur HPS	3x40	= 120.00	3x31.4	= 94.20
(e)	Chamera HPS	3x180	= 540.00	3x180	= 540.00
(f)	URI	4x120	= 480.00	4x120	= 480.00
	Sub-Total		<u>2010.00</u>		<u>1984.20</u>
C	NPC				
(a)	RAPS -A	2x220	= 440.00	1x100+1x200	= 300.00
(b)	RAPS -B	2x220	= 440.00	2x220	= 440.00
(c)	NAPS	2x235	= 470.00	2x220	= 440.00
	Sub-Total		<u>1350.00</u>		<u>1180.00</u>
Total Central Sector (A + B + C)			<u>11544.04</u>		<u>11333.24</u>

2 BBMB					
(a)	Bhakra Complex				
	(i) Bhakra (L)	5x108	=	540.00	5x108 = 540.00
	(ii) Bhakra (R)	5x157	=	785.00	5x157 = 785.00
	(iii) Ganguwal	1x29.25+1x27.63+1x26.7	=	83.58	1x29.25+1x27.63+1x26.7 = 83.58
	(iv) Kotla	1x29.25+1x24.2+1x28.12	=	81.57	1x29.25+1x24.2+1x28.12 = 81.57
	Sub-Total			<u>1490.15</u>	<u>1490.15</u>
(b)	Dehar	6x165	=	990.00	6x165 = 990.00
(c)	Pong	4x60+2x66	=	372.00	4x60+2x66 = 372.00
	Total BBMB			<u>2852.15</u>	<u>2852.15</u>
3 CHANDIGARH					
(a)	Diesel Gen Set			2.00	1.40
4 DELHI					
	<u>THERMAL</u>				
(a)	Indra Prastha	3x62.5+1x60	=	247.50	3x62.5+1x60 = 247.50
(b)	Rajghat	1x15+2x67.5	=	150.00	1x14+2x67.5 = 149.00
(c)	Gas Turbines	6x30+3x34	=	282.00	6x30+3x34 = 282.00
	Total DELHI			<u>679.50</u>	<u>678.50</u>
5 HARYANA					
	<u>HYDRO</u>				
(a)	Western Yamuna Canal (WYC)	6x8	=	48.00	6x8 = 48.00
	Total Hydro			<u>48.00</u>	<u>48.00</u>
	<u>THERMAL</u>				
(b)	Faridabad (New)	3x60	=	180.00	3x55 = 165.00
(c)	Panipat	4x110+2x210	=	860.00	4x110+2x210 = 860.00
	Total Thermal			<u>1040.00</u>	<u>1025.00</u>
(d)	Magnum Diesel (IPP)	4x6.3	=	25.20	- 25.20
	Total HARYANA			<u>1113.20</u>	<u>1098.20</u>

6 HP

	<u>HYDRO</u>					
(a)	Giri	2x30.00	=	60.00	2x30.00	= 60.00
(b)	Bassi	4x15.00	=	60.00	4x15.00	= 60.00
(c)	Binwa	2x 3.00	=	6.00	2x 3.00	= 6.00
(d)	Rongtong	4x 0.50	=	2.00	4x 0.50	= 2.00
(e)	Andhra	3x 5.65	=	16.95	3x 5.65	= 16.95
(f)	Micro Hydel+Killar+Thirot			9.22		8.52
(g)	Nogli	2x 0.25+4x0.50	=	2.50	2x 0.25+4x0.50	= 2.50
(h)	Bhabha	3x40.00	=	120.00	3x40.00	= 120.00
(i)	Baner	3x 4.00	=	12.00	3x 4.00	= 12.00
(j)	Gaj	3x 3.50	=	10.50	3x 3.50	= 10.50
(k)	Sal -2	1x2	=	2.00	1x2	= 2.00
(l)	Gumma	1x3	=	3.00	1x3	= 3.00
(m)	Ghanvi	2x11.25	=	22.50	2x11.25	= 22.50
(l)	Diesel Gen. Set			0.13		0.13
	Total HP			<u>326.80</u>		<u>326.10</u>

6 J & K

	<u>HYDRO</u>					
(a)	Lower Jhelum	3x35.0	=	105.00	3x35.0	= 105.00
(b)	Upper Sindh	2x11.30+1x35.0	=	57.60	2x11.30+1x35.0	= 57.60
(c)	Ganderbal	2x3+2x4.5	=	15.00	2x3+2x4.5	= 15.00
(d)	Mohra	2x4.5	=	9.00	2x4.5	= 9.00
(e)	Chenani	5x4.66 +2x1.0+3x2.5	=	32.80	5x4.66 +2x1.0+3x2.5	= 32.80
(f)	Stakna	2x2.0+3x1.25+2.0	=	9.75	2x2.0+3x1.25+2.0	= 9.75
(g)	Small Hydel			3.54		3.54
	Total Hydro			<u>232.69</u>		<u>232.69</u>

J & K (Contd.)

	<u>GAS TURBINES</u>					
(h)	Pampore GT St - I	3x25.0	=	75.00	3x25.0	= 75.00
	Pampore GT St - II	4x25.0	=	100.00	4x25.0	= 100.00
	Total Gas			<u>175.00</u>		<u>175.00</u>
(l)	Diesel Gen. Set			<u>8.94</u>		<u>7.18</u>

	Total J & K	<u>416.63</u>	<u>414.87</u>
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7 PUNJAB

	<u>HYDRO</u>						
(a)	Jogindernagar/ Shanan	4x15+1x50	=	110.00	4x15+1x50	=	110.00
(b)	Upper Behari Doab Canal (UBDC)	3x15+3x15	=	90.00	3x15+3x15	=	90.00
(c)	Mukerian	6x15+6x19.5	=	207.00	6x15+6x19.5	=	207.00
(d)	Anandpur Sahib (APS)	4x33.5	=	134.00	4x33.5	=	134.00
(e)	Ranjit Sagar (Thein Dam)	4x150	=	600.00	4x150	=	600.00
(f)	Small Hydel		=	4.10		=	4.10
	Total Hydro			<u>1145.10</u>			<u>1145.10</u>
	<u>THERMAL</u>						
(g)	Guru Nanak Dev TPS (Bhatinda)	4x110	=	440.00	4x110	=	440.00
(h)	Guru Gobind Singh TPS (Ropar)	6x210	=	1260.00	6x210	=	1260.00
(i)	Lehra Mohabbat TPS	2x210	=	420.00	2x210	=	420.00
(j)	Jhalkeri Rice Straw Fired	1x10	=	10.00	1x10	=	10.00
	Total Thermal			<u>2130.00</u>			<u>2130.00</u>
	Total PUNJAB			<u>3275.10</u>			<u>3275.10</u>

8 RAJASTHAN

	<u>HYDRO</u>						
(a)	Mahi Bajaj Sagar	2x25+2x45	=	140.00	2x25+2x45	=	140.00
(b)	Rana Pratap Sagar (RPS)	4x43	=	172.00	4x43	=	172.00
(c)	Jawahar Sagar (JS)	3x33	=	99.00	3x33	=	99.00
(d)	Anoopgarh	6x1.5	=	9.00	6x1.5	=	9.00
(e)	Small Hydro			14.86			14.86
	Total Hydro			<u>434.86</u>			<u>434.86</u>
	<u>THERMAL</u>						
(f)	Kota TPS	2x110+3x210	=	850.00	2x110+3x210	=	850.00
(g)	Suratgarh TPS	2x250	=	500.00	2x250	=	500.00

(g)	RAMGARH GT	1x3	=	3.00	1x3	=	3.00
(h)	RAMGARH GT EXT	1x35.5	=	35.50	1x35.5	=	35.50
	Total Thermal			<u>1388.50</u>			<u>1388.50</u>
(l)	Wind Farm			<u>4.25</u>		-	<u>4.25</u>
	Total RAJASTHAN			<u>1827.61</u>			<u>1827.61</u>
				-			-

9 UP

	<u>HYDRO</u>						
(a)	Rihand	6x50.0	=	300.00	6x50.0	=	300.00
(b)	Obra	3x33.0	=	99.00	3x33.0	=	99.00
(c)	Matatilla	3x10.0	=	30.00	3x10.0	=	30.00
(d)	Khatima	3x13.8	=	41.40	3x13.8	=	41.40
(e)	Ramganga	3x66.0	=	198.00	3x66.0	=	198.00
(f)	Ganga Canal						
	Bhola	4x.375+2x.6+			4x.375+2x.6+		
	Salara	2x1.5+			2x1.5+		
	Chitwa	2x1.5+			2x1.5+		
	Nirgazni	2x2.5+			2x2.5+		
	Mohamedpur	3x3.1+			3x3.1+		
	Pathri	3x6.8	=	43.40	3x6.8	=	43.40
(g)	Yamuna (I & IV)						
	- Dhalipur	3x17.00+			3x17.00+		
	- Dhakrani	3x11.25+			3x11.25+		
	- Kulhal	3x10.00	=	114.75	3x10.00	=	114.75
(h)	Chibro	4x60.0	=	240.00	4x60.0	=	240.00
(i)	Khodri	4x30.0	=	120.00	4x30.0	=	120.00
(j)	Chilla	4x36.0	=	144.00	4x36.0	=	144.00
(k)	Maneri Bhali	3x30.0	=	90.00	3x30.0	=	90.00
(l)	Khara	3x24.0	=	72.00	3x24.0	=	72.00
(m)	Sobla & Small Hydro	6+12.2	=	18.20	6+12.2	=	18.20
	Total Hydro			<u>1510.75</u>			<u>1510.75</u>
	<u>THERMAL</u>						
(m)	Obra	5x50	=	250.00	4x40	=	160.00
(n)	Obra Extn. - I	3x100	=	300.00	3x94	=	282.00
(o)	Obra Extn. - II	5x200	=	1000.00	5x200	=	1000.00
(p)	Panki	1x32	=	32.00	1x32	=	32.00

(q)	Panki Extn.	2x110	=	220.00	2x105	=	210.00
(r)	Harduaganj - A	3x30	=	90.00	0	=	0.00
(s)	Harduaganj - B	2x50+2x60	=	220.00	1x40+2x55	=	150.00
(t)	Harduaganj - C	2x60+1x110	=	230.00	2x60+1x105	=	225.00
(u)	Paricha	2x110	=	220.00	2x110	=	220.00
(v)	Anpara - A	3x210	=	630.00	3x210	=	630.00
(w)	Anpara - B	2x500	=	1000.00	2x500	=	1000.00
	Total Thermal			<u>4192.00</u>			<u>3909.00</u>
	Total UP			<u>5702.75</u>			<u>5419.75</u>
				-			-
Total Region (1 to 9)				27739.78			27226.92

- NOTE:** 1. The ownership & control of Tanda TPS (4x110 MW capacity) was transferred from erstwhile Uttar Pradesh State Electricity Board (UPSEB) to National Thermal Power Corporation (NTPC) Ltd. w.e.f. 15th January 2000.
2. Indraprastha unit # 1 (30 MW) & Panki unit # 1 (32 MW) were permanently retired during 1999-2000.
3. Installed Capacity of each unit of NAPP declared to be 235 MW instead of 220 MW.

THE SUMMARY OF EFFECTIVE GENERATING CAPACITY IN THE NORTHERN REGION

Agency/ Source	Hydro	Thermal	Gas/Diesel/Wind	Nuclear	Total	% of Total
NTPC	---	5825.00	2344.04	---	8169.04	30.00%
NHPC	1984.20	---	---	---	1984.20	7.29%
NPC	---	---	---	1180.00	1180.00	4.33%
BBMB	2852.15	---	---	---	2852.15	10.48%
CHANDIGARH	---	---	1.40	---	1.40	0.01%
DELHI	---	396.50	282.00	---	678.50	2.49%
HARYANA	48.00	1025.00	25.20	---	1098.20	4.03%
HIMACHAL	325.97	---	0.13	---	326.10	1.20%
J&K	232.69	---	182.18	---	414.87	1.52%
PUNJAB	1145.10	2130.00	---	---	3275.10	12.03%
RAJASTHAN	434.86	1350.00	42.75	---	1827.61	6.71%
UP	1510.75	3909.00	---	---	5419.75	19.91%
Total	8533.72	14635.50	2877.70	1180.00	27226.92	100.00%
% of TOTAL	31.34%	53.75%	10.57%	4.33%	100.00%	

Notes The above table doesn't take into account the shares of a state in power stations located in the neighbouring state. Details of this is as under :

- (i) Haryana has one-third share in unit Nos. 2, 3, 4 at Indraprastha power stations of DVB viz. 62.5 MW.
- (ii) HP has 25 % share in the Dhalipur, Dhakrani, Chibro and Khodri power houses of UPSEB viz. 111.20 MW. It also has a 20 % share in the Kulhal and Khara hydro power houses viz. 20.40 MW. However, these shares are subject to actual physical drawals over designated transmission lines.
- (iii) HP has a fixed energy share every month in the Shanan power house of PSEB
- (iv) HP has 4.6 % share in Ranjit Sagar Dam Project of Punjab.
- (v) The shares of Rajasthan in Chambal and Satpura projects are as under :

CHAMBAL

PROJECTS	LOCATED	INSTALLED CAPACITY (MW)
Gandhi Sagar	M.P.	5 x 23 = 115
Rana Pratap Sagar	Rajasthan	4 x 43 = 172
Jawahar Sagar	Rajasthan	3 x 33 = <u>99</u>
	Total	386

Rajasthan has 50 % share in these Chambal projects viz. 193 MW.

SATPURA

PROJECTS	LOCATED	INSTALLED CAPACITY (MW)
Satpura TPS	M.P.	$5 \times 62.5 + 200.0 + 3 \times 210.0 = 1142.50$

Rajasthan has 40 % share viz. 125 MW in the first five units of Satpura TPS.

If the above shares of Rajasthan are included, the regional effective generating capacity would be 27273.92 MW.

5.2 BREAKUP OF EFFECTIVE HYDRO CAPACITY (MW) IN NORTHERN REGION AS ON 31st March 2001

Agency / Source	Run-of -the -river	Reservoir	Total
NHPC	1444.20	540.00	1984.20
BBMB	1155.15	1697.00	2852.15
DELHI	0.00	0.00	0.00
HARYANA	48.00	0.00	48.00
HP	325.97	0.00	325.97
J&K	232.69	0.00	232.69
PUNJAB	545.10	600.00	1145.10
RAJASTHAN	262.86	172.00	434.86
UP	1012.75	498.00	1510.75
Total	5026.72	3507.00	8533.72

5.3 GROWTH OF INSTALLED CAPACITY IN NORTHERN REGION DURING PAST DECADE

S. NO.	YEAR	THERMAL	HYDRO	GAS/DIESEL/WIND	NUCLEAR	TOTAL INSTALLED CAPACITY
1	1991-92	11462.60	6257.00	1582.00	880.00	20181.60
2	1992-93	12027.60	6300.50	1844.00	880.00	21052.10
3	1993-94	12673.00	6463.00	2187.00	880.00	22203.00
4	1994-95	13170.60	7311.50	2377.00	880.00	23739.10
5	1995-96	13272.60	7336.50	2377.00	880.00	23866.10
6	1996-97	13358.10	7645.80	2377.50	880.00	24261.40
7	1997-98	13358.10	7782.23	2407.97	880.00	24428.30
8	1998-99	14373.30	7817.40	2407.97	880.00	25478.67
9	1999-2000	14778.00	7868.18	2693.74	1130.00	26469.92
10	2000-01	14988.00	8560.22	2841.56	1350.00	27739.78
Compound Annual Growth Rate (CAGR)%		3.02	3.54	6.72	4.87	3.60

SECTION – 6

POWER SUPPLY POSITION
IN
NORTHERN REGION

6.1 SUMMARY OF 2000-01 POWER SUPPLY POSITION IN THE NORTHERN REGION

A. Average Energy/day (Net)

State / U.T.	Availability MU/Day	Requirement MU/Day	Shortage MU/Day	Shortage %
Chandigarh	2.78	2.78	0.00	0.00
Delhi	47.57	49.95	2.38	4.77
Haryana	44.38	45.76	1.38	3.02
H.P.	8.24	8.42	0.18	2.13
J & K	14.35	16.88	2.53	14.98
Punjab	72.02	74.38	2.36	3.17
Rajasthan	64.99	66.97	1.97	2.95
U.P.	109.76	126.40	16.64	13.16
N.F.F./Rail	0.35	0.35	0.00	0.24
Total	364.45	391.89	27.44	7.00

B. Peak MW

State / U.T.	MAX. Availability MW	MAX. Requirement MW	Shortage MW		Shortage %	
			ARITHMETICAL	AT MAXM. REQUIREMENT HR.	ARITHMETICAL	AT MAXM. REQUIREMENT HR.
	A	B	C=B-A	D	(C/B)*100	(D/B)*100
Chandigarh	171	171	0	0	0.00	0.00
Delhi	2670	3077	407	626	13.23	20.34
Haryana	2709	2709	0	0	0.00	0.00
H.P. *	585	585	0	0	0.00	0.00
J & K *	974	1172	198	250	16.89	21.33
Punjab	4897	4997	100	0	2.00	0.00
Rajasthan	3663	3754	91	0	2.42	0.00

U.P.	6119	7311	1192	1492	16.30	20.41
N.F.F.	52	52	0	0	0.00	0.00
Region	19860	21479	1619	2031	7.54	9.46

Diversity Factor = 1.10

* Approximate and Estimated

6.2(a) MONTHWISE POWER SUPPLY POSITION (avg energy in MU/day) IN NORTHERN REGION DURING 2000-01

State / U.T.->	CHANDIGARH				DELHI			
Month	Demand met (MU/day)	Requirement (MU/day)	Shortage (MU/day)	Shortage %	Demand met (MU/day)	Requirement (MU/day)	Shortage (MU/day)	Shortage %
APR - 2000	2.71	2.71	0.00	0.00	46.50	48.82	2.32	4.75
MAY- 2000	3.23	3.23	0.00	0.00	53.49	56.11	2.62	4.67
JUN - 2000	3.13	3.13	0.00	0.00	52.86	54.94	2.08	3.79
JUL - 2000	3.08	3.08	0.00	0.00	53.23	54.69	1.46	2.67
AUG - 2000	3.26	3.26	0.00	0.00	52.86	55.20	2.34	4.24
SEP - 2000	3.10	3.10	0.00	0.00	52.75	55.65	2.90	5.21
OCT - 2000	2.60	2.60	0.00	0.00	48.00	49.48	1.48	2.99
NOV - 2000	2.31	2.31	0.00	0.00	41.63	43.19	1.56	3.61
DEC - 2000	2.46	2.46	0.00	0.00	41.82	45.14	3.32	7.35
JAN - 2001	2.81	2.81	0.00	0.00	44.44	49.28	4.84	9.82
FEB - 2001	2.43	2.43	0.00	0.00	41.95	44.33	2.38	5.37
MAR -2001	2.22	2.22	0.00	0.00	40.87	42.12	1.25	2.97
2000-2001	2.78	2.78	0.00	0.00	47.57	49.95	2.38	4.77

State / U.T.->	HARYANA				HIMACHAL PRADESH			
Month	Demand met (MU/day)	Requirement (MU/day)	Shortage (MU/day)	Shortage %	Demand met (MU/day)	Requirement (MU/day)	Shortage (MU/day)	Shortage %
APR - 2000	37.14	37.98	0.84	2.21	8.09	8.09	0.00	0.00
MAY- 2000	41.97	42.75	0.78	1.82	8.08	8.08	0.00	0.00
JUN - 2000	46.19	47.04	0.85	1.81	8.13	8.13	0.00	0.00
JUL - 2000	47.91	48.68	0.77	1.58	8.35	8.35	0.00	0.00
AUG - 2000	52.02	52.85	0.83	1.57	8.17	8.26	0.09	1.09
SEP - 2000	49.99	50.92	0.93	1.83	8.37	8.37	0.00	0.00
OCT - 2000	47.30	48.64	1.34	2.75	8.04	8.04	0.00	0.00
NOV - 2000	41.64	42.73	1.09	2.55	8.34	8.34	0.00	0.00

DEC - 2000	43.31	44.13	0.82	1.86	8.66	8.81	0.15	1.70
JAN - 2001	40.12	43.55	3.43	7.88	8.34	8.86	0.52	5.87
FEB - 2001	41.40	45.12	3.72	8.24	8.30	9.01	0.71	7.88
MAR -2001	43.20	44.53	1.33	2.99	8.07	8.78	0.71	8.09
2000-2001	44.38	45.76	1.38	3.02	8.24	8.42	0.18	2.13
State / U.T.->	JAMMU & KASHMIR				PUNJAB			
Month	Demand met (MU/day)	Requirement (MU/day)	Shortage (MU/day)	Shortage %	Demand met (MU/day)	Requirement (MU/day)	Shortage (MU/day)	Shortage %
APR - 2000	14.77	17.98	3.21	17.85	61.63	61.93	0.30	0.48
MAY- 2000	13.74	16.30	2.56	15.71	75.38	75.68	0.30	0.40
JUN - 2000	13.81	15.29	1.48	9.68	91.69	92.49	0.80	0.86
JUL - 2000	13.56	15.05	1.49	9.90	92.23	93.29	1.06	1.14
AUG - 2000	14.40	15.14	0.74	4.89	97.58	99.30	1.72	1.73
SEP - 2000	13.97	15.45	1.48	9.58	80.06	87.19	7.13	8.18
OCT - 2000	14.63	15.69	1.06	6.76	67.78	72.28	4.50	6.23
NOV - 2000	15.46	17.20	1.74	10.12	56.93	57.25	0.32	0.56
DEC - 2000	16.67	18.54	1.87	10.09	60.06	60.32	0.26	0.43
JAN - 2001	14.06	19.06	5.00	26.23	57.63	60.07	2.44	4.06
FEB - 2001	12.72	18.49	5.77	31.21	62.31	66.34	4.03	6.07
MAR -2001	14.28	18.47	4.19	22.69	60.12	65.70	5.58	8.49
2000-2001	14.35	16.88	2.53	14.98	72.02	74.38	2.36	3.17

State / U.T.->	RAJASTHAN				UTTAR PRADESH			
Month	Demand met (MU/day)	Requirement (MU/day)	Shortage (MU/day)	Shortage %	Demand met (MU/day)	Requirement (MU/day)	Shortage (MU/day)	Shortage %
APR - 2000	60.86	64.07	3.21	5.01	107.31	123.88	16.57	13.38
MAY- 2000	65.32	66.56	1.24	1.86	110.94	125.12	14.18	11.33
JUN - 2000	68.30	69.45	1.15	1.66	105.54	117.10	11.56	9.87
JUL - 2000	55.74	56.18	0.44	0.78	105.96	123.33	17.37	14.08
AUG - 2000	60.15	60.42	0.27	0.45	109.82	125.26	15.44	12.33
SEP - 2000	62.25	64.57	2.32	3.59	105.32	121.08	15.76	13.02
OCT - 2000	63.79	65.37	1.58	2.42	113.58	129.97	16.39	12.61
NOV - 2000	70.85	71.29	0.44	0.62	114.88	126.85	11.97	9.44
DEC - 2000	68.98	70.75	1.77	2.50	114.12	129.91	15.79	12.15
JAN - 2001	65.52	71.76	6.24	8.70	104.14	132.26	28.12	21.26
FEB - 2001	68.06	71.98	3.92	5.45	110.63	132.90	22.27	16.76
MAR -2001	70.45	71.72	1.27	1.77	114.80	129.24	14.44	11.17
2000-2001	64.99	66.97	1.97	2.95	109.76	126.40	16.64	13.16
State / U.T.->	N.F.F./RAIL				REGION			
Month	Demand met	Requirement	Shortage	Shortage %	Demand met	Requirement	Shortage	Shortage %

	(MU/day)	(MU/day)	(MU/day)		(MU/day)	(MU/day)	(MU/day)	
APR - 2000	0.15	0.15	0.00	0.00	339.16	365.61	26.45	7.23
MAY- 2000	0.13	0.13	0.00	0.00	372.28	393.96	21.68	5.50
JUN - 2000	0.14	0.14	0.00	0.00	389.79	407.71	17.92	4.40
JUL - 2000	0.14	0.14	0.00	0.00	380.20	402.79	22.59	5.61
AUG - 2000	0.14	0.14	0.00	0.00	398.40	419.83	21.43	5.10
SEP - 2000	0.16	0.16	0.00	0.00	375.97	406.49	30.52	7.51
OCT - 2000	0.14	0.14	0.00	0.00	365.86	392.21	26.35	6.72
NOV - 2000	0.14	0.14	0.00	0.00	352.18	369.30	17.12	4.64
DEC - 2000	0.78	0.78	0.00	0.00	356.86	380.84	23.98	6.30
JAN - 2001	0.73	0.74	0.01	1.35	337.79	388.39	50.60	13.03
FEB - 2001	0.79	0.79	0.00	0.00	348.59	391.39	42.80	10.94
MAR -2001	0.78	0.78	0.00	0.00	354.79	383.56	28.77	7.50
2000-2001	0.35	0.35	0.00	0.24	364.45	391.89	27.44	7.00

6.2 (b) MONTHWISE POWER SUPPLY POSITION (Peak MW) IN NORTHERN REGION DURING 2000-01

State / U.T.->	CHANDIGARH				DELHI			
Month	Demand met MW	Requirement MW	Shortage MW	Shortage %	Demand met MW	Requirement MW	Shortage MW	Shortage %
APR - 2000	151	151	0	0.00	2441	2719	278	10.22
MAY- 2000	171	171	0	0.00	2628	2912	284	9.75
JUN - 2000	170	170	0	0.00	2670	2847	177	6.22
JUL - 2000	164	164	0	0.00	2621	2941	320	10.88
AUG - 2000	170	170	0	0.00	2607	2978	371	12.46
SEP - 2000	170	170	0	0.00	2577	2877	300	10.43
OCT - 2000	158	158	0	0.00	2548	2807	259	9.23
NOV - 2000	131	131	0	0.00	2498	2653	155	5.84
DEC - 2000	136	136	0	0.00	2371	2740	369	13.47
JAN - 2001	161	161	0	0.00	2602	3077	475	15.44
FEB - 2001	135	135	0	0.00	2491	2911	420	14.43
MAR -2001	121	121	0	0.00	2256	2516	260	10.33
2000-2001	171	171	0	0.00	2670	3077	407	13.23

State / U.T.->	HARYANA				HIMACHAL PRADESH			
Month	Demand met MW	Requirement MW	Shortage MW	Shortage %	Demand met MW	Requirement MW	Shortage MW	Shortage %
APR - 2000	2237	2237	0	0.00	540	540	0	0.00
MAY- 2000	2393	2404	11	0.46	564	564	0	0.00

JUN - 2000	2619	2619	0	0.00	557	557	0	0.00
JUL - 2000	2497	2549	52	2.04	579	579	0	0.00
AUG - 2000	2693	2693	0	0.00	562	562	0	0.00
SEP - 2000	2632	2697	65	2.41	576	576	0	0.00
OCT - 2000	2709	2709	0	0.00	541	541	0	0.00
NOV - 2000	2295	2308	13	0.56	585	585	0	0.00
DEC - 2000	2327	2327	0	0.00	530	555	25	4.50
JAN - 2001	2339	2525	186	7.37	562	562	0	0.00
FEB - 2001	2359	2509	150	5.98	523	535	12	2.24
MAR - 2001	2341	2427	86	3.54	486	515	29	5.63
2000-2001	2709	2709	0	0.00	585	585	0	0.00
State / U.T.->	JAMMU & KASHMIR				PUNJAB			
Month	Demand met MW	Requirement MW	Shortage MW	Shortage %	Demand met MW	Requirement MW	Shortage MW	Shortage %
APR - 2000	974	1101	127	11.53	3446	3456	10	0.29
MAY- 2000	958	1043	85	8.15	4172	4172	0	0.00
JUN - 2000	916	1001	85	8.49	4806	4806	0	0.00
JUL - 2000	972	1082	110	10.17	4897	4997	100	2.00
AUG - 2000	956	1013	57	5.63	4789	4886	97	1.99
SEP - 2000	937	1024	87	8.50	4408	4877	469	9.62
OCT - 2000	872	1015	143	14.09	3726	4137	411	9.93
NOV - 2000	890	1040	150	14.42	3276	3365	89	2.64
DEC - 2000	958	1172	214	18.26	3340	3440	100	2.91
JAN - 2001	835	1128	293	25.98	3465	3635	170	4.68
FEB - 2001	723	1112	389	34.98	3394	3594	200	5.56
MAR - 2001	808	1115	307	27.53	3486	3523	37	1.05
2000-2001	974	1172	198	16.89	4897	4997	100	2.00

State / U.T.->	RAJASTHAN				UTTAR PRADESH			
Month	Demand met MW	Requirement MW	Shortage MW	Shortage %	Demand met MW	Requirement MW	Shortage MW	Shortage %
APR - 2000	3212	3412	200	5.86	5735	6488	753	11.61
MAY- 2000	3303	3429	126	3.67	5793	6761	968	14.32
JUN - 2000	3370	3490	120	3.44	5699	6595	896	13.59
JUL - 2000	3260	3328	68	2.04	5679	6611	932	14.10
AUG - 2000	3175	3175	0	0.00	5627	6471	844	13.04
SEP - 2000	3165	3365	200	5.94	5595	6402	807	12.61
OCT - 2000	3306	3307	1	0.03	6119	7211	1092	15.14
NOV - 2000	3574	3574	0	0.00	5859	7007	1148	16.38
DEC - 2000	3623	3631	8	0.22	5856	7125	1269	17.81
JAN - 2001	3645	3754	109	2.90	5539	7311	1772	24.24

FEB - 2001	3663	3663	0	0.00	5697	6967	1270	18.23
MAR - 2001	3631	3631	0	0.00	5870	6714	844	12.57
2000-2001	3663	3754	91	2.42	6119	7311	1192	16.30
State / U.T.->	N.F.F.				REGION			
Month	Demand met MW	Requirement MW	Shortage MW	Shortage %	Demand met MW	Requirement MW	Shortage MW	Shortage %
APR - 2000	10	10	0	0.00	18059	19911	1852	9.30
MAY - 2000	7	7	0	0.00	18948	20687	1739	8.41
JUN - 2000	8	8	0	0.00	19842	21469	1627	7.58
JUL - 2000	7	7	0	0.00	19366	21409	2043	9.54
AUG - 2000	7	7	0	0.00	19860	21479	1619	7.54
SEP - 2000	8	8	0	0.00	18765	21087	2322	11.01
OCT - 2000	9	9	0	0.00	19372	21316	1944	9.12
NOV - 2000	7	7	0	0.00	17751	19634	1883	9.59
DEC - 2000	41	41	0	0.00	18062	20475	2413	11.79
JAN - 2001	41	41	0	0.00	17465	20788	3323	15.99
FEB - 2001	42	42	0	0.00	17482	20202	2720	13.46
MAR - 2001	52	52	0	0.00	17844	19970	2126	10.65
2000-2001	52	52	0	0.00	19860	21479	1619	7.54

6.3 (a) MONTHWISE MAXIMUM AND MINIMUM ENERGY CONSUMPTION WITH CORRESPONDING DATES IN NORTHERN REGION DURING 2000-01

State / U.T.->	CHANDIGARH				DELHI			
Month	Max. Consumption MU/Day	Date	Min. Consumption MU/Day	Date	Max. Consumption MU/Day	Date	Min. Consumption MU/Day	Date
APR - 2000	3.13	27.04.2000	2.10	09.04.2000	51.37	26.04.2000	42.45	02.04.2000
MAY - 2000	3.63	25.05.2000	2.53	07.05.2000	57.07	20.05.2000	45.55	07.05.2000
JUN - 2000	3.69	02.06.2000	2.31	08.06.2000	56.62	27.06.2000	43.85	08.06.2000
JUL - 2000	3.58	06.07.2000	2.57	02.07.2000	58.00	10.07.2000	47.12	23.07.2000
AUG - 2000	3.66	09.08.2000	2.82	15.08.2000	57.18	28.08.2000	45.43	16.08.2000
SEP - 2000	3.47	14.09.2000	2.51	24.09.2000	55.97	08.09.2000	48.33	27.09.2000
OCT - 2000	3.13	06.10.2000	2.02	27.10.2000	53.85	06.10.2000	43.23	27.10.2000
NOV - 2000	2.51	02.11.2000	2.08	19.11.2000	46.09	03.11.2000	38.11	18.11.2000
DEC - 2000	2.67	27.12.2000	2.17	24.12.2000	42.79	12.12.2000	40.18	16.12.2000
JAN - 2001	3.23	12.01.2001	2.38	01.01.2001	47.95	04.01.2001	39.52	12.01.2001
FEB - 2001	2.65	01.02.2001	2.04	25.02.2001	44.55	01.02.2001	35.97	25.02.2001
MAR -2001	2.69	01.03.2001	1.85	11.03.2001	44.16	28.03.2001	34.48	10.03.2001
2000-2001	3.69	02.06.2000	1.85	11.03.2001	58.00	10.07.2000	34.48	10.03.2001

State / U.T.->	HARYANA				HIMACHAL PRADESH			
Month	Max. Consumption MU/Day	Date	Min. Consumption MU/Day	Date	Max. Consumption MU/Day	Date	Min. Consumption MU/Day	Date
APR - 2000	43.83	26.04.2000	31.66	14.04.2000	8.39	20.04.2000	7.55	28.04.2000
MAY - 2000	47.28	30.05.2000	30.64	13.05.2000	8.77	09.05.2000	6.98	28.05.2000
JUN - 2000	52.86	18.06.2000	31.22	08.06.2000	8.65	02.06.2000	7.29	04.06.2000
JUL - 2000	53.09	31.07.2000	40.56	18.07.2000	8.98	19.07.2000	7.32	05.07.2000
AUG - 2000	57.63	13.08.2000	47.59	28.08.2000	8.72	26.08.2000	7.01	02.08.2000
SEP - 2000	52.65	03.09.2000	41.27	26.09.2000	8.95	21.09.2000	7.23	26.09.2000
OCT - 2000	51.99	04.10.2000	43.29	24.10.2000	8.42	20.10.2000	7.36	07.10.2000
NOV - 2000	45.10	02.11.2000	37.16	15.11.2000	9.11	23.11.2000	7.69	07.11.2000
DEC - 2000	45.70	12.12.2000	39.86	01.12.2000	9.34	30.12.2000	6.96	04.12.2000
JAN - 2001	46.05	26.01.2001	30.43	01.01.2001	9.40	01.01.2001	7.87	16.01.2001
FEB - 2001	46.67	21.02.2001	34.74	25.02.2001	8.78	20.02.2001	8.08	11.02.2001
MAR -2001	47.24	06.03.2001	37.92	30.03.2001	8.51	02.03.2001	7.32	10.03.2001
2000-2001	57.63	13.08.2000	30.43	01.01.2001	9.40	01.01.2001	6.96	04.12.2000

State / U.T.->	JAMMU & KASHMIR				PUNJAB			
Month	Max. Consumption MU/Day	Date	Min. Consumption MU/Day	Date	Max. Consumption MU/Day	Date	Min. Consumption MU/Day	Date
APR - 2000	16.25	16.04.2000	13.16	04.04.2000	67.77	30.04.2000	56.07	15.04.2000
MAY - 2000	16.04	05.05.2000	10.43	31.05.2000	85.34	29.05.2000	59.95	05.05.2000
JUN - 2000	14.65	06.06.2000	12.50	09.06.2000	100.07	21.06.2000	79.49	08.06.2000
JUL - 2000	14.29	19.07.2000	12.22	11.07.2000	100.16	31.07.2000	79.07	25.07.2000
AUG - 2000	15.36	02.08.2000	13.16	16.08.2000	102.54	13.08.2000	91.82	28.08.2000
SEP - 2000	16.01	11.09.2000	11.91	26.09.2000	92.67	03.09.2000	59.59	26.09.2000
OCT - 2000	16.18	26.10.2000	12.62	03.10.2000	73.52	11.10.2000	52.13	14.10.2000
NOV - 2000	16.82	11.11.2000	12.22	29.11.2000	63.45	01.11.2000	52.72	15.11.2000
DEC - 2000	17.42	25.12.2000	15.73	01.12.2000	64.10	09.12.2000	55.13	30.12.2000
JAN - 2001	17.54	03.01.2001	12.89	31.01.2001	66.95	31.01.2001	48.49	01.01.2001
FEB - 2001	15.17	13.02.2001	8.08	18.02.2001	65.87	08.02.2001	58.67	18.02.2001
MAR - 2001	15.89	06.03.2001	12.43	19.03.2001	64.99	03.03.2001	52.58	30.03.2001
2000-2001	17.54	03.01.2001	8.08	18.02.2001	102.54	13.08.2000	48.49	01.01.2001

State / U.T.->	RAJASTHAN				UTTAR PRADESH			
Month	Max. Consumption MU/Day	Date	Min. Consumption MU/Day	Date	Max. Consumption MU/Day	Date	Min. Consumption MU/Day	Date
APR - 2000	70.15	03.04.2000	51.50	12.04.2000	112.79	26.04.2000	87.84	15.04.2000
MAY - 2000	71.51	31.05.2000	56.95	14.05.2000	117.35	11.05.2000	96.77	06.05.2000
JUN - 2000	72.42	16.06.2000	60.75	12.06.2000	116.59	03.06.2000	78.33	08.06.2000
JUL - 2000	70.27	10.07.2000	41.85	22.07.2000	114.46	01.07.2000	92.42	27.07.2000
AUG - 2000	67.11	07.08.2000	53.61	15.08.2000	117.64	13.08.2000	100.58	31.08.2000
SEP - 2000	66.41	09.09.2000	57.78	27.09.2000	111.80	12.09.2000	95.18	05.09.2000
OCT - 2000	69.52	27.10.2000	59.21	20.10.2000	121.37	27.10.2000	106.93	02.10.2000
NOV - 2000	73.86	11.11.2000	65.35	30.11.2000	122.44	23.11.2000	103.65	07.11.2000
DEC - 2000	74.14	28.12.2000	62.41	15.12.2000	120.69	28.12.2000	104.67	06.12.2000
JAN - 2001	73.90	01.01.2001	58.49	03.01.2001	112.73	16.01.2001	88.08	03.01.2001
FEB - 2001	72.74	23.02.2001	60.73	13.02.2001	118.08	23.02.2001	92.62	02.02.2001
MAR - 2001	73.85	14.03.2001	66.97	02.03.2001	120.18	13.03.2001	109.78	08.03.2001
2000-2001	74.14	28.12.2000	41.85	22.07.2000	122.44	23.11.2000	78.33	08.06.2000

State / U.T.->	N.F.F./RAIL				REGION			
Month	Max. Consumption MU/Day	Date	Min. Consumption MU/Day	Date	Max. Consumption MU/Day	Date	Min. Consumption MU/Day	Date

APR - 2000	0.24	23.04.2000	0.13	20.04.2000	361.88	29.04.2000	320.44	15.04.2000
MAY- 2000	0.15	20.05.2000	0.08	03.05.2000	392.10	28.05.2000	336.40	13.05.2000
JUN - 2000	0.18	29.06.2000	0.08	19.06.2000	413.38	29.06.2000	324.04	08.06.2000
JUL - 2000	0.16	12.07.2000	0.04	07.07.2000	403.35	31.07.2000	348.56	18.07.2000
AUG - 2000	0.16	13.08.2000	0.12	07.08.2000	418.64	13.08.2000	376.88	16.08.2000
SEP - 2000	0.17	29.09.2000	0.14	03.09.2000	391.80	12.09.2000	347.06	26.09.2000
OCT - 2000	0.17	02.10.2000	0.07	30.10.2000	384.59	06.10.2000	345.52	14.10.2000
NOV - 2000	0.57	30.11.2000	0.04	01.11.2000	363.78	03.11.2000	338.03	15.11.2000
DEC - 2000	0.97	27.12.2000	0.70	01.12.2000	369.36	28.12.2000	340.36	01.12.2000
JAN - 2001	0.98	01.01.2001	0.46	25.01.2001	358.05	26.01.2001	310.59	03.01.2001
FEB - 2001	0.99	25.02.2001	0.70	23.02.2001	363.22	08.02.2001	318.80	02.02.2001
MAR -2001	1.21	31.03.2001	0.63	22.03.2001	369.13	06.03.2001	337.91	30.03.2001
2000-2001	1.21	31.03.2001	0.04	07.07.2000	418.64	13.08.2000	310.59	03.01.2001

6.3(b) MONTHWISE MAXIMUM AND MINIMUM ENERGY REQUIREMENT WITH CORRESPONDING DATES IN NORTHERN REGION DURING 2000-01

State / U.T.->	CHANDIGARH				DELHI			
Month	Max.Requirement MU/Day	Date	Min. Requirement MU/Day	Date	Max.Requirement MU/Day	Date	Min. Requirement MU/Day	Date
APR - 2000	3.13	27.04.2000	2.10	09.04.2000	53.92	20.04.2000	42.85	02.04.2000
MAY- 2000	3.63	25.05.2000	2.53	07.05.2000	60.71	26.05.2000	45.82	07.05.2000
JUN - 2000	3.69	02.06.2000	2.31	08.06.2000	59.81	27.06.2000	44.05	08.06.2000
JUL - 2000	3.58	06.07.2000	2.57	02.07.2000	61.38	07.07.2000	47.36	27.07.2000
AUG - 2000	3.66	09.08.2000	2.82	15.08.2000	61.24	09.08.2000	56.50	15.08.2000
SEP - 2000	3.47	14.09.2000	2.58	10.09.2000	59.37	15.09.2000	50.67	27.09.2000
OCT - 2000	3.13	06.10.2000	2.02	27.10.2000	56.09	06.10.2000	43.30	29.10.2000
NOV - 2000	2.51	02.11.2000	2.08	19.11.2000	46.52	03.11.2000	40.25	18.11.2000
DEC - 2000	2.67	27.12.2000	2.17	24.12.2000	46.71	15.12.2000	41.60	31.12.2000
JAN - 2001	3.23	12.01.2001	2.38	01.01.2001	54.86	12.01.2001	39.98	01.01.2001
FEB - 2001	2.65	01.02.2001	2.04	25.02.2001	49.65	02.02.2001	37.60	25.02.2001
MAR -2001	2.69	01.03.2001	1.85	11.03.2001	45.15	28.03.2001	34.86	10.03.2001
2000-2001	3.69	02.06.2000	1.85	11.03.2001	61.38	07.07.2000	34.86	10.03.2001

State / U.T.->	HARYANA				HIMACHAL PRADESH			
Month	Max.Requirement MU/Day	Date	Min. Requirement MU/Day	Date	Max.Requirement MU/Day	Date	Min. Requirement MU/Day	Date
APR - 2000	43.87	30.04.2000	31.66	14.04.2000	8.39	20.04.2000	7.50	22.04.2000

MAY- 2000	49.12	30.05.2000	30.65	13.05.2000	8.77	09.05.2000	6.98	28.05.2000
JUN - 2000	55.37	28.06.2000	31.37	08.06.2000	8.65	02.06.2000	7.29	04.06.2000
JUL - 2000	53.27	03.07.2000	40.56	18.07.2000	8.98	19.07.2000	7.32	05.07.2000
AUG - 2000	57.63	13.08.2000	49.08	16.08.2000	8.72	26.08.2000	7.78	05.08.2000
SEP - 2000	54.21	04.09.2000	41.27	26.09.2000	8.95	21.09.2000	7.23	26.09.2000
OCT - 2000	52.72	04.10.2000	44.13	31.10.2000	8.42	20.10.2000	7.36	07.10.2000
NOV - 2000	45.10	02.11.2000	41.28	20.11.2000	9.11	23.11.2000	7.69	07.11.2000
DEC - 2000	46.17	20.12.2000	40.65	30.12.2000	9.35	16.12.2000	7.96	04.12.2000
JAN - 2001	46.77	24.01.2001	30.43	01.01.2001	9.40	01.01.2001	8.03	26.01.2001
FEB - 2001	50.20	08.02.2001	36.44	25.02.2001	9.27	10.02.2001	8.65	18.02.2001
MAR -2001	48.49	06.03.2001	38.03	29.03.2001	8.98	09.03.2001	8.31	29.03.2001
2000-2001	57.63	13.08.2000	30.43	01.01.2001	9.40	01.01.2001	6.98	28.05.2000

State / U.T.->	JAMMU & KASHMIR				PUNJAB			
Month	Max.Requirement MU/Day	Date	Min. Requirement MU/Day	Date	Max.Requirement MU/Day	Date	Min. Requirement MU/Day	Date
APR - 2000	18.35	10.04.2000	17.46	26.04.2000	68.07	30.04.2000	56.37	15.04.2000
MAY- 2000	18.14	01.05.2000	15.43	31.05.2000	85.64	29.05.2000	60.25	05.05.2000
JUN - 2000	16.11	03.06.2000	14.59	11.06.2000	101.12	21.06.2000	63.59	04.06.2000
JUL - 2000	15.45	31.07.2000	14.57	22.07.2000	100.49	13.07.2000	82.17	25.07.2000
AUG - 2000	15.48	06.08.2000	14.66	02.08.2000	102.84	13.08.2000	92.17	04.08.2000
SEP - 2000	16.01	11.09.2000	11.91	26.09.2000	103.00	05.09.2000	59.89	26.09.2000
OCT - 2000	16.42	24.10.2000	14.62	03.10.2000	83.39	21.10.2000	58.17	15.10.2000
NOV - 2000	18.03	20.11.2000	16.47	02.11.2000	64.64	02.11.2000	52.02	15.11.2000
DEC - 2000	19.04	13.12.2000	17.73	01.12.2000	64.40	09.12.2000	55.13	31.12.2000
JAN - 2001	19.42	17.01.2001	18.74	28.01.2001	72.30	31.01.2001	48.49	01.01.2001
FEB - 2001	19.04	02.02.2001	18.08	18.02.2001	70.93	03.02.2001	60.90	25.02.2001
MAR -2001	19.07	31.03.2001	17.93	19.03.2001	73.76	26.03.2001	52.88	30.03.2001
2000-2001	19.42	17.01.2001	11.91	26.09.2000	103.00	05.09.2000	48.49	01.01.2001

State / U.T.->	RAJASTHAN				UTTAR PRADESH			
Month	Max.Requirement MU/Day	Date	Min. Requirement MU/Day	Date	Max.Requirement MU/Day	Date	Min. Requirement MU/Day	Date
APR - 2000	71.09	03.04.2000	58.01	22.04.2000	131.13	12.04.2000	98.76	15.04.2000
MAY- 2000	72.98	31.05.2000	57.67	14.05.2000	133.84	04.05.2000	102.41	06.05.2000
JUN - 2000	74.05	22.06.2000	61.47	12.06.2000	127.85	03.06.2000	84.60	07.06.2000
JUL - 2000	70.27	10.07.2000	41.85	22.07.2000	129.92	29.07.2000	113.60	08.07.2000
AUG - 2000	67.11	07.08.2000	53.61	15.08.2000	134.21	08.08.2000	110.14	16.08.2000
SEP - 2000	69.21	20.09.2000	58.12	05.09.2000	127.64	30.09.2000	111.42	03.09.2000
OCT - 2000	69.62	27.10.2000	61.42	10.10.2000	135.98	26.10.2000	123.09	02.10.2000

NOV - 2000	73.86	11.11.2000	65.75	30.11.2000	130.84	03.11.2000	120.17	30.11.2000
DEC - 2000	75.50	29.12.2000	63.31	01.12.2000	135.99	17.12.2000	123.31	01.12.2000
JAN - 2001	76.73	24.01.2001	65.59	06.01.2001	138.04	16.01.2001	114.11	01.01.2001
FEB - 2001	75.27	09.02.2001	67.63	13.02.2001	139.51	03.02.2001	120.50	25.02.2001
MAR -2001	75.35	19.03.2001	69.34	01.03.2001	134.12	27.03.2001	117.74	30.03.2001
2000-2001	76.73	24.01.2001	41.85	22.07.2000	139.51	03.02.2001	84.60	07.06.2000

State / U.T.->	N.F.F./RAIL				REGION			
Month	Max.Requirement MU/Day	Date	Min. Requirement MU/Day	Date	Max.Requirement MU/Day	Date	Min. Requirement MU/Day	Date
APR - 2000	0.24	23.04.2000	0.13	20.04.2000	383.66	26.04.2000	336.32	15.04.2000
MAY- 2000	0.15	20.05.2000	0.08	03.05.2000	419.23	30.05.2000	355.66	13.05.2000
JUN - 2000	0.18	29.06.2000	0.08	19.06.2000	435.79	29.06.2000	334.03	08.06.2000
JUL - 2000	0.16	12.07.2000	0.04	07.07.2000	430.22	06.07.2000	368.39	18.07.2000
AUG - 2000	0.16	13.08.2000	0.12	07.08.2000	441.84	09.08.2000	388.05	16.08.2000
SEP - 2000	0.17	29.09.2000	0.14	03.09.2000	421.93	19.09.2000	363.97	26.09.2000
OCT - 2000	0.17	02.10.2000	0.07	30.10.2000	406.81	06.10.2000	370.32	15.10.2000
NOV - 2000	0.57	30.11.2000	0.04	01.11.2000	383.19	02.11.2000	359.97	30.11.2000
DEC - 2000	0.97	27.12.2000	0.70	01.12.2000	388.58	30.12.2000	362.23	01.12.2000
JAN - 2001	0.98	01.01.2001	0.46	25.01.2001	407.70	31.01.2001	332.53	02.01.2001
FEB - 2001	0.99	25.02.2001	0.70	23.02.2001	408.11	03.02.2001	357.23	25.02.2001
MAR -2001	1.26	31.03.2001	0.63	22.03.2001	398.18	26.03.2001	352.07	30.03.2001
2000-2001	1.26	31.03.2001	0.04	07.07.2000	441.84	09.08.2000	332.53	02.01.2001

6.4 MONTHWISE PEAK DEMAND MET (MW) AND REQUIREMENT (MW) WITH CORRESPONDING DATES IN NORTHERN REGION DURING 2000-01

State / U.T.->	CHANDIGARH				DELHI			
Month	Peak Met MW	Date	Peak Reqt MW	Date	Peak Met MW	Date	Peak Reqt MW	Date
APR - 2000	151	11.04.2000	151	11.04.2000	2441	14.04.2000	2719	25.04.2000
MAY - 2000	171	26.05.2000	171	26.05.2000	2628	25.05.2000	2912	30.05.2000
JUN - 2000	170	01.06.2000	170	01.06.2000	2670	27.06.2000	2847	28.06.2000
JUL - 2000	164	05.07.2000	164	05.07.2000	2621	06.07.2000	2941	09.07.2000
AUG - 2000	170	09.08.2000	170	09.08.2000	2607	14.08.2000	2978	08.08.2000
SEP - 2000	170	04.09.2000	170	04.09.2000	2577	15.09.2000	2877	15.09.2000
OCT - 2000	158	05.10.2000	158	05.10.2000	2548	05.10.2000	2807	06.10.2000
NOV - 2000	131	01.11.2000	131	01.11.2000	2498	04.11.2000	2653	09.11.2000
DEC - 2000	136	29.12.2000	136	29.12.2000	2371	13.12.2000	2740	12.12.2000
JAN - 2001	161	12.01.2001	161	12.01.2001	2602	26.01.2001	3077	17.01.2001
FEB - 2001	135	02.02.2001	135	02.02.2001	2491	04.02.2001	2911	02.02.2001
MAR -2001	121	02.03.2001	121	02.03.2001	2256	27.03.2001	2516	03.03.2001
2000-2001	171	26.05.2000	171	26.05.2000	2670	27.06.2000	3077	17.01.2001

State / U.T.->	HARYANA				HIMACHAL PRADESH			
Month	Peak Met MW	Date	Peak Reqt MW	Date	Peak Met MW	Date	Peak Reqt MW	Date
APR - 2000	2237	24.04.2000	2237	24.04.2000	540	20.04.2000	540	20.04.2000
MAY - 2000	2393	29.05.2000	2404	30.05.2000	564	09.05.2000	564	09.05.2000
JUN - 2000	2619	18.06.2000	2619	18.06.2000	557	02.06.2000	557	02.06.2000
JUL - 2000	2497	05.07.2000	2549	09.07.2000	579	19.07.2000	579	19.07.2000
AUG - 2000	2693	13.08.2000	2693	13.08.2000	562	26.08.2000	562	26.08.2000
SEP - 2000	2632	03.09.2000	2697	12.09.2000	576	21.09.2000	576	21.09.2000
OCT - 2000	2709	28.10.2000	2709	28.10.2000	541	20.10.2000	541	20.10.2000
NOV - 2000	2295	01.11.2000	2308	08.11.2000	585	23.11.2000	585	23.11.2000
DEC - 2000	2327	07.12.2000	2327	07.12.2000	530	31.12.2000	555	25.12.2000
JAN - 2001	2339	22.01.2001	2525	30.01.2001	562	04.01.2001	562	04.01.2001
FEB - 2001	2359	06.02.2001	2509	06.02.2001	523	20.02.2001	535	08.02.2001
MAR -2001	2341	03.03.2001	2427	24.03.2001	486	31.03.2001	515	31.03.2001
2000-2001	2709	28.10.2000	2709	28.10.2000	585	23.11.2000	585	23.11.2000

State / U.T.->	JAMMU & KASHMIR	PUNJAB
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Month	Peak Met MW	Date	Peak Reqt MW	Date	Peak Met MW	Date	Peak Reqt MW	Date
APR - 2000	974	11.04.2000	1101	06.04.2000	3446	29.04.2000	3456	28.04.2000
MAY - 2000	958	18.05.2000	1043	08.05.2000	4172	27.05.2000	4172	27.05.2000
JUN - 2000	916	20.06.2000	1001	21.06.2000	4806	16.06.2000	4806	16.06.2000
JUL - 2000	972	31.07.2000	1082	31.07.2000	4897	31.07.2000	4997	31.07.2000
AUG - 2000	956	14.08.2000	1013	04.08.2000	4789	01.08.2000	4886	13.08.2000
SEP - 2000	937	22.09.2000	1024	14.09.2000	4408	05.09.2000	4877	05.09.2000
OCT - 2000	872	26.10.2000	1015	04.10.2000	3726	01.10.2000	4137	20.10.2000
NOV - 2000	890	29.11.2000	1040	28.11.2000	3276	01.11.2000	3365	02.11.2000
DEC - 2000	958	21.12.2000	1172	21.12.2000	3340	13.12.2000	3440	13.12.2000
JAN - 2001	835	03.01.2001	1128	05.01.2001	3465	31.01.2001	3635	31.01.2001
FEB - 2001	723	11.02.2001	1112	06.02.2001	3394	07.02.2001	3594	07.02.2001
MAR -2001	808	17.03.2001	1115	09.03.2001	3486	10.03.2001	3523	23.03.2001
2000-2001	974	11.04.2000	1172	21.12.2000	4897	31.07.2000	4997	31.07.2000

State / U.T.- >	RAJASTHAN				UTTAR PRADESH			
Month	Peak Met MW	Date	Peak Reqt MW	Date	Peak Met MW	Date	Peak Reqt MW	Date
APR - 2000	3212	03.04.2000	3412	03.04.2000	5735	04.04.2000	6488	12.04.2000
MAY - 2000	3303	05.05.2000	3429	29.05.2000	5793	18.05.2000	6761	12.05.2000
JUN - 2000	3370	16.06.2000	3490	16.06.2000	5699	02.06.2000	6595	28.06.2000
JUL - 2000	3260	10.07.2000	3328	08.07.2000	5679	01.07.2000	6611	13.07.2000
AUG - 2000	3175	01.08.2000	3175	01.08.2000	5627	02.08.2000	6471	18.08.2000
SEP - 2000	3165	16.09.2000	3365	16.09.2000	5595	26.09.2000	6402	21.09.2000
OCT - 2000	3306	28.10.2000	3307	28.10.2000	6119	26.10.2000	7211	26.10.2000
NOV - 2000	3574	19.11.2000	3574	19.11.2000	5859	21.11.2000	7007	02.11.2000
DEC - 2000	3623	31.12.2000	3631	16.12.2000	5856	28.12.2000	7125	28.12.2000
JAN - 2001	3645	23.01.2001	3754	23.01.2001	5539	23.01.2001	7311	23.01.2001
FEB - 2001	3663	20.02.2001	3663	20.02.2001	5697	11.02.2001	6967	11.02.2001
MAR -2001	3631	22.03.2001	3631	22.03.2001	5870	29.03.2001	6714	25.03.2001
2000-2001	3663	20.02.2001	3754	23.01.2001	6119	26.10.2000	7311	23.01.2001

State / U.T.- >	N.F.F.				REGION			
Month	Peak Met MW	Date	Peak Reqt MW	Date	Peak Met MW	Date	Peak Reqt MW	Date
APR - 2000	10	23.04.2000	10	23.04.2000	18057	29.04.2000	20136	29.04.2000

MAY- 2000	7	20.05.2000	7	20.05.2000	18953	29.05.2000	21074	30.05.2000
JUN - 2000	8	29.06.2000	8	29.06.2000	19432	29.06.2000	21340	28.06.2000
JUL - 2000	7	12.07.2000	7	12.07.2000	19261	31.07.2000	21479	07.07.2000
AUG - 2000	7	13.08.2000	7	13.08.2000	19860	01.08.2000	21308	02.08.2000
SEP - 2000	8	29.09.2000	8	29.09.2000	18823	12.09.2000	21077	15.09.2000
OCT - 2000	9	10.10.2000	9	10.10.2000	19372	26.10.2000	21316	26.10.2000
NOV - 2000	7	25.11.2000	7	25.11.2000	17751	02.11.2000	19840	15.11.2000
DEC - 2000	41	27.12.2000	41	27.12.2000	18013	28.12.2000	19811	29.12.2000
JAN - 2001	41	30.01.2001	41	30.01.2001	17561	13.01.2001	20848	15.01.2001
FEB - 2001	42	25.02.2001	42	25.02.2001	17494	08.02.2001	20458	08.02.2001
MAR -2001	52	31.03.2001	52	31.03.2001	17694	24.03.2001	20034	24.03.2001
2000-2001	52	31.03.2001	52	31.03.2001	19860	01.08.2000	21479	07.07.2000

6.5 MONTHWISE MINIMUM DEMAND MET (MW) WITH CORRESPONDING DATES OF MAJOR STATES IN NORTHERN REGION DURING 2000-01

State / U.T.->	DELHI			HARYANA			PUNJAB		
Month	Minimum Demand Met MW	Date	Time	Minimum Demand Met MW	Date	Time	Minimum Demand Met MW	Date	Time
APR - 2000	1340	14.04.2000	09:00	858	14.04.2000	19:00	1832	14.04.2000	18:00
MAY- 2000	1617	07.05.2000	08:00	813	07.05.2000	08:00	1883	13.05.2000	01:00
JUN - 2000	1483	08.06.2000	03:00	987	08.06.2000	05:00	1527	09.06.2000	01:00
JUL - 2000	1639	23.07.2000	03:00	1378	18.07.2000	13:00	3006	25.07.2000	18:00
AUG - 2000	1340	31.08.2000	17:00	1553	19.08.2000	16:00	2237	22.08.2000	12:00
SEP - 2000	1752	27.09.2000	17:00	1218	24.09.2000	16:00	1503	26.09.2000	04:00
OCT - 2000	1425	12.10.2000	02:00	1132	08.10.2000	16:00	1548	14.10.2000	14:00
NOV - 2000	1120	20.11.2000	02:00	927	15.11.2000	18:00	1741	20.11.2000	02:00
DEC - 2000	997	27.12.2000	24:00	1073	31.12.2000	24:00	1583	31.12.2000	24:00
JAN - 2001	999	01.01.2001	03:00	920	01.01.2001	10:00	1358	01.01.2001	03:00
FEB - 2001	1011	13.02.2001	24:00	894	25.02.2001	04:00	1619	04.02.2001	24:00
MAR -2001	1009	11.03.2001	03:00	1218	31.03.2001	16:00	1626	29.03.2001	24:00
2000-2001	997	27.12.2000	24:00	813	07.05.2000	08:00	1358	01.01.2001	03:00

State / U.T.->	RAJASTHAN			UTTAR PRADESH			REGION		
Month	Minimum Demand Met MW	Date	Time	Minimum Demand Met MW	Date	Time	Minimum Demand Met MW	Date	Time
APR - 2000	1921	11.04.2000	10:00	3111	15.04.2000	05:00	13142	15.04.2000	09:00
MAY- 2000	2136	14.05.2000	19:00	3511	31.05.2000	07:00	13057	13.05.2000	04:00
JUN - 2000	2281	12.06.2000	19:00	3152	07.06.2000	16:00	12708	04.06.2000	14:00
JUL - 2000	1581	22.07.2000	16:00	2840	26.07.2000	24:00	14458	26.07.2000	10:00
AUG - 2000	2083	18.08.2000	19:00	3078	22.08.2000	14:00	15274	29.08.2000	10:00
SEP - 2000	2153	29.09.2000	18:00	3686	03.09.2000	12:00	14533	26.09.2000	04:00
OCT - 2000	1667	12.10.2000	02:00	3497	12.10.2000	17:00	14305	14.10.2000	15:00
NOV - 2000	2412	18.11.2000	17:00	3518	10.11.2000	16:00	14064	27.11.2000	02:00
DEC - 2000	2292	15.12.2000	11:00	4295	06.12.2000	14:00	13932	01.12.2000	02:00
JAN - 2001	1850	06.01.2001	15:00	3849	01.01.2001	16:00	12627	01.01.2001	04:00
FEB - 2001	2436	04.02.2001	18:00	3770	02.02.2001	15:00	13197	02.02.2001	15:00
MAR -2001	2377	16.03.2001	12:00	3876	30.03.2001	13:00	13907	30.03.2001	13:00
2000-2001	1581	22.07.2000	16:00	2840	26.07.2000	24:00	12627	01.01.2001	04:00

6.6 AVERAGE ENERGY REQUIREMENT/DEMAND MET (MU/DAY) OF STATES IN THE NORTHERN REGION DURING THE PAST DECADE

SL. NO.	YEAR	CHANDIGARH		DELHI		HARYANA		H.P.		J & K		PUNJAB		RAJASTHAN		U.P.	
		REQT.	AVAIL.	REQT.	AVAIL.	REQT.	AVAIL.	REQT.	AVAIL.	REQT.	AVAIL.	REQT.	AVAIL.	REQT.	AVAIL.	REQT.	AVAIL.
1	1991-92	1.70	1.70	25.34	25.16	27.54	27.02	3.96	3.94	8.99	8.07	45.98	43.16	36.00	35.51	87.35	78.67
2	1992-93	1.71	1.71	27.66	27.59	30.48	29.81	4.20	4.20	9.70	7.93	48.75	46.99	38.77	38.30	89.79	80.82
3	1993-94	1.83	1.83	30.02	29.76	31.56	28.74	4.25	4.25	10.07	8.14	50.78	49.16	43.22	40.93	93.91	84.79
4	1994-95	1.95	1.95	32.98	32.69	31.15	30.01	5.11	5.09	10.95	8.77	53.75	51.95	45.70	43.50	101.80	89.48
5	1995-96	2.11	2.11	35.53	35.22	34.31	33.59	6.00	5.94	12.00	9.02	54.83	53.62	51.77	49.90	106.20	93.99
6	1996-97	2.33	2.33	38.13	37.22	37.14	34.92	6.54	6.49	12.92	10.53	58.99	58.04	53.63	49.98	112.99	97.24
7	1997-98	2.49	2.49	40.63	40.02	35.35	34.77	7.07	7.06	14.12	13.78	60.32	59.93	55.72	54.82	112.58	98.88
8	1998-99	2.85	2.85	44.36	43.53	36.99	36.34	7.86	7.85	15.42	14.48	66.02	65.00	62.33	60.90	115.08	103.91
9	1999-2000	2.70	2.70	47.20	45.89	42.08	41.15	8.25	8.22	16.46	13.13	70.44	69.92	66.86	63.86	121.25	105.65
10	2000-2001	2.78	2.78	49.95	47.57	45.76	44.38	8.42	8.24	16.88	14.35	74.38	72.02	66.97	64.99	126.40	109.76
RATE OF GROWTH C		5.62		7.83		5.80		8.75		7.25		5.49		7.14		4.19	
OF REQUIREMENT (% PER ANNUM) A		7.06		10.79		7.35		12.53		9.75		6.86		9.56		4.97	

C: COMPOUND

A: AVERAGE

6.7 PEAK REQUIREMENT / DEMAND MET (MW) OF STATES IN THE NORTHERN REGION DURING THE PAST DECADE

SL. NO.	YEAR	CHANDIGARH		DELHI		HARYANA		H.P.		J & K		PUNJAB		RAJASTHAN		U.P.	
		REQT.	AVAIL.	REQT.	AVAIL.	REQT.	AVAIL.	REQT.	AVAIL.	REQT.	AVAIL.	REQT.	AVAIL.	REQT.	AVAIL.	REQT.	AVAIL.
1	1991-92	119	119	1550	1533	1700	1675	300	300	595	515	4000	3008	2250	2094	5543	4883
2	1992-93	120	120	1632	1568	1850	1811	325	325	632	572	3600	3172	2325	2278	5830	4970
3	1993-94	135	135	1850	1639	2050	1843	365	365	668	550	3600	3484	2600	2476	6238	5227
4	1994-95	140	140	1884	1869	2025	1947	450	450	748	846	4200	3548	2700	2585	6676	5296
5	1995-96	147	147	2123	2000	2150	2012	506	506	825	600	3925	3820	2950	2818	6793	5420
6	1996-97	166	166	2234	2078	2187	2090	525	525	900	750	3868	3864	3145	2972	6833	5873
7	1997-98	179	179	2448	2355	2273	2273	593	593	1076	1035	4371	4371	3262	3229	6616	5666
8	1998-99	197	197	2710	2491	2449	2331	585	585	1150	973	4559	4559	3718	3589	6864	5926
9	1999-2000	180	180	2854	2591	2575	2575	618	618	1207	1004	5013	5013	3672	3672	7017	5960
10	2000-2001	171	171	3077	2670	2709	2709	585	585	1172	974	4997	4897	3754	3663	7311	6119
RATE OF GROWTH C		4.11		7.92		5.31		7.70		7.82		2.50		5.85		3.12	
OF REQUIREMENT (% PER ANNUM) A		4.86		10.95		6.59		10.56		10.77		2.77		7.43		3.54	

C: COMPOUND

A: AVERAGE

6.8 DEMAND MET / REQUIREMENT OF ENERGY AND PEAK POWER IN NORTHERN REGION DURING PAST DECADE

SL. NO.	YEAR	ENERGY IN MU (NET)			PEAK POWER IN MW		
		DEMAND MET	REQUIREMENT	% SHORTAGE	DEMAND MET	REQUIREMENT	% SHORTAGE
1	1991-92	81624.95	86599.90	5.74	12520	14533	13.85
2	1992-93	86763.00	91746.22	5.43	13772	15040	8.43
3	1993-94	90525.00	97135.00	6.80	13714	15633	12.28
4	1994-95	96323.50	103623.50	7.04	14296	16375	12.70
5	1995-96	103834.20	110938.26	6.40	15804	17729	10.86
6	1996-97	108504.70	117906.00	7.97	16109	18201	11.49
7	1997-98	113929.91	119962.88	5.03	17091	19016	10.12
8	1998-99	122300.02	128168.04	4.58	18372	20183	8.97
9	1999-2000	128366.54	137412.29	6.58	19341	21083	8.26
10	2000-2001	133389.55	143433.09	7.00	19860	21479	7.54
COMPOUND ANNUAL GROWTH RATE (CAGR) %		5.61	5.77		5.26	4.44	

6.9 MONTHWISE ENTITLEMENT VIS -A -VIS ACTUAL IMPORT BY CONSTITUENTS FROM NORTHERN GRID DURING 2000-01

State / U.T.->	CHANDIGARH			DELHI (Excl. BTPS)		
Month	ENTITLEMENT	ACTUAL	O/D(+)/U/D(-)	ENTITLEMENT	ACTUAL	O/D(+)/U/D(-)
APR - 2000	79.88	81.25	1.37	849.44	856.30	6.86
MAY- 2000	98.22	99.95	1.73	1159.81	998.71	-161.10
JUN - 2000	98.80	93.94	-4.86	1134.13	972.82	-161.31
JUL - 2000	100.62	95.29	-5.33	1148.30	988.34	-159.96
AUG - 2000	101.89	101.20	-0.69	1121.97	1011.30	-110.67
SEP - 2000	90.51	93.05	2.54	991.57	996.88	5.31
OCT - 2000	82.80	80.74	-2.06	1026.14	816.16	-209.98
NOV - 2000	74.47	69.40	-5.07	842.83	686.89	-155.94
DEC - 2000	68.70	76.40	7.70	830.89	733.74	-97.15
JAN - 2001	65.59	87.10	21.51	823.39	772.81	-50.58
FEB - 2001	59.78	67.94	8.16	764.18	594.27	-169.91
MAR -2001	66.22	68.92	2.70	818.81	623.79	-195.02
2000-2001	987.48	1015.18	27.70	11511.46	10052.01	-1459.45

State / U.T.->	HARYANA			HIMACHAL PRADESH		
Month	ENTITLEMENT	ACTUAL	O/D(+)/U/D(-)	ENTITLEMENT	ACTUAL	O/D(+)/U/D(-)
APR - 2000	696.07	700.46	4.39	158.76	159.48	0.72
MAY- 2000	958.35	1021.86	63.51	104.13	106.33	2.20
JUN - 2000	940.50	1031.97	91.47	64.65	79.55	14.90
JUL - 2000	985.33	1036.06	50.73	75.87	84.61	8.74
AUG - 2000	1025.47	1125.56	100.09	90.22	94.44	4.22
SEP - 2000	913.90	974.14	60.24	107.52	112.69	5.17
OCT - 2000	790.00	935.88	145.88	158.26	163.74	5.48
NOV - 2000	676.63	727.11	50.48	182.20	197.11	14.91
DEC - 2000	650.71	688.62	37.91	223.59	228.32	4.73
JAN - 2001	605.85	656.82	50.97	209.81	222.74	12.93
FEB - 2001	558.77	729.86	171.09	171.89	201.74	29.85
MAR -2001	600.41	743.64	143.23	192.10	225.65	33.55
2000-2001	9401.99	10371.98	969.99	1739.00	1876.40	137.40

NOTE:- The above figures are based on operational data available at NRLDC.

State / U.T.->	JAMMU & KASHMIR			PUNJAB		
Month	ENTITLEMENT	ACTUAL	O/D(+)/U/D(-)	ENTITLEMENT	ACTUAL	O/D(+)/U/D(-)
APR - 2000	365.19	368.09	2.90	703.68	659.71	-43.97
MAY- 2000	372.68	348.30	-24.38	1026.80	990.66	-36.14
JUN - 2000	323.37	353.07	29.70	1188.05	1244.81	56.76
JUL - 2000	323.49	362.98	39.49	1205.74	1235.50	29.76
AUG - 2000	351.54	370.26	18.72	1312.62	1318.87	6.25
SEP - 2000	308.55	368.49	59.94	1071.07	1023.05	-48.02
OCT - 2000	367.57	419.76	52.19	837.28	791.31	-45.97
NOV - 2000	359.42	444.28	84.86	534.55	494.08	-40.47
DEC - 2000	339.49	495.98	156.49	556.94	500.53	-56.41
JAN - 2001	361.36	420.02	58.66	513.88	458.55	-55.33
FEB - 2001	365.13	340.40	-24.73	549.49	527.50	-21.99
MAR -2001	408.32	407.01	-1.31	654.63	664.94	10.31
2000-2001	4246.11	4698.64	452.53	10154.73	9909.51	-245.22

State / U.T.->	RAJASTHAN			UTTAR PRADESH		
Month	ENTITLEMENT	ACTUAL	O/D(+)/U/D(-)	ENTITLEMENT	ACTUAL	O/D(+)/U/D(-)
APR - 2000	810.59	960.27	149.68	1346.24	1217.92	-128.32
MAY- 2000	957.91	1139.93	182.02	1441.68	1426.26	-15.42
JUN - 2000	990.99	1235.48	244.49	1393.76	1106.82	-286.94
JUL - 2000	981.12	957.89	-23.23	1418.32	1480.88	62.56
AUG - 2000	1024.14	1079.07	54.93	1327.96	1251.51	-76.45
SEP - 2000	948.60	980.57	31.97	1310.94	1191.61	-119.33
OCT - 2000	931.32	978.06	46.74	1479.75	1490.36	10.61
NOV - 2000	987.56	1025.50	37.94	1492.25	1512.43	20.18
DEC - 2000	1033.81	1062.20	28.39	1585.52	1538.35	-47.17
JAN - 2001	989.92	1028.17	38.25	1439.62	1400.52	-39.10
FEB - 2001	913.02	1021.74	108.72	1546.21	1490.60	-55.61
MAR -2001	1005.75	1159.62	153.87	1689.51	1590.92	-98.59
2000-2001	11574.73	12628.50	1053.77	17471.76	16698.18	-773.58

NOTE:- The above figures are based on operational data available at NRLDC.

6.10 INTER REGIONAL EXCHANGES DURING 2000-2001

	WR					ER		NEPAL
IR EXCHG VIA -->	VINDHYACHAL HVDC B/B		220kV AURIYA MALANPUR	M.P. TO RAJASTHAN	RAJASTHAN TO M.P.	BIHAR TO U.P.	U.P. TO BIHAR	TANAKPUR TO MAHENDRAGARH
Month	IMPORT	EXPORT	EXPORT	IMPORT	EXPORT	(IMPORT)	(EXPORT)	(EXPORT)
APR - 2000	0.00	73.82	7.22	0.00	0.00	36.06	6.75	5.42
MAY - 2000	0.38	104.32	0.00	0.00	0.00	29.05	1.72	6.06
JUN - 2000	37.22	31.46	9.91	0.00	0.00	40.11	2.31	6.34
JUL - 2000	77.86	37.82	11.91	0.00	0.00	39.77	3.10	6.60
AUG - 2000	56.56	24.31	8.49	0.00	0.00	38.21	0.00	6.96
SEP - 2000	31.30	5.66	0.00	0.00	0.00	28.57	0.66	6.83
OCT - 2000	12.46	16.55	13.15	0.00	0.00	34.66	0.00	6.21
NOV - 2000	11.80	69.31	16.19	0.00	0.00	36.90	0.00	5.93
DEC - 2000	22.05	5.28	15.71	0.00	0.00	35.58	0.00	6.17
JAN - 2001	79.45	0.30	13.36	36.36	0.00	49.83	0.00	4.89
FEB - 2001	68.96	0.57	13.86	62.65	0.00	37.35	0.54	4.15
MAR -2001	52.65	16.31	14.85	50.57	0.00	39.91	0.00	4.48
2000-2001	450.69	385.71	124.65	149.58	0.00	446.00	15.08	70.04
1999-2000	587.30	215.11	110.13	31.28	0.00	418.29	26.47	13.47

6.11 UTILISATION OF VINDHYACHAL HVDC B/B 500 MW STATION DURING PAST DECADE

Sl. No.	Year	Vindhyachal HVDC B/B		Utilisation Factor (%)
		Import (MU)	Export (MU)	
1	1991-92	350.71	443.75	18.09
2	1992-93	187.78	271.12	10.48
3	1993-94	1281.99	20.05	29.73
4	1994-95	578.37	53.64	14.43
5	1995-96	189.02	301.05	11.16
6	1996-97	252.05	151.61	9.19
7	1997-98	472.83	352.78	18.85
8	1998-99	442.96	587.30	21.25
9	1999-2000	587.30	215.11	18.27
10	2000-2001	450.69	385.71	19.10

SECTION – 7

**PERFORMANCE OF GENERATING STATIONS
IN
NORTHERN REGION**

[PLEASE REFER SEPERATE LINKS PROVIDED ON THE WEBSITE]

SECTION – 8

NORTHERN REGIONAL LOAD CURVE DATA

8.1 HOURLY GENERATION / LOAD FOR THE REGIONAL PEAK DEMAND MET DAY IN APRIL 2000
DATE: 26.04.2000

HOUR	GENERATION					INTER REGIONAL EXCHANGE Export(+)/Import(-)	TOTAL DEMAND MET	FREQ.	FREQUENCY CORRECTED DEMAND	LOAD SHEDDING	REQUIREMENT	
	HYDRO	THERMAL			TOTAL						WITHOUT FREQ. CORRECTION	WITH FREQ. CORRECTION
		NUCLEA R	COAL	GAS								
	(MW)	(MW)	(MW)	(MW)	'A'	'I'	'P' = 'A' - 'I'	'F'	'P _f ' =P/(1+0.03(F-50))	'L _s '	'P+L _s '	'P _f +L _s '
1	3743	717	10213	2076	16749	0	16749	49.12	17203	785	17534	17988
2	3619	718	10216	2082	16635	-15	16650	48.96	17186	440	17090	17626
3	3452	718	10280	2085	16535	-15	16550	48.84	17147	490	17040	17637
4	3453	715	9999	2075	16242	-10	16252	48.24	17158	440	16692	17598
5	3640	715	10084	2129	16568	-2	16570	49.56	16792	555	17125	17347
6	3485	721	10065	2198	16469	-2	16471	50.16	16392	632	17103	17024
7	2814	718	9956	2118	15606	10	15596	49.20	15980	620	16216	16600
8	2768	741	9935	2116	15560	0	15560	49.60	15749	575	16135	16324
9	2852	734	10053	2095	15734	-12	15746	49.68	15899	565	16311	16464
10	2690	730	9837	2044	15301	-4	15305	49.08	15739	466	15771	16205
11	2724	730	9898	2014	15366	-15	15381	49.16	15779	984	16365	16763
12	2761	730	10077	2025	15593	-10	15603	49.36	15908	766	16369	16674
13	2812	726	10272	2056	15866	-10	15876	49.64	16049	672	16548	16721
14	2952	725	9991	2046	15714	-5	15719	50.20	15625	827	16546	16452
15	2985	712	10138	2046	15881	-2	15883	49.64	16056	528	16411	16584
16	2923	730	10389	2047	16089	-5	16094	49.92	16133	623	16717	16756
17	2988	732	10416	2044	16180	92	16088	49.68	16244	303	16391	16547
18	3218	735	10206	2061	16220	95	16125	49.92	16164	422	16547	16586
19	3516	737	10274	2044	16571	88	16483	50.96	16022	1413	17896	17435
20	4791	740	10274	2067	17872	90	17782	49.56	18020	1929	19711	19949
21	4743	740	10302	2109	17894	35	17859	49.64	18054	1841	19700	19895
22	4410	740	10294	2093	17537	40	17497	48.76	18173	1399	18896	19572
23	4064	740	10290	2110	17204	40	17164	48.76	17827	1252	18416	19079
24	3963	741	10317	2079	17100	-10	17110	49.16	17552	930	18040	18482

8.1 HOURLY GENERATION / LOAD FOR THE REGIONAL PEAK DEMAND MET DAY IN MAY 2000

DATE : 28.05.2000

Hour	Generation					Inter Regional Exchange Export(+)/Import(-)	Total Demand Met	Freq.	Frequency Corrected Demand	Load Shedding	Requirement	
	Hydro	Thermal			Total						Without Freq. Correction	With Freq. Correction
		Nuclear	Coal	Gas								
						Fired	Fired	'A'	'I'	'P' = 'A' - 'I'		
	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(Hz)	(MW)	(MW)	(MW)	(MW)
1	4802	750	10768	1797	18117	40	18077	50.16	17991	425	18502	18416
2	4802	758	10796	1678	18034	140	17894	50.00	17894	360	18254	18254
3	4776	760	10691	1682	17909	140	17769	50.16	17684	360	18129	18044
4	4785	756	10562	1680	17783	140	17643	50.08	17601	353	17996	17954
5	4876	756	10827	1661	18120	40	18080	48.68	18825	393	18473	19218
6	5033	759	10864	1694	18350	35	18315	50.40	18098	452	18767	18550
7	4527	759	10706	1678	17670	35	17635	49.72	17784	496	18131	18280
8	4501	757	10805	1701	17764	135	17629	50.68	17277	637	18266	17914
9	4257	760	10569	1708	17294	250	17044	50.48	16802	941	17985	17743
10	4170	759	10697	1677	17303	445	16858	50.28	16718	1201	18059	17919
11	4138	750	10668	1576	17132	450	16682	49.72	16823	1124	17806	17947
12	4168	741	10706	1558	17173	405	16768	49.24	17159	1303	18071	18462
13	4284	743	10713	1539	17279	257	17022	48.76	17680	820	17842	18500
14	4328	735	10738	1559	17360	103	17257	49.08	17747	877	18134	18624
15	4358	729	10738	1561	17386	40	17346	49.28	17729	1031	18377	18760
16	4300	732	10628	1673	17333	35	17298	49.32	17658	1013	18311	18671
17	4313	737	10684	1685	17419	37	17382	49.56	17615	863	18245	18478
18	4236	742	10695	1708	17381	40	17341	49.72	17488	1137	18478	18625
19	4555	734	10752	1741	17782	50	17732	50.52	17460	1730	19462	19190
20	5293	732	10782	1726	18533	-45	18578	49.44	18895	1959	20537	20854
21	5410	731	10884	1684	18709	-55	18764	48.76	19489	1626	20390	21115
22	5283	725	10841	1702	18551	-75	18626	48.36	19590	1547	20173	21137
23	5129	732	10732	1729	18322	-71	18393	49.16	18868	1189	19582	20057
24	4986	736	10758	1743	18223	-70	18293	49.00	18859	1110	19403	19969

DATE : 16.06.20
00

			FIRED	FIRED	'A'	'I'	'P' = 'A' - 'I'	'F'	'P _f ' =P/(1+0.03(F-50))	'L _s '	'P+L _s '	'P _f +L _s '
	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(HZ)	(MW)	(MW)	(MW)	(MW)
1	5108	793	10810	1928	18639	-47	18686	50.00	18686	200	18886	18886
2	4954	789	10878	1940	18561	-46	18607	49.92	18652	200	18807	18852
3	4959	793	10911	1914	18577	-47	18624	50.72	18230	200	18824	18430
4	5015	795	10933	1928	18671	-47	18718	50.88	18237	200	18918	18437
5	4986	851	11086	1781	18704	-47	18751	50.12	18684	200	18951	18884
6	4907	847	11039	1824	18617	-34	18651	50.48	18386	267	18918	18653
7	4548	900	10912	1787	18147	-51	18198	50.52	17918	422	18620	18340
8	4347	872	10914	1784	17917	48	17869	49.80	17977	322	18191	18299
9	4427	875	10963	1803	18068	60	18008	50.36	17816	317	18325	18133
10	4336	875	10948	1806	17965	70	17895	50.32	17725	250	18145	17975
11	4522	876	10709	1811	17918	60	17858	50.60	17542	329	18187	17871
12	4601	871	10621	1791	17884	59	17825	50.52	17551	372	18197	17923
13	4756	874	10757	1787	18174	62	18112	50.68	17750	382	18494	18132
14	4725	874	10727	1792	18118	57	18061	49.96	18083	359	18420	18442
15	4798	868	10823	1895	18384	58	18326	50.84	17876	388	18714	18264
16	4611	880	10772	1893	18156	50	18106	49.88	18171	581	18687	18752
17	4795	887	10868	1886	18436	255	18181	50.12	18116	474	18655	18590
18	4783	886	11016	1894	18579	261	18318	51.00	17784	386	18704	18170
19	4714	873	11042	1707	18336	266	18070	50.84	17626	905	18975	18531
20	5254	887	11130	1844	19115	64	19051	48.80	19762	1638	20689	21400
21	5495	909	11275	1870	19549	-36	19585	50.12	19515	1531	21116	21046
22	5490	922	11285	1897	19594	-33	19627	50.92	19100	1273	20900	20373
23	5501	916	11216	1932	19565	-46	19611	50.44	19356	643	20254	19999
24	5315	916	11389	1907	19527	-45	19572	49.92	19619	176	19748	19795

8.1 HOURLY GENERATION / LOAD FOR THE REGIONAL PEAK DEMAND MET DAY IN JULY 2000

DATE : 01.07.20
00

HOUR	GENERATION					INTER REGIONAL EXCHANGE Export(+)/Import(-)	TOTAL DEMAND MET	FREQ.	FREQUENCY CORRECTED DEMAND	LOAD SHEDDING	REQUIREMENT	
	HYDRO	THERMAL			TOTAL						WITHOUT FREQ. CORRECTION	WITH FREQ. CORRECTION
		NUCLEA R	COAL FIRED	GAS FIRED								
	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(HZ)	(MW)	(MW)	(MW)	(MW)
1	5277	702	11229	1661	18869	-75	18944	48.88	19603	206	19150	19809

2	5226	702	11334	1682	18944	-73	19017	49.16	19509	200	19217	19709
3	5282	702	11343	1792	19119	-68	19187	49.00	19780	200	19387	19980
4	5219	682	11310	1797	19008	-61	19069	48.72	19830	200	19269	20030
5	5199	693	11347	1792	19031	-160	19191	48.64	20007	305	19496	20312
6	5208	698	11462	1839	19207	-159	19366	50.00	19366	702	20068	20068
7	4852	711	11294	1834	18691	-113	18804	49.44	19125	582	19386	19707
8	4811	708	11182	1749	18450	-115	18565	50.16	18476	477	19042	18953
9	4617	708	11105	1647	18077	-30	18107	50.96	17600	803	18910	18403
10	4434	705	11144	1624	17907	-35	17942	51.04	17399	630	18572	18029
11	4477	674	10987	1593	17731	-37	17768	49.76	17897	647	18415	18544
12	4559	683	10646	1809	17697	-40	17737	50.72	17362	506	18243	17868
13	4530	693	10607	1812	17642	-44	17686	50.76	17292	533	18219	17825
14	4729	696	10317	1765	17507	-230	17737	49.44	18040	518	18255	18558
15	4882	692	10229	1802	17605	-335	17940	49.96	17962	584	18524	18546
16	4986	688	10373	1794	17841	-344	18185	49.92	18229	693	18878	18922
17	4986	690	10457	1838	17971	-341	18312	50.32	18138	469	18781	18607
18	4994	693	10467	1731	17885	-22	17907	50.88	17446	224	18131	17670
19	4722	697	10494	1657	17570	-29	17599	51.00	17086	1237	18836	18323
20	5461	699	10630	1782	18572	-32	18604	49.00	19179	1807	20411	20986
21	5520	699	10683	1797	18699	-27	18726	49.00	19305	1832	20558	21137
22	5510	699	10583	1821	18613	-122	18735	49.28	19149	1628	20363	20777
23	5205	698	10452	1828	18183	-225	18408	49.24	18837	1278	19686	20115
24	5120	698	10416	1821	18055	-531	18586	49.00	19161	600	19186	19761

8.1 HOURLY GENERATION / LOAD FOR THE REGIONAL PEAK DEMAND MET DAY IN AUGUST 2000

DATE : 01.08.20
00

HOUR	GENERATION					INTER REGIONAL EXCHANGE Export(+)/Import(-)	TOTAL DEMAND MET	FREQ.	FREQUENCY CORRECTED DEMAND	LOAD SHEDDING	REQUIREMENT	
	HYDRO	THERMAL			TOTAL						WITHOUT FREQ. CORRECTION	WITH FREQ. CORRECTION
		NUCLEA R	COAL FIRED	GAS FIRED								
	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(HZ)	(MW)	(MW)	(MW)	(MW)
1	5434	568	10762	1902	18666	-51	18717	49.78	18841	200	18917	19041
2	3232	571	10795	1913	16511	-57	16568	49.70	16718	200	16768	16918
3	5165	682	10734	1932	18513	-61	18574	50.10	18518	200	18774	18718
4	5091	686	10776	1927	18480	-61	18541	50.42	18310	200	18741	18510

5	5071	681	10774	1925	18451	-51	18502	49.74	18647	320	18822	18967
6	5109	681	10828	1923	18541	-51	18592	50.14	18514	692	19284	19206
7	4726	653	10854	1876	18109	-51	18160	50.02	18149	732	18892	18881
8	4663	653	10870	1880	18066	-56	18122	49.98	18133	312	18434	18445
9	4459	650	10718	1666	17493	-54	17547	49.94	17579	552	18099	18131
10	4471	698	10636	1665	17470	46	17424	50.02	17414	856	18280	18270
11	4723	702	10673	1848	17946	146	17800	50.62	17475	861	18661	18336
12	4549	658	10666	1813	17686	149	17537	49.10	18024	569	18106	18593
13	4736	675	10596	1812	17819	148	17671	49.10	18161	587	18258	18748
14	4722	683	10394	1815	17614	148	17466	49.10	17951	499	17965	18450
15	4714	682	10365	1811	17572	148	17424	49.10	17908	588	18012	18496
16	4622	679	10353	1758	17412	163	17249	48.76	17915	649	17898	18564
17	4744	691	10303	1797	17535	167	17368	49.78	17483	759	18127	18242
18	4546	704	10415	1824	17489	270	17219	50.10	17167	679	17898	17846
19	4615	689	10806	1865	17975	-43	18018	50.98	17503	930	18948	18433
20	5721	691	10833	1835	19080	-340	19420	49.02	20008	1682	21102	21690
21	5643	690	10885	1845	19063	-340	19403	49.34	19795	1708	21111	21503
22	5806	698	11016	1842	19362	-350	19712	50.38	19490	1409	21121	20899
23	5740	713	10884	1838	19175	-300	19475	49.70	19652	1013	20488	20665
24	5706	709	10888	1838	19141	-84	19225	49.42	19565	200	19425	19765

8.1 HOURLY GENERATION / LOAD FOR THE REGIONAL PEAK DEMAND MET DAY IN SEPTEMBER 2000

DATE : 12.09.20
00

HOUR	GENERATION					INTER REGIONAL EXCHANGE Export(+)/Import(-)	TOTAL DEMAND MET	FREQ.	FREQUENCY CORRECTED DEMAND	LOAD SHEDDING	REQUIREMENT	
	HYDRO	THERMAL			TOTAL						WITHOUT FREQ. CORRECTION	WITH FREQ. CORRECTION
		NUCLEA R	COAL	GAS								
			FIRED	FIRED								
			'A'									
'I'	'P' = 'A' - 'I'	'F'	'P _f ' =P/(1+0.03(F-50))	'L _s '	'P+L _s '	'P _f +L _s '						
(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(HZ)	(MW)	(MW)	(MW)	(MW)	
1	4997	940	9986	2033	17956	-45	18001	48.88	18627	425	18426	19052
2	5041	941	9607	2017	17606	-40	17646	48.72	18351	425	18071	18776
3	5043	936	9610	2044	17633	-40	17673	48.88	18287	525	18198	18812
4	4926	943	9713	2051	17633	-50	17683	48.96	18252	525	18208	18777
5	5034	935	9737	2043	17749	-50	17799	48.96	18372	500	18299	18872
6	5034	940	9774	2093	17841	-45	17886	50.40	17674	975	18861	18649

7	3782	956	10067	2108	16913	-50	16963	50.36	16782	965	17928	17747
8	3722	954	10084	2103	16863	50	16813	50.20	16713	365	17178	17078
9	3673	942	10155	2009	16779	148	16631	48.96	17167	351	16982	17518
10	3953	941	10128	2005	17027	60	16967	48.84	17579	405	17372	17984
11	4072	928	9905	1833	16738	-55	16793	48.76	17442	859	17652	18301
12	4189	929	9908	1849	16875	-55	16930	48.96	17475	852	17782	18327
13	4375	932	9966	1655	16928	-45	16973	48.76	17629	601	17574	18230
14	4363	934	10136	1724	17157	-60	17217	48.88	17816	570	17787	18386
15	4375	925	10089	2001	17390	-63	17453	49.48	17730	573	18026	18303
16	4376	931	10170	2015	17492	-65	17557	50.00	17557	581	18138	18138
17	4440	930	10079	2002	17451	-58	17509	49.16	17962	770	18279	18732
18	4448	927	10131	2048	17554	-45	17599	50.60	17288	658	18257	17946
19	5073	938	10130	2046	18187	-56	18243	49.72	18398	1197	19440	19595
20	5353	937	10123	2046	18459	-62	18521	49.32	18907	1701	20222	20608
21	5336	942	9930	2066	18274	-65	18339	49.84	18427	2029	20368	20456
22	5271	947	9904	2030	18152	-65	18217	48.72	18944	1987	20204	20931
23	5379	943	10104	2068	18494	-54	18548	49.48	18842	1646	20194	20488
24	5168	941	10120	2044	18273	-58	18331	48.68	19087	550	18881	19637

8.1 HOURLY GENERATION / LOAD FOR THE REGIONAL PEAK DEMAND MET DAY IN OCTOBER 2000

DATE : 26.10.20

00

HOUR	GENERATION					INTER REGIONAL EXCHANGE Export(+)/Import(-)	TOTAL DEMAND MET	FREQ.	FREQUENCY CORRECTED DEMAND	LOAD SHEDDING	REQUIREMENT			
	HYDRO	THERMAL			TOTAL						WITHOUT FREQ. CORRECTION	WITH FREQ. CORRECTION		
		NUCLEA R	COAL	GAS									'P' = 'A' - 'I'	'P' = 'A' - 'I'
			FIRED	FIRED										
	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(HZ)	(MW)	(MW)	(MW)	(MW)		
1	2816	804	10677	2018	16315	-55	16370	48.12	17348	1860	18230	19208		
2	2642	800	10673	2032	16147	-55	16202	48.32	17062	1470	17672	18532		
3	2651	799	10692	2043	16185	-55	16240	48.28	17124	1480	17720	18604		
4	2843	795	10678	2061	16377	-55	16432	48.56	17174	1305	17737	18479		
5	3133	796	10718	2070	16717	-63	16780	48.16	17760	1385	18165	19145		
6	3199	795	10682	2097	16773	-58	16831	48.72	17503	2045	18876	19548		
7	2260	808	10687	2090	15845	-63	15908	48.12	16859	1707	17615	18566		
8	2259	817	10773	2075	15924	-71	15995	49.44	16268	892	16887	17160		
9	2279	823	10657	2035	15794	-71	15865	48.36	16686	952	16817	17638		

10	2275	815	10704	2188	15982	-71	16053	49.52	16288	1159	17212	17447
11	2084	809	10941	2211	16045	-78	16123	49.92	16162	345	16468	16507
12	2078	810	11101	2234	16223	-79	16302	50.48	16071	375	16677	16446
13	1791	813	11161	2219	15984	-73	16057	50.12	15999	150	16207	16149
14	1821	804	11092	2135	15852	53	15799	50.32	15649	150	15949	15799
15	2024	805	10770	2027	15626	152	15474	50.60	15200	150	15624	15350
16	2084	807	10723	1921	15535	150	15385	49.68	15534	150	15535	15684
17	2612	807	11059	2097	16575	147	16428	50.56	16157	150	16578	16307
18	4184	789	10742	2149	17864	-76	17940	48.60	18727	613	18553	19340
19	4933	797	11093	2231	19054	-78	19132	49.16	19627	1969	21101	21596
20	4958	803	11080	2231	19072	-80	19152	48.80	19867	1858	21010	21725
21	4881	803	11104	2230	19018	-80	19098	48.56	19960	1429	20527	21389
22	4530	801	11085	2247	18663	-80	18743	49.00	19323	1593	20336	20916
23	4328	803	11119	2259	18509	-78	18587	49.36	18951	578	19165	19529
24	3643	807	11154	2278	17882	-146	18028	49.20	18471	179	18207	18650

8.1 HOURLY GENERATION / LOAD FOR THE REGIONAL PEAK DEMAND MET DAY IN NOVEMBER 2000

DATE : 02.11.20
00

HOUR	GENERATION					INTER REGIONAL EXCHANGE Export(+)/Import(-)	TOTAL DEMAND MET	FREQ.	FREQUENCY CORRECTED DEMAND	LOAD SHEDDING	REQUIREMENT	
	HYDRO	THERMAL			TOTAL						WITHOUT FREQ. CORRECTION	WITH FREQ. CORRECTION
		NUCLEA R	COAL FIRED	GAS FIRED								
	(MW)	(MW)	(MW)	(MW)	(MW)	'I'	'P' = 'A' - 'I'	'F'	'P _f ' =P/(1+0.03(F-50))	'L _s '	'P+L _s '	'P _f +L _s '
1	2888	825	10243	2106	16062	-30	16092	49.12	16528	175	16267	16703
2	2584	823	10343	2123	15873	-30	15903	49.72	16038	175	16078	16213
3	2582	817	10336	2124	15859	-30	15889	49.72	16024	175	16064	16199
4	2811	817	10380	2150	16158	-25	16183	49.80	16281	175	16358	16456
5	3268	823	10315	2140	16546	-25	16571	49.08	17041	295	16866	17336
6	3593	820	10291	2128	16832	-20	16852	49.12	17309	1170	18022	18479
7	3162	603	10516	2124	16405	-25	16430	48.88	17001	1371	17801	18372
8	2629	822	10399	2155	16005	-33	16038	49.80	16135	1402	17440	17537
9	2292	835	10588	2130	15845	17	15828	49.52	16059	1012	16840	17071
10	2268	826	10709	2093	15896	12	15884	50.20	15789	1022	16906	16811
11	2380	820	10303	2073	15576	-30	15606	49.12	16029	1100	16706	17129
12	2248	809	10401	2050	15508	-30	15538	49.56	15746	961	16499	16707

13	2234	808	10425	2041	15508	-30	15538	49.76	15651	893	16431	16544
14	2005	809	10441	2049	15304	-26	15330	49.80	15423	873	16203	16296
15	2100	812	10436	2053	15401	-25	15426	50.24	15316	846	16272	16162
16	2199	808	10253	2037	15297	-25	15322	48.96	15815	571	15893	16386
17	2725	815	10861	2048	16449	121	16328	50.52	16077	495	16823	16572
18	3442	819	10921	2065	17247	115	17132	50.64	16809	781	17913	17590
19	3727	817	10732	2054	17330	110	17220	49.36	17557	1726	18946	19283
20	3827	813	10854	2070	17564	123	17441	50.32	17275	1797	19238	19072
21	3567	819	11105	2089	17580	73	17507	50.00	17507	1667	19174	19174
22	3478	813	11149	2129	17569	73	17496	50.96	17006	1759	19255	18765
23	3559	820	10791	2112	17282	223	17059	50.80	16659	860	17919	17519
24	3246	820	10835	2108	17009	459	16550	49.72	16690	200	16750	16890

8.1 HOURLY GENERATION / LOAD FOR THE REGIONAL PEAK DEMAND MET DAY IN DECEMBE

DATE : 28.12.20
00

HOUR	GENERATION						INTER REGIONAL		TOTAL		FREQUENCY		LOAD	REQU
	HYDRO	THERMAL				Export(+)/Import(-)	EXCHANGE	DEMAND	FREQ.	CORRECTED	SHEDDING	WITHOUT FREQ.	WITH FREQ	
		NUCLEA R	COAL	GAS	TOTAL		MET	DEMAND						
FIRED	FIRED	'A'	'I'	'P' = 'A' - 'I'	'F'	'P _f ' = P/(1+0.03(F-50))	'L _s '	'P+L _s '	'P _f +L _s '					
(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(HZ)	(MW)	(MW)	(MW)	(MW)			
1	1473	1018	11350	2025	15866	-100	15966	48.76	16583	375	16341	16958		
2	1468	1022	11408	2015	15913	-100	16013	49.24	16387	375	16388	16762		
3	1457	1025	11347	2031	15860	-105	15965	49.48	16218	375	16340	16593		
4	1628	1020	11392	2053	16093	-105	16198	49.68	16355	375	16573	16730		
5	2352	1021	11476	2052	16901	-100	17001	49.56	17228	570	17571	17798		
6	2396	1031	11622	2046	17095	-50	17145	48.48	17964	915	18060	18879		
7	2871	1025	11524	2046	17466	-50	17516	48.68	18238	1134	18650	19372		
8	2882	1021	11593	2042	17538	-46	17584	48.52	18401	1106	18690	19507		
9	2437	1020	11684	2022	17163	-53	17216	48.52	18016	895	18111	18911		
10	2318	1021	11698	2004	17041	-56	17097	48.56	17869	785	17882	18654		
11	2007	1025	11637	1998	16667	-56	16723	49.00	17240	701	17424	17941		
12	1671	1013	11462	1991	16137	-51	16188	48.76	16813	478	16666	17291		
13	1504	1031	11530	1994	16059	-40	16099	49.64	16275	327	16426	16602		
14	1315	1038	11587	1984	15924	-41	15965	49.28	16317	230	16195	16547		
15	1228	1031	11568	1987	15814	-41	15855	50.08	15817	225	16080	16042		

16	1256	1028	11661	1972	15917	-51	15968	49.20	16361	225	16193	16586
17	2027	1025	11665	1982	16699	-51	16750	49.20	17162	250	17000	17412
18	2963	1025	11778	2003	17769	-56	17825	49.20	18263	814	18639	19077
19	3225	1000	11721	2011	17957	-56	18013	49.20	18456	1798	19811	20254
20	2974	1000	11733	2098	17805	-46	17851	49.20	18290	1728	19579	20018
21	2523	1000	11769	2024	17316	-46	17362	49.20	17789	1671	19033	19460
22	2074	1026	11769	2009	16878	-50	16928	49.20	17344	1705	18633	19049
23	1863	1031	11750	2017	16661	-55	16716	48.84	17319	535	17251	17854
24	1675	1040	11693	2043	16451	-60	16511	50.00	16511	250	16761	16761

8.1 HOURLY GENERATION / LOAD FOR THE REGIONAL PEAK DEMAND MET DAY IN JANUAR

DATE : 13.01.20

01

HOUR	GENERATION							INTER REGIONAL		TOTAL		FREQUENCY		LOAD	REQU		
	HYDRO	THERMAL				Export(+)/Import(-)	EXCHANGE		DEMAND	FREQ.	CORRECTED	SHEDDING	WITHOUT FREQ.	FREQ.	WITH FREQ		
		NUCLEA R	COAL	GAS	TOTAL		MET	DEMAND								CORRECTION	CORRECTION
(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)						
1	1273	832	11303	2123	15531	-89	15620	49.60	15810	400	16020	16210					
2	1278	839	11337	2131	15585	-89	15674	49.60	15864	400	16074	16264					
3	1391	838	11360	2116	15705	-71	15776	49.60	15968	400	16176	16368					
4	1445	839	11374	2108	15766	-72	15838	49.60	16030	400	16238	16430					
5	2085	840	11454	2058	16437	-69	16506	49.60	16706	1227	17733	17933					
6	2699	839	11456	1868	16862	-71	16933	49.60	17139	1127	18060	18266					
7	2488	831	10963	1840	16122	34	16088	49.60	16283	1998	18086	18281					
8	2094	824	11364	1820	16102	-93	16195	49.60	16392	2149	18344	18541					
9	2039	817	11374	1824	16054	-94	16148	48.44	16941	2140	18288	19081					
10	2100	823	11354	1822	16099	-60	16159	49.52	16395	2255	18414	18650					
11	1696	827	11344	1813	15680	-80	15760	50.04	15741	2154	17914	17895					
12	1694	827	11322	1866	15709	-75	15784	49.60	15976	1914	17698	17890					
13	1451	830	11377	1965	15623	-75	15698	50.72	15366	1153	16851	16519					
14	1450	833	11417	1947	15647	-75	15722	50.40	15536	741	16463	16277					
15	1473	832	11125	2026	15456	-75	15531	49.40	15816	776	16307	16592					
16	1616	830	11247	1924	15617	-75	15692	50.44	15488	1139	16831	16627					
17	1947	827	11295	1970	16039	-80	16119	49.52	16355	1040	17159	17395					
18	2654	823	11236	1973	16686	-75	16761	51.08	16235	1568	18329	17803					

19	3059	838	11414	2079	17390	-75	17465	50.12	17402	2341	19806	19743
20	2694	842	11418	2077	17031	-77	17108	49.88	17170	2498	19606	19668
21	2341	842	11377	2082	16642	-81	16723	49.32	17071	2287	19010	19358
22	2031	839	11353	2096	16319	-85	16404	49.48	16664	2622	19026	19286
23	1635	840	11208	2079	15762	-210	15972	50.12	15915	1832	17804	17747
24	1514	840	11209	2086	15649	-310	15959	49.16	16372	1025	16984	17397

8.1 HOURLY GENERATION / LOAD FOR THE REGIONAL PEAK DEMAND MET DAY IN FEBRUAR

DATE : 22.02.20

01

HOUR	GENERATION \					INTER REGIONAL EXCHANGE	TOTAL DEMAND	FREQ.	FREQUENCY CORRECTED	LOAD SHEDDING	REQUIREMENT							
	HYDRO	THERMAL			Export(+)/Import(-)						MET		DEMAND		CORRECTION	WITHOUT FREQ.	WITH FREQ	
		NUCLEA R	COAL FIRED	GAS FIRED		TOTAL 'A'	'I'	'P' = 'A' - 'I'	'F'	'P _f ' =P/((1+0.03(F-50)))						'L _s '	'P+L _s '	'P _f +L _s '
(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(HZ)	(MW)	(MW)	(MW)	(MW)							
1	1241	819	11699	2260	16019	-150	16169	50.04	16150	400	16569	16550						
2	1098	820	11614	2266	15798	-156	15954	50.20	15859	400	16354	16259						
3	1082	819	11605	2258	15764	-155	15919	50.12	15862	400	16319	16262						
4	1169	820	11688	2263	15940	-161	16101	50.00	16101	400	16501	16501						
5	1596	821	11761	2264	16442	-131	16573	49.32	16918	400	16973	17318						
6	2355	826	11694	2283	17158	-161	17319	49.80	17424	1208	18527	18632						
7	2490	852	11711	2283	17336	-146	17482	49.84	17566	1677	19159	19243						
8	2167	846	11705	2264	16982	-142	17124	49.40	17438	1375	18499	18813						
9	1697	837	11684	2274	16492	-149	16641	49.92	16681	1245	17886	17926						
10	1226	841	11597	2259	15923	-175	16098	50.52	15851	1655	17753	17506						
11	1169	940	11104	222	13435	-19	13454	50.52	13247	1350	14804	14597						
12	1168	940	10052	2038	14198	-256	14454	51.32	13903	1966	16420	15869						
13	1183	927	10336	2173	14619	-198	14817	49.92	14853	1685	16502	16538						
14	1151	933	10396	2161	14641	-202	14843	49.35	15137	1190	16033	16327						
15	1294	922	10593	2175	14984	-201	15185	49.00	15655	764	15949	16419						
16	1180	936	11064	2186	15366	-214	15580	49.80	15674	986	16566	16660						
17	1333	938	11526	2031	15828	-207	16035	49.72	16171	605	16640	16776						
18	1557	935	11542	2114	16148	-230	16378	50.20	16280	564	16942	16844						
19	2335	951	11536	2116	16938	-222	17160	49.76	17284	2212	19372	19496						
20	2408	945	11635	2116	17104	-157	17261	50.36	17077	1969	19230	19046						
21	2032	950	11441	2207	16630	-155	16785	50.28	16645	1649	18434	18294						

22	1559	961	11602	2201	16323	-159	16482	49.72	16622	1708	18190	18330
23	1455	964	11711	2252	16382	-160	16542	50.00	16542	735	17277	17277
24	1273	962	11722	2272	16229	-174	16403	50.00	16403	400	16803	16803

8.1 HOURLY GENERATION / LOAD FOR THE REGIONAL PEAK DEMAND MET DAY IN MARCH

DATE : 06.03.20

01

HOUR	GENERATION							INTER REGIONAL		TOTAL		FREQUENCY		LOAD	REQU
	HYDRO	THERMAL				Export(+)/Import(-)	EXCHANGE		DEMAND	FREQ.	CORRECTED	SHEDDING	WITHOUT FREQ.	FREQ.	WITH FREQ.
		NUCLEA R	COAL	GAS	TOTAL		MET	DEMAND							
			FIRED	FIRED	'A'	'I'	'P' = 'A' - 'I'	'F'	'P _f ' =P/(1+0.03(F-50))	'L _s '	'P+L _s '	'P _f +L _s '			
	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)	(HZ)	(MW)	(MW)	(MW)	(MW)			
1	1009	1027	11888	2261	16185	-293	16478	49.00	16988	350	16828	17338			
2	960	1033	11934	2256	16183	-289	16472	49.36	16794	350	16822	17144			
3	957	1044	11959	2284	16244	-295	16539	49.60	16740	300	16839	17040			
4	1011	1037	11945	2288	16281	-304	16585	9.36	-75661	300	16885	-75361			
5	1482	1039	12027	2301	16849	-288	17137	49.72	17282	780	17917	18062			
6	1787	1049	11942	2292	17070	-194	17264	49.36	17602	1045	18309	18647			
7	2294	1049	11958	2281	17582	-135	17717	48.68	18448	947	18664	19395			
8	1764	1039	11983	2295	17081	-143	17224	49.84	17307	1185	18409	18492			
9	1461	1039	11982	2266	16748	-209	16957	49.56	17184	1540	18497	18724			
10	983	1035	11907	2259	16184	-228	16412	50.52	16160	1668	18080	17828			
11	1026	1036	11910	2170	16142	-135	16277	48.76	16906	1613	17890	18519			
12	1018	1025	11821	2147	16011	-234	16245	48.92	16789	1535	17780	18324			
13	1090	1037	11932	2189	16248	-105	16353	50.44	16140	1461	17814	17601			
14	1189	1032	12009	2166	16396	-120	16516	49.40	16819	917	17433	17736			
15	1194	1033	11208	2158	15593	-284	15877	49.60	16070	817	16694	16887			
16	1212	1016	11229	2150	15607	-290	15897	48.92	16429	675	16572	17104			
17	1442	1020	11881	2162	16505	-295	16800	49.36	17129	577	17377	17706			
18	1645	1022	12128	2200	16995	-298	17293	50.44	17068	609	17902	17677			
19	2353	1022	12145	2203	17723	-121	17844	49.32	18216	1816	19660	20032			
20	2310	1025	12088	2220	17643	-110	17753	49.84	17839	1963	19716	19802			
21	2012	1029	12121	2235	17397	-119	17516	48.56	18307	1751	19267	20058			
22	1895	1026	12040	2233	17194	-123	17317	49.52	17570	1632	18949	19202			
23	1599	1022	12031	2196	16848	-120	16968	49.20	17385	881	17849	18266			
24	1083	1020	11775	2196	16074	-125	16199	49.08	16659	658	16857	17317			

8.2 LOAD DURATION DATA OF THE NORTHERN REGION FOR THE YEAR 2000-2001

UNRESTRICTED DEMAND IN MW	% OF TIME
ABOVE 23500	0.00
ABOVE 23000	0.00
ABOVE 22500	0.08
ABOVE 22000	0.47
ABOVE 21500	1.35
ABOVE 21000	2.63
ABOVE 20500	5.29
ABOVE 20000	9.70
ABOVE 19500	16.93
ABOVE 19000	26.58
ABOVE 18500	37.73
ABOVE 18000	48.71
ABOVE 17500	60.50
ABOVE 17000	71.87
ABOVE 16500	82.71
ABOVE 16000	90.50
ABOVE 15500	94.66
ABOVE 15000	97.29
ABOVE 14500	98.55
ABOVE 14000	99.03
ABOVE 13500	99.45
ABOVE 13000	99.75
ABOVE 12500	99.94
ABOVE 12000	100.00
ABOVE 11500	100.00
ABOVE 11000	100.00

REGIONAL LOAD DURATION CURVE FOR THE YEAR 2000-2001 IS ENCLOSED (Graph G6)

SECTION – 9

FREQUENCY, VOLTAGE & RESERVOIR DATA

9.1 FREQUENCY ANALYSIS FOR 2000-2001

Month ----> ITEM	Apr'2000	May'2000	Jun'2000	Jul '2000	Aug '2000	Sep '2000	Oct '2000	Nov '2000	Dec '2000	Jan '2001	Feb '2001	Mar '2001	2000- 2001
Avg. freq. Hz	49.05	49.61	49.71	49.54	49.44	49.08	49.30	49.49	49.03	49.37	49.54	49.45	49.38
Std Dev Hz	0.65	0.84	0.89	0.90	0.86	0.76	0.71	0.80	0.78	0.62	0.62	0.59	0.76
Maximum Instant Freq. Hz	51.36	51.48	51.48	51.44	51.44	51.40	51.40	51.44	51.40	51.48	51.32	51.40	51.48
Minimum Instant Freq. Hz	47.84	47.84	47.84	47.84	47.84	47.80	47.84	47.84	47.80	47.80	47.88	47.96	47.80
Frequency Variation Index(FVI)	13.26	8.62	8.76	10.46	10.50	14.20	9.66	8.99	15.12	7.83	5.91	6.40	10.36
Above 50.5 %	3.27	18.02	22.52	18.25	12.76	5.34	5.81	11.91	5.38	4.75	6.43	5.66	10.03
50.5 - 49.0 %	43.43	55.80	52.90	50.04	51.61	43.75	59.20	57.99	39.34	67.38	75.87	73.90	55.84
Below 49.0 %	53.30	26.18	24.58	31.71	35.63	50.91	34.99	30.10	55.28	27.87	17.70	20.44	34.13
Below 48.5 %	22.59	10.36	12.30	18.92	18.98	26.83	14.99	13.23	28.41	8.04	4.31	2.72	15.19
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

NOTE : Calculation of FVI is done using the following formula -

$$FVI = \frac{10 \sum (F - 50)^2}{24 \times 60 \times 6}$$

where frequency 'F' is measured at 10 seconds interval.(approximate updation period of telemetered frequency from 220 kV BTPS bus at NRLDC)

9.2 FREQUENCY SPECTRUM OF THE NORTHERN REGION SINCE THE LAST DECADE

SL . NO.	YEAR	% OF TIME FREQUENCY REMAINED				AVERAGE FREQ (Hz) DURING YEAR
		BELOW 48.5 Hz	BELOW 49.0 Hz	BETWEEN 49.0 Hz TO 50.5 Hz	ABOVE 50.5 Hz	
1	1991-92	1.65	12.23	63.92	23.85	49.89
2	1992-93	6.04	21.67	56.07	22.26	49.69
3	1993-94	20.53	44.33	43.80	11.87	49.21
4	1994-95	14.71	32.73	53.01	14.26	49.37
5	1995-96	8.71	22.77	53.82	23.41	49.63
6	1996-97	25.26	44.93	41.17	13.90	49.14
7	1997-98	15.43	28.16	40.74	31.10	49.61
8	1998-99	14.12	27.81	39.70	32.49	49.64
9	1999-2000	24.83	43.91	43.20	12.89	49.27
10	2000-2001	15.19	34.13	55.84	10.03	49.38

9.3 MONTHWISE MAXIMUM & MINIMUM VOLTAGE RECORDED AT 400 KV DADRI BUS IN 2000-2001

MONTH	MAXIMUM VOLTAGE		MINIMUM VOLTAGE	
	(KV)	Date	(KV)	Date
APR - 2000	424	14.04.2000	362	26.04.2000
MAY- 2000	426	12.05.2000	336	29.05.2000
JUN - 2000	426	04.06.2000	340	19.06.2000
JUL - 2000	416	18.07.2000	342	05.07.2000
AUG - 2000	416	16.08.2000	349	07.08.2000
SEP - 2000	418	26.09.2000	358	15.09.2000
OCT - 2000	412	02.10.2000	356	09.10.2000
NOV - 2000	420	27.10.2000	370	16.10.2000
DEC - 2000	418	25.12.2000	364	09.12.2000
JAN - 2001	424	01.01.2001	378	31.01.2001
FEB - 2001	422	25.02.2001	378	05.02.2001
MAR -2001	422	29.03.2001	368	16.03.2001
2000-2001	426	04.06.2000	336	29.05.2000

9.4 RESERVOIR DATA FOR 2000-01

Resrvoir ----->	Bhakra			Pong		
End of the Month	Reservoir Level (Mtr)	Live Capacity (Mhmt)	Energy Content (MU)	Reservoir Level (Mtr)	Live Capacity (Mhmt)	Energy Content (MU)
APR - 2000	455.43	0.06	200.00	400.36	0.17	245.00
MAY- 2000	460.27	0.09	308.00	396.29	0.13	162.00
JUN - 2000	464.35	0.12	400.00	394.70	0.11	135.00
JUL - 2000	486.88	0.34	1220.00	405.62	0.27	375.00
AUG - 2000	499.70	0.49	1910.00	411.26	0.37	525.00
SEP - 2000	501.54	0.52	2050.00	409.94	0.34	490.00
OCT - 2000	498.82	0.48	1860.00	407.39	0.27	420.00
NOV - 2000	492.83	0.40	1530.00	404.04	0.24	330.00
DEC - 2000	484.77	0.31	1130.00	401.20	0.19	265.00
JAN - 2001	476.60	0.23	810.00	399.75	0.17	230.00
FEB - 2001	468.03	0.15	520.00	397.76	0.14	190.00
MAR -2001	457.54	0.07	240.00	394.92	0.11	140.00
Max. Level (DATE)	502.26 21.09.2000			412.15 08.09.2000		
Min. Level (DATE)	454.16 09.05.2000			392.12 26.06.2000		
Full Reservoir Level (FRL)	514.50			433.12		
Min. Draw Down Level (MDDL)	445.62			384.05		

Resrvoir ----->	Rana Pratap Sagar			Gandhi Sagar		
Month	Reservoir Level (Mtr)	Live Capacity (Mhmt)	Energy Content (MU)	Reservoir Level (Mtr)	Live Capacity (Mhmt)	Energy Content (MU)

APR - 2000	346.69	0.05	91.00	383.59	0.04	130.00
MAY- 2000	347.13	0.06	106.00	383.21	0.05	100.00
JUN - 2000	346.96	0.05	100.00	382.80	0.03	80.00
JUL - 2000	349.22	0.09	167.00	384.94	0.07	200.00
AUG - 2000	349.65	0.10	180.00	384.89	0.07	200.00
SEP - 2000	349.25	0.09	167.00	384.72	0.06	190.00
OCT - 2000	348.33	0.08	144.00	383.14	0.03	90.00
NOV - 2000	346.62	0.05	93.00	381.35	0.01	10.00
DEC - 2000	345.52	0.03	61.00	380.91	0.00	0.00
JAN - 2001	345.16	0.03	53.00	380.72	0.00	0.00
FEB - 2001	344.92	0.03	48.00	380.65	0.00	0.00
MAR -2001	344.60	0.02	35.00	380.60	0.00	0.00
Max. Level	349.68			385.00		
(DATE)	06.09.2000			25.07.2000		
Min. Level	344.60			380.60		
(DATE)	31.03.2001			31.03.2001		
Full Reservoir Level (FRL)	352.65			402.64		
Min. Draw Down Level (MDDL)	342.90			381.00		

Resrvoir ----->	Rihand		
Month	Reservoir Level (Mtr)	Live Capacity (Mhmt)	Energy Content (MU)
APR - 2000	259.81	0.21	400.00
MAY- 2000	257.92	0.15	235.00
JUN - 2000	256.46	0.10	150.00
JUL - 2000	258.62	0.17	315.00
AUG - 2000	260.06	0.21	410.00
SEP - 2000	266.06	0.47	920.00
OCT - 2000	265.21	0.43	845.00

NOV - 2000	264.08	0.38	750.00
DEC - 2000	262.71	0.32	625.00
JAN - 2001	260.74	0.24	460.00
FEB - 2001	259.32	0.19	365.00
MAR -2001	258.81	0.18	325.00
Max. Level	266.12		
(DATE)	21.09.2000		
Min. Level	256.46		
(DATE)	30.06.2000		
Full Reservoir Level (FRL)	268.22		
Min. Draw Down Level (MDDL)	252.98		

Notes :

Energy content of Bhakra : Total energy content at Bhakra, Ganguwal and Kotla Power Stations.

Energy content of Rihand

:

Total energy content at Rihand and Obra Power Stations.

Energy content of RPS

: Total energy content at Rana Pratap Sagar and Jawahar Sagar Power Stations.

Energy Content of G. Sagar

: Total energy content at Gandhi Sagar, R. P. Sagar and Jawahar Sagar Power Stations.

SECTION – 10

MISCELLANEOUS

**10.1 SETTING OF FLAT UNDERFREQUENCY AND df/dt RELAYS IN NORTHERN REGION AS APPROVED BY NREB
(AS ON 31.03.2001)**

CONSTITUENTS	Flat Under Frequency			df/dt relay setting						
	at 48.2 Hz	at 48.0 Hz	TOTAL	To be initialised at 50.0 Hz		To be initialised at 49.0 Hz		To be initialised at 48.5 Hz		TOTAL
	MW	MW	MW	Setting Hz/sec	Load relief MW	Setting Hz/sec	Load relief MW	Setting Hz/sec	Load relief MW	MW
Chandigarh	5	5	10	---	---	---	---	---	---	---
Delhi	75	115	190	---	---	0.22	581	0.20	166	747
Haryana	70	105	175	---	---	0.22	519	0.20	148	667
H.P.	15	25	40	---	---	---	---	---	---	---
J & K	25	35	60	---	---	---	---	---	---	---
Punjab	110	165	275	---	---	0.20	656	0.20	328	984
Rajasthan	105	160	265	---	---	0.22	655	0.20	327	982
U.P.	195	290	485	0.30	1586	---	---	---	---	1586
TOTAL	600	900	1500		1586		2411		969	4966

10.2 SHUNT CAPACITORS INSTALLATION IN NORTHERN REGION DURING 2000-2001

CONSTITUENT	INSTALLED			WORKING AS ON 31.03.2001	REQUIREMENT AT AT THE END OF 2000-2001	BACKLOG AS ON 31.03.2001
	AS ON 31.03.2000	DURING 2000-2001	AS ON 31.03.2001			
	A	B	C=A+B	D	E	G=E-C
Chandigarh	33	60	93	93	110	17
Delhi	2035	201	2236	1620	2640	404
Haryana	1275	368	1643	1273	3080	1437
H.P.	73	46	119	107	385	266
J & K	147	0	147	147	880	733
Punjab	4047	384	4431	4176	5500	1069
Rajasthan	2181	176	2357	2230	3044	687
U.P.	3927	279	4206	2693	6435	2229
BBMB	381	0	381	361	345	-36
TOTAL	14099	1514	15613	12700	22419	6806

10.3 STATUS OF IMPORTANT TRANSMISSION LINES UNDER CONSTRUCTION AS ON 31ST MARCH 2001

S. NO.	NAME OF LINE/ICT	NO. OF CKTS.	Revised TARGET DATE	LENGT H IN Kms.	TOTAL LOCATION S	STUBS COMPLETE D	ERECTION OF TOWERS COMPLETE D	STRINGING COMPLETE D IN Ckt. Kms.	REMARKS
800 KV LINES									
POWERGRID									
1	Tehri - Meerut - I	S/C	Oct-2001	180	452	343	269	70	
2	Tehri - Meerut - II	S/C	Oct-2001	182	458	331	371	68	
400 KV LINES									
POWERGRID									
1	Nathpa Jhakri -Nalagarh	D/C	Apr-2001	290	373	372	368	250	
2	Sasaram -Allahabad	D/C	Dec-2001	410	583	572	535	324	
UPPCL									
1	Unnao -Bareilly	D/C	Dec-2000	542	745	745	745	542	
2	LILO of Anpara -Sarnath at Obra	S/C	Apr-2001	21	40	40	40	20	
220 KV LINES									
POWERGRID									
1	Jallandhar -Hamirpur	D/C	Feb-2001	242	354	354	354	242	
DVB									
1	Ghazipur -NOIDA	D/C	Mar-2002	16	48	38	28	0	status as on 30.06.2001
2	Bawana -Rohini	D/C	Mar-2002	20	55	41	28	5	status as on 30.06.2001
3	S.O.W. - K. Gate	D/C	Dec-2001	11	29	21	19	5	status as on

Detailed Data for 2001-02									30.06.2001 status as on 30.06.2001
Sl. No.	Particulars	Category	Period	2000-01	2001-02	2002-03	2003-04	2004-05	
4	LILO of Mandola -Patparganj at S.O.W.	D/C	Mar-2002	3	6	2	1	0	
J&K , PDD									
1	Gladni -Udhampur	S/C	Mar-2002	50	134	133	26	0	
2	Thein - Hiranagar	D/C	Mar-2002	83	120	114	113	0	
PSEB									
1	RSD -Sarna (2 nd line)	D/C	Jun- 2001	61	109	109	100	19	
2	GHTP -Kotkapura (Bajakhana)	D/C	Apr-2001	57	84	84	84	12	
3	Jamsher -Nakodar	S/C on D/C	Apr-2001	15	48	48	47	9	
4	Muktsar -Jallalabad	S/C on D/C	Mar-2002	40	121	121	83	0	
5	Civil Lines - Khassa	S/C on D/C	Mar-2002	31	95	95	74	0	
6	LILO of Moga -Muktsar at Kotkapura	D/C	Jun- 2001	40	<-----Not available----->			0	
7	Sarna -Kotli Suratmalli	D/C	Mar -2002	123	185	38	0	0	
8	GGSSTP -Govindgarh (2 nd line)	D/C	Apr- 2001	124	201	201	193	53	
9	LILO of Churian -Batala at Kotli Suratmalli (1 st Circuit)	S/C	Mar -2002	18	29	25	19	0	
RAJASTHAN									
1	Sikar -Reengus	D/C	Mar -2002	110	172	172	171	100	
2	Sikar -Laxmangarh	D/C	May -2001	41	69	69	67	0	
UPPCL									
1	C.B. Ganj -Haldwani	S/C	Mar -2002	95	272	263	246	72	
2	Fatehpur -Banda	S/C	Mar -2002	68	200	195	178	5	
3	Bareilly -Shahjahanpur	S/C on D/C	2002-2003	101	296	133	126	0	
HPSEB									

1	Khodri - Majri (2 nd ckt)	D/C	Mar -2002	35	106	106	106	16
2	Thein - Jassore	S/C	Mar -2002	26	75	71	16	0

HARYANA

1	Palli - Badshahpur	D/C	Mar -2002	43	83	22	0	0
2	Badshahpur -Manesar	S/C on D/C	Mar -2002	12	49	16	6	0

Source: CEA report on "Status of construction progress of transmission works" dated 9th April 2001.

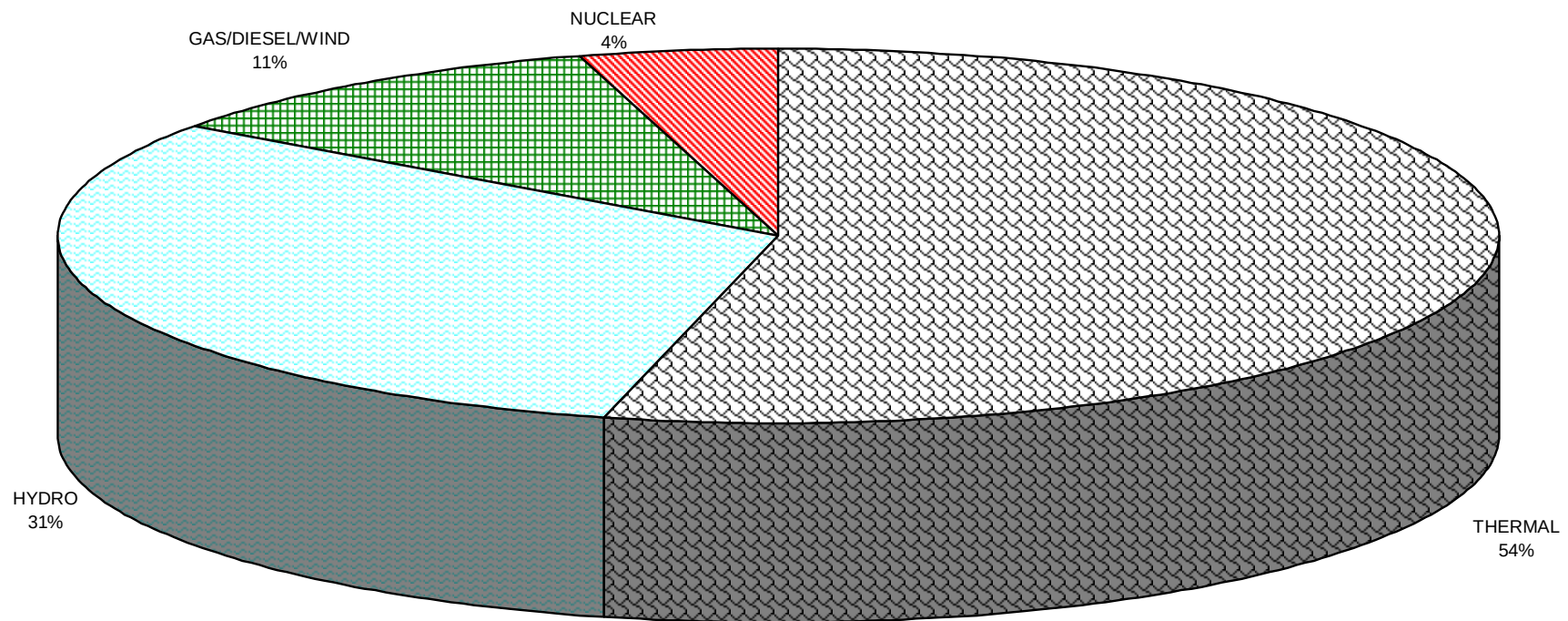
10.4 STATUS OF NEW GENERATING UNITS UNDER CONSTRUCTION AS ON 31ST MARCH 2001

SL. NO.	NAME OF SCHEME	NAME OF UNIT	CAPACITY (MW)	COMMISSIONING SCHEDULE	
				ORIGINAL	REVISED
1.	<u>NHPC</u>				
	(i) DULHASTI HPS	1	130	94-95	2003-04
		2	130	94-95	2003-04
		3	130	94-95	2003-04
	(ii) CHAMERA STAGE -II HPS	1	100	----	2004-05
		2	100	----	2004-05
		2	100	----	2004-05
	(iii) DHAULIGANGA HPS	1	70	----	2004-05
		2	70	----	2004-05
		3	70	----	2004-05
		4	70	----	2004-05
2.	<u>NJPC</u>				
	(i) NATHPA JHAKRI HPS	1	250	95-97	2003-04
		2	250	95-97	2003-04
		3	250	95-97	2003-04

		4	250	95-97	2003-04
		5	250	95-97	2003-04
		6	250	95-97	2003-04
3.	<u>THDC</u>				
	(i) TEHRI STAGE -I HPS	1	250	81-82	2003-04
		2	250	81-82	2003-04
		3	250	81-82	2003-04
		4	250	81-82	2003-04
4.	<u>HPSEB</u>				
	(i) BASPA - II HPS (P)	1	100	2001-2002	2002-03
		2	100	2001-2002	2002-03
		3	100	2001-2002	2002-03
5.	<u>HARYANA</u>				
	(i) PANIPAT TPS	6	210	SEP. 93	2001-02
6.	<u>J & K</u>				
	(i) SEWA HPS	1	3	-	2002-03
		2	3	-	2002-03
		3	3	-	2002-03
	UPPER SINDH HPS				
	(iii) STAGE-II	2	35	97-98	2002-03
	(iv) UPPER SINDH HPS EXTN.	1	35	93-94	2002-03
	(v) PHALAGAM HPS	1	1.5		2002-03
		2	1.5		2002-03

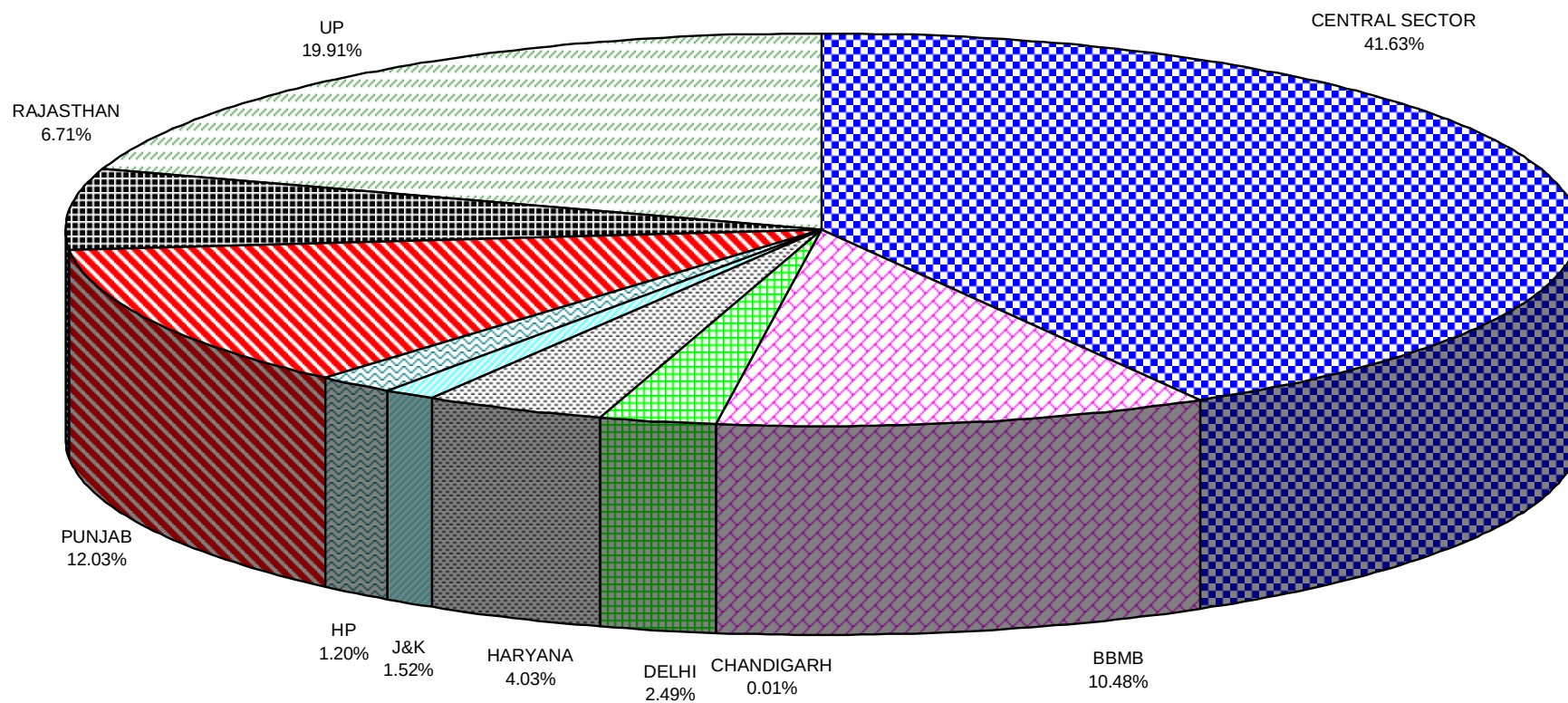
GRAPHS

BREAK UP OF EFFECTIVE GENERATING CAPACITY (SOURCE WISE)
AS ON 31st MARCH 2001



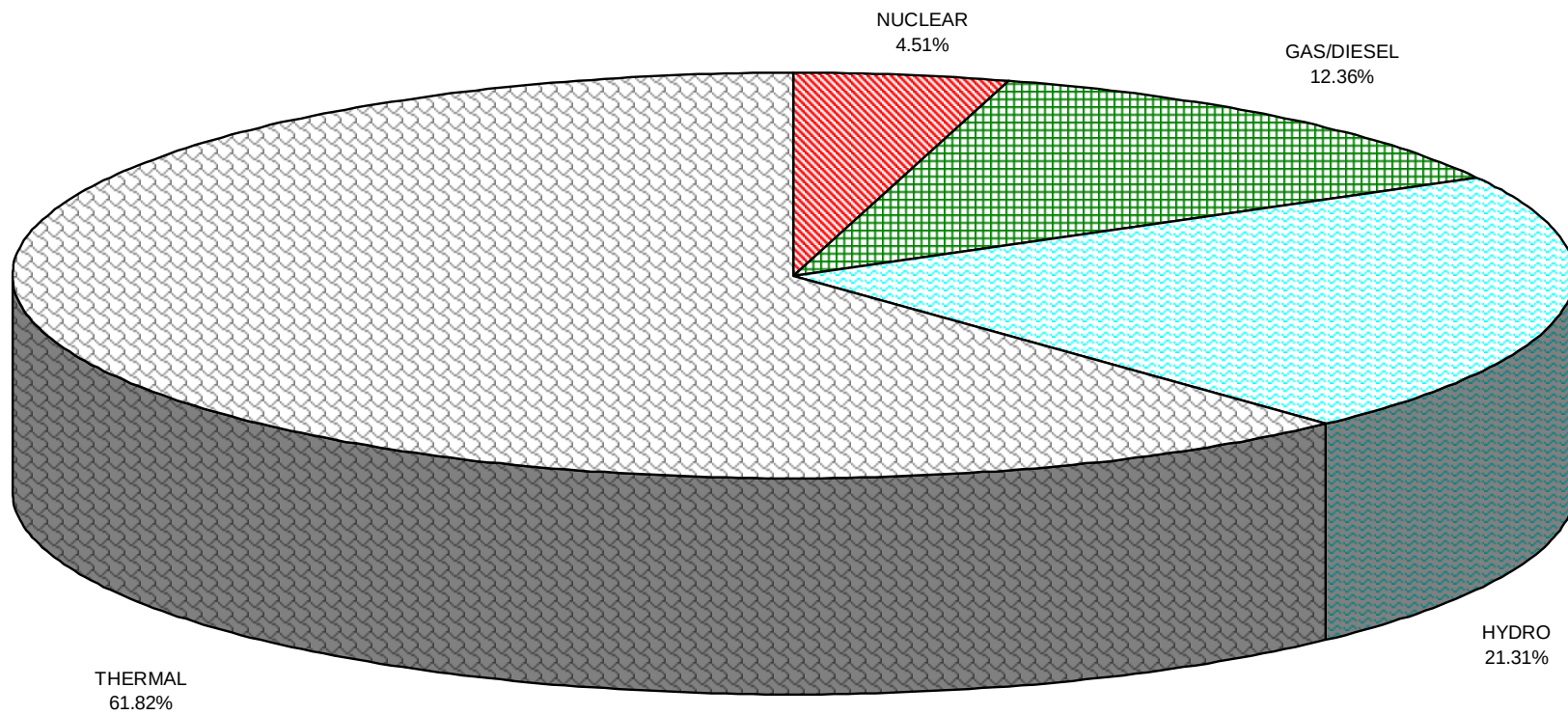
<u>GENERATION SOURCE</u>	<u>EFFECTIVE CAPACITY (MW)</u>
THERMAL	14635.50
HYDRO	8533.72
GAS/DIESEL/WIND	2877.70
NUCLEAR	1180.00
TOTAL REGION	27226.92

BREAKUP OF EFFECTIVE GENERATING CAPACITY (CONSTITUENT WISE) **AS ON 31st MARCH 2001.**



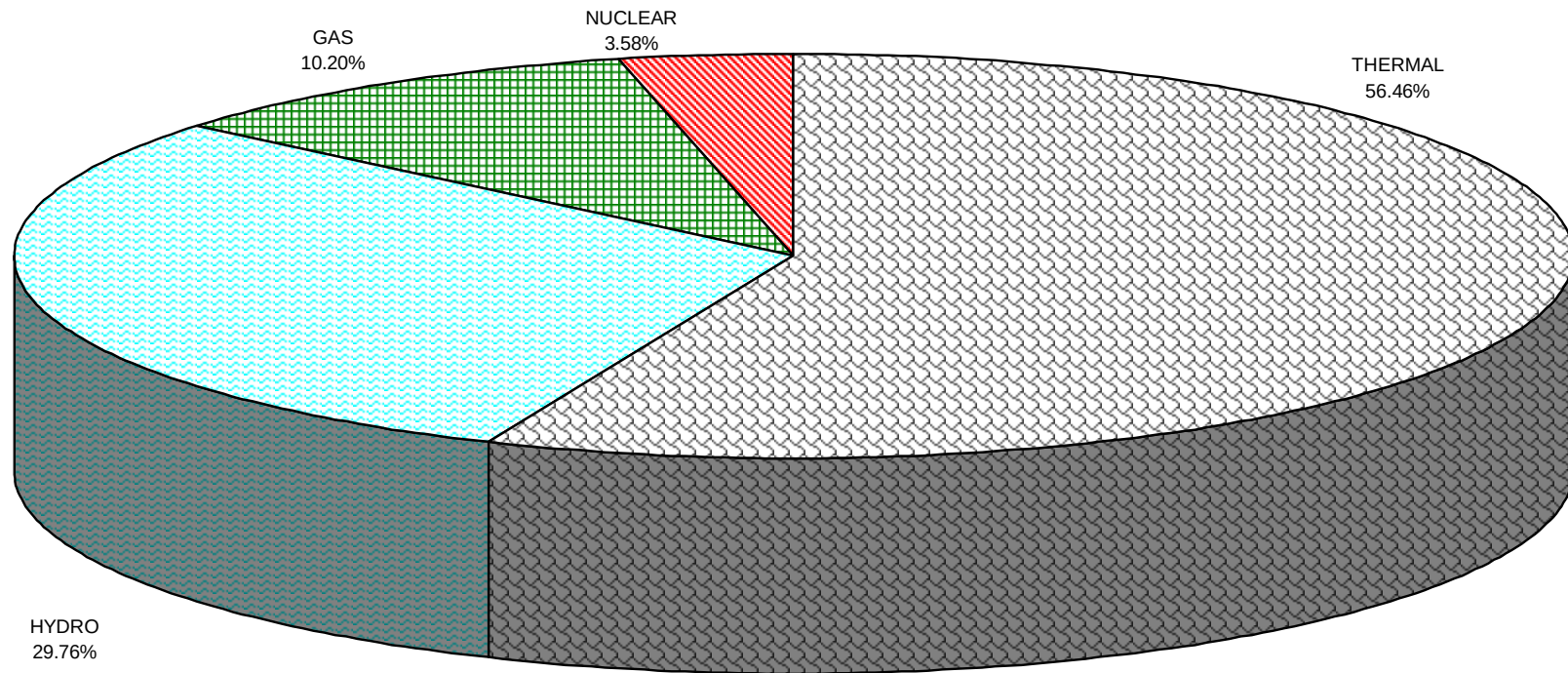
Control Area	CENTRAL SECTOR	BBMB	CHANDIGARH	DELHI	HARYANA	HP	J&K	PUNJAB	RAJASTHAN	UP	Total
Capacity	11333.24	2852.15	1.40	678.50	1098.20	326.10	414.87	3275.10	1827.61	5419.75	27226.92

SOURCE WISE CONTRIBUTION TO NET REGIONAL ENERGY DURING 2000-01



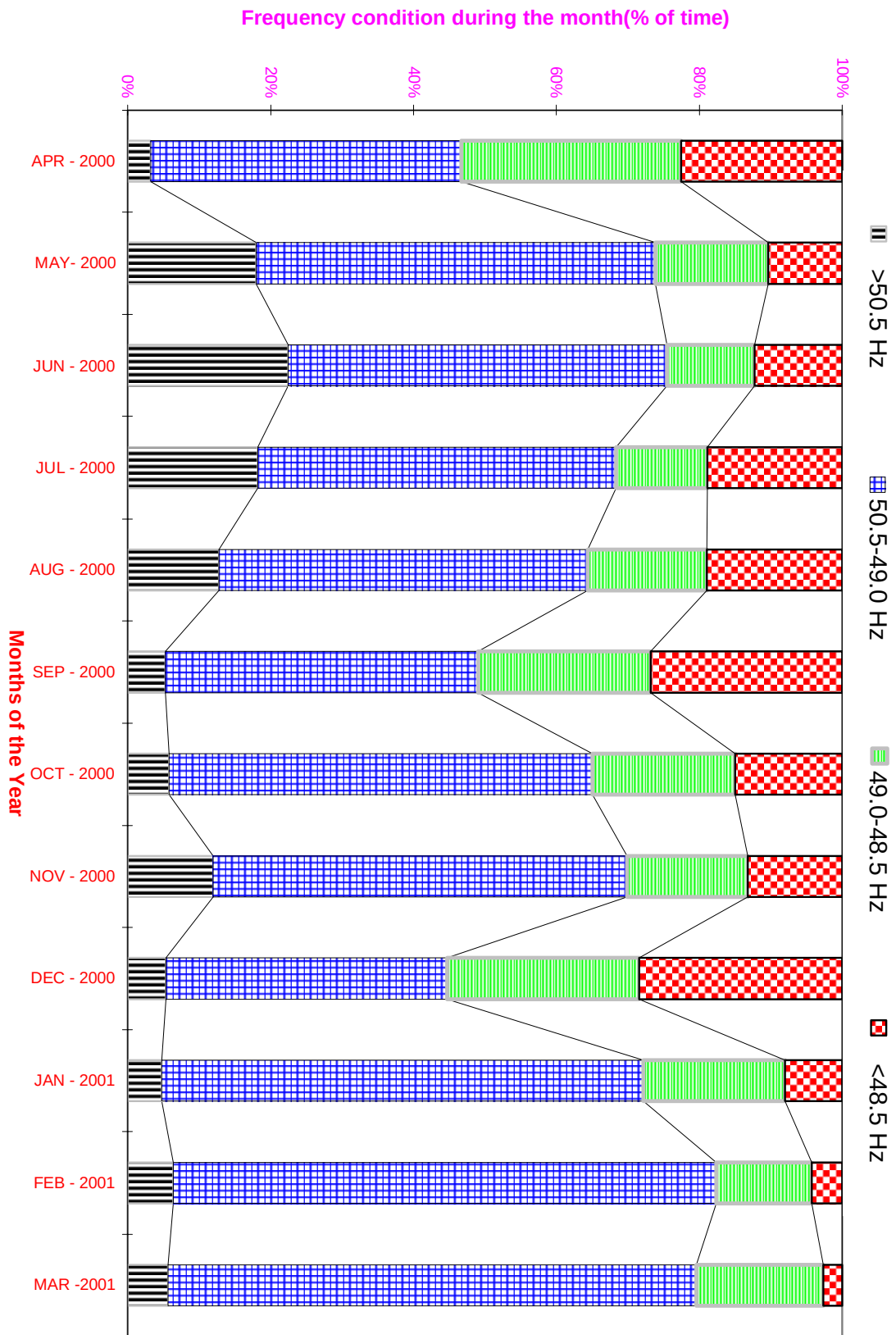
SOURCE	NUCLEAR	GAS/DIESEL	HYDRO	THERMAL	TOTAL REGIONAL
NET ENERGY (MU)	6061.47	16624.93	28664.86	83141.45	134492.72

**SOURCE WISE CONTRIBUTION TO REGION'S PEAK MET DURING
2000-01**

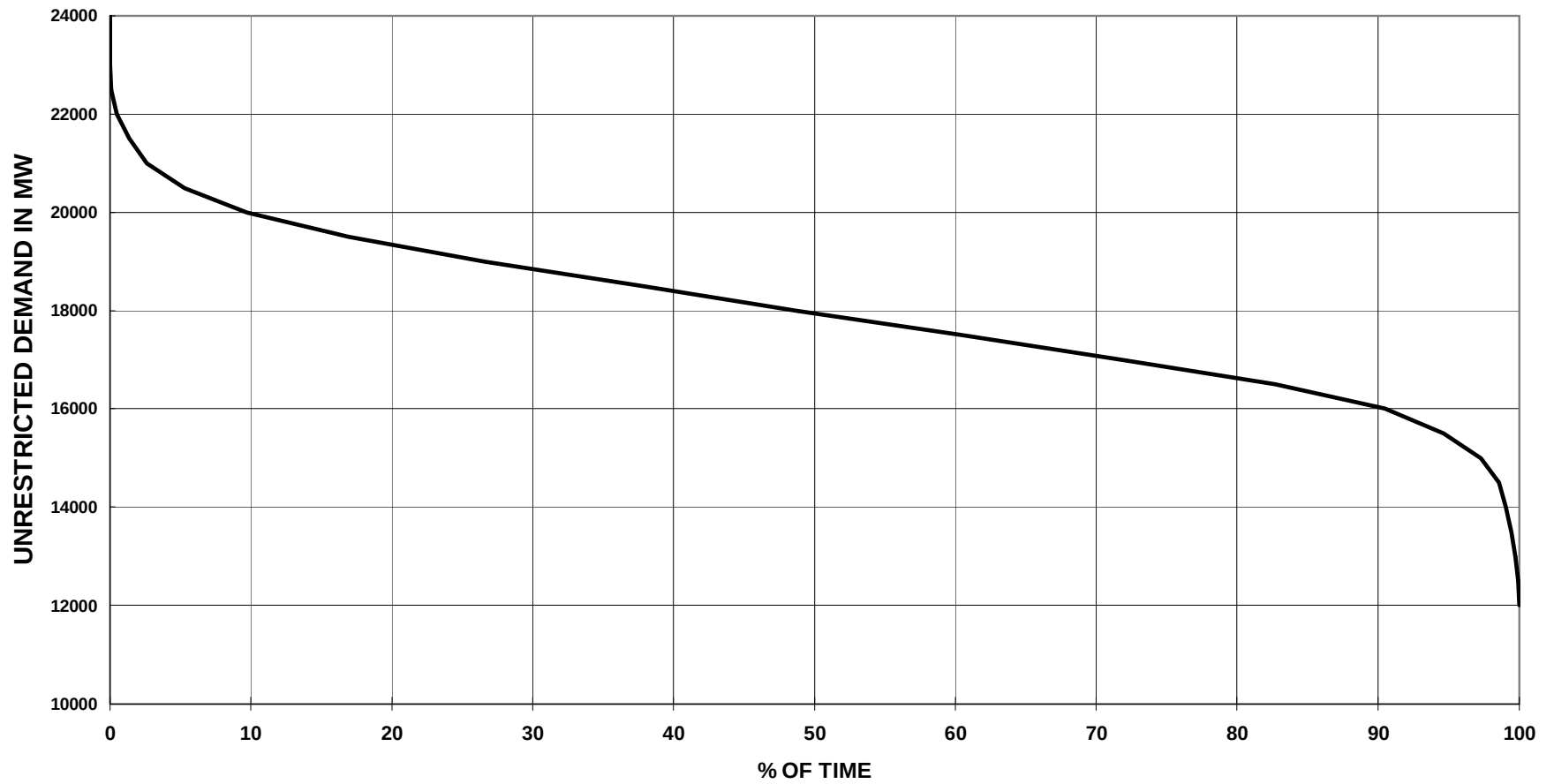


SOURCE	CONTRIBUTION (MW)
THERMAL	11016
HYDRO	5806
GAS	1990
NUCLEAR	698
TOTAL GENERATI	19510
LESS EXPORT	-350
ADD IMPORT	0
REGIONAL PEAK	19860

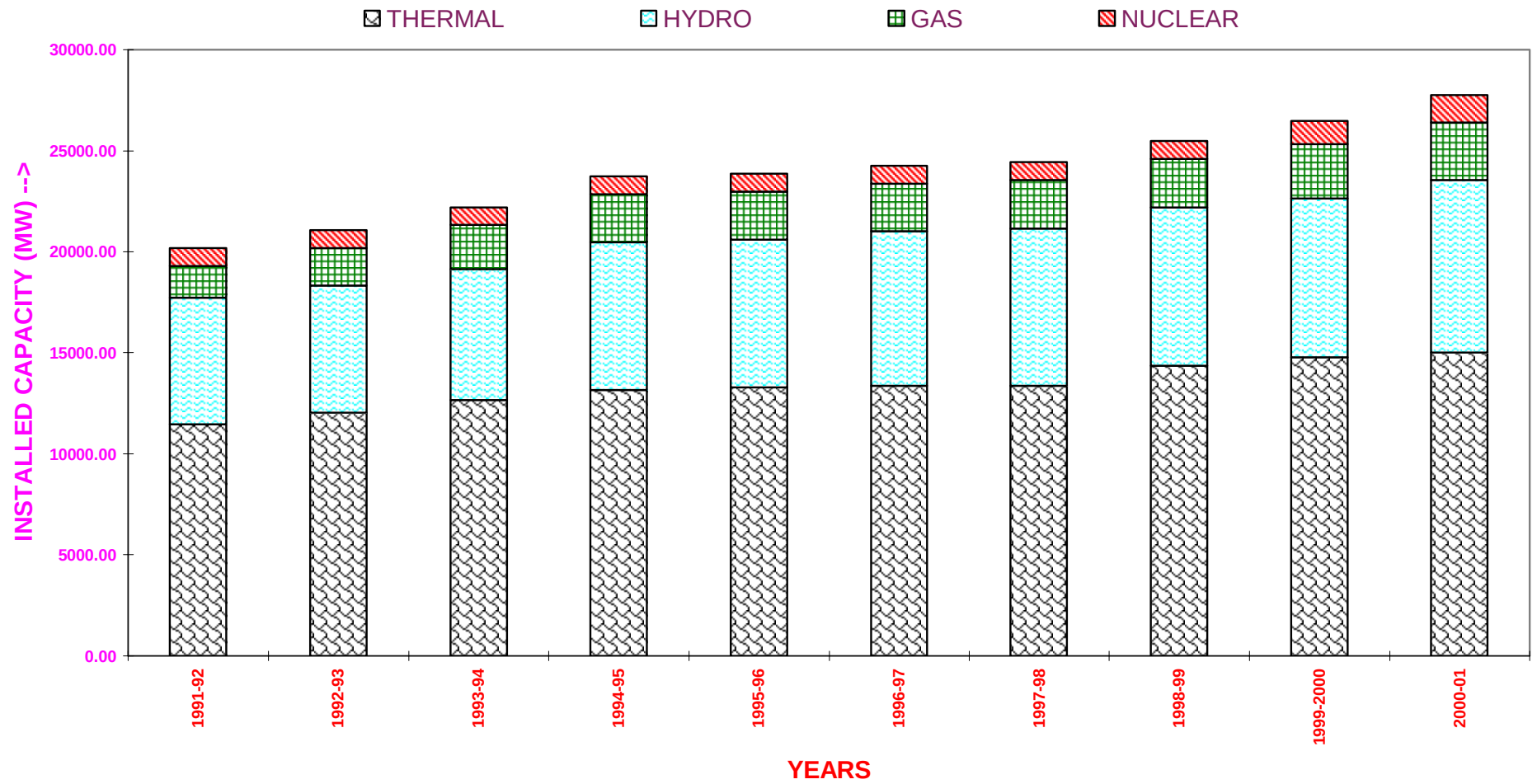
FREQUENCY SPECTRUM OF NORTHERN REGION DURING 2000-01



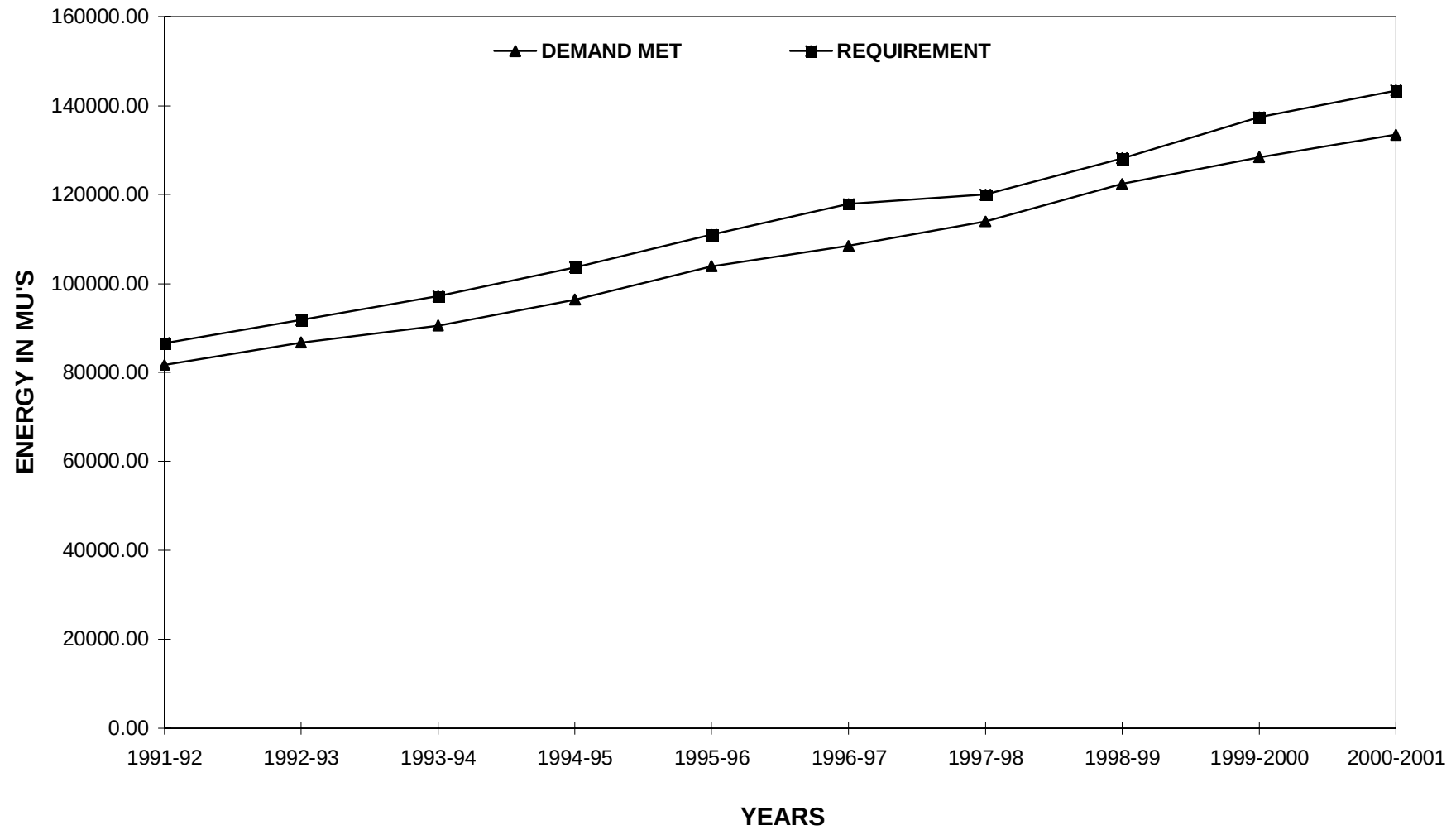
LOAD DURATION CURVE OF THE NORTHERN REGION DURING 2000-2001



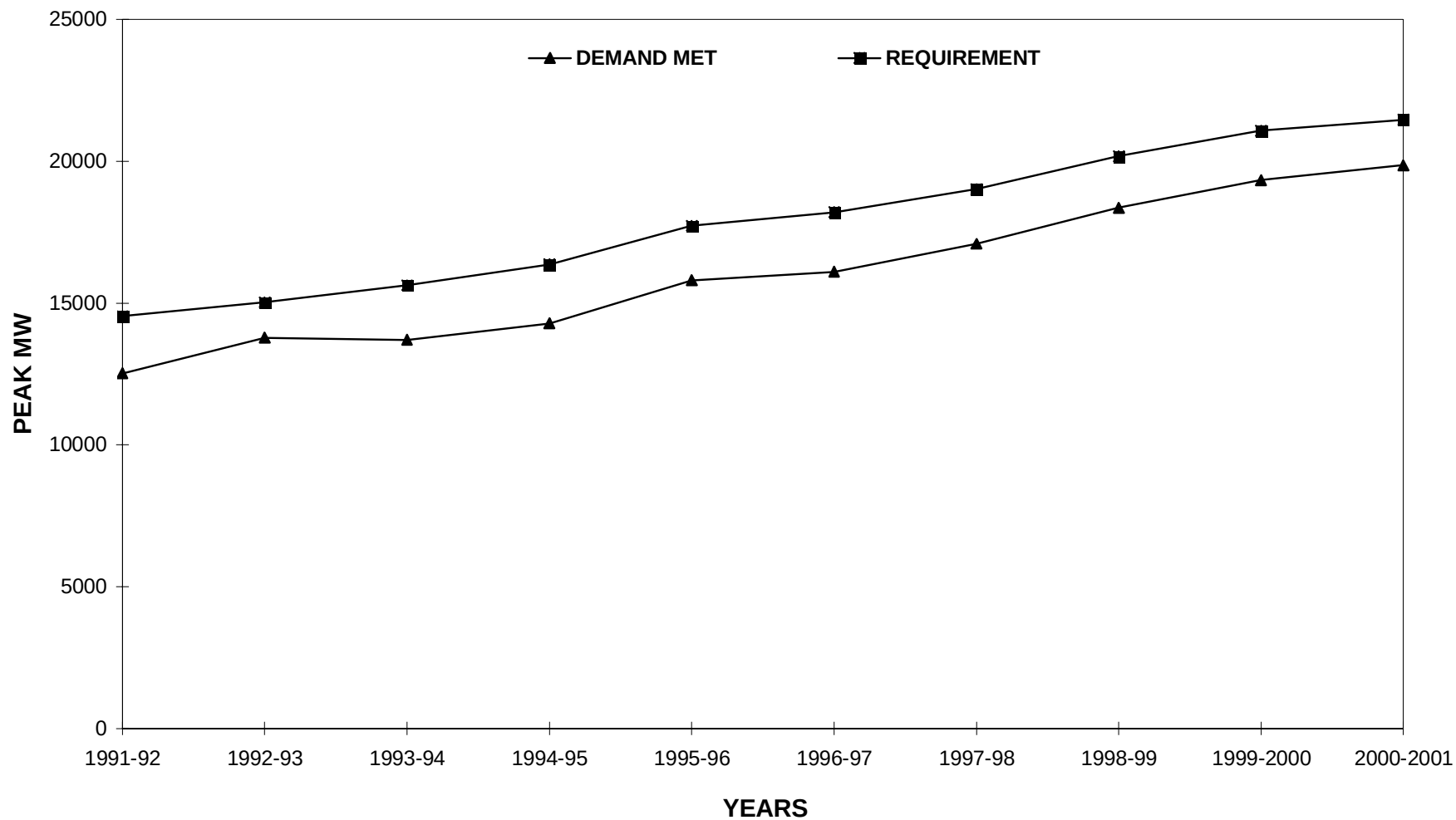
GROWTH OF INSTALLED GENERATING CAPACITY IN NORTHERN REGION



DEMAND MET VS REQUIREMENT IN ENERGY DURING PAST DECADE

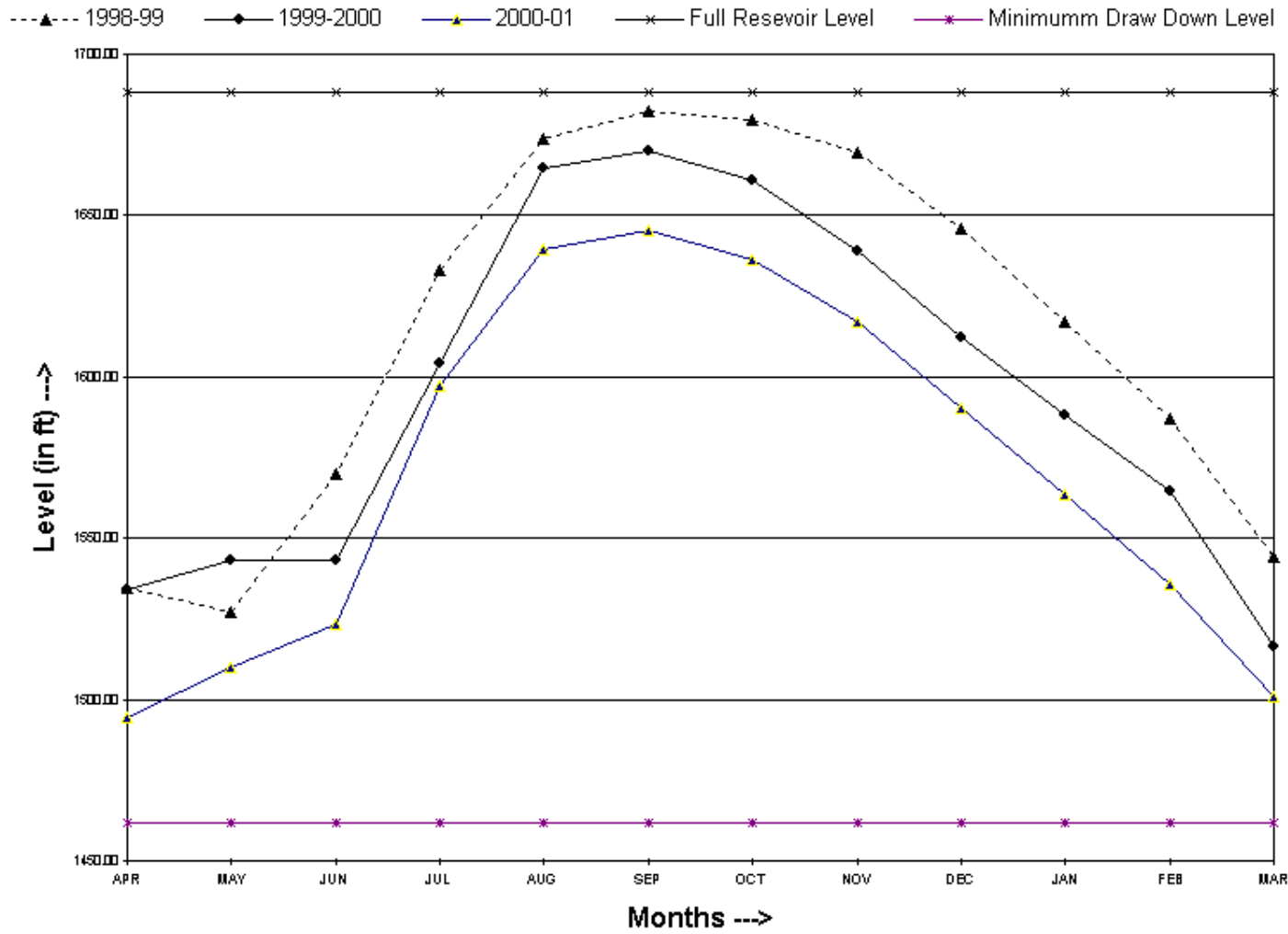


DEMAND MET VS REQUIREMENT IN PEAK MW IN NORTHERN REGION DURING PAST DECADE



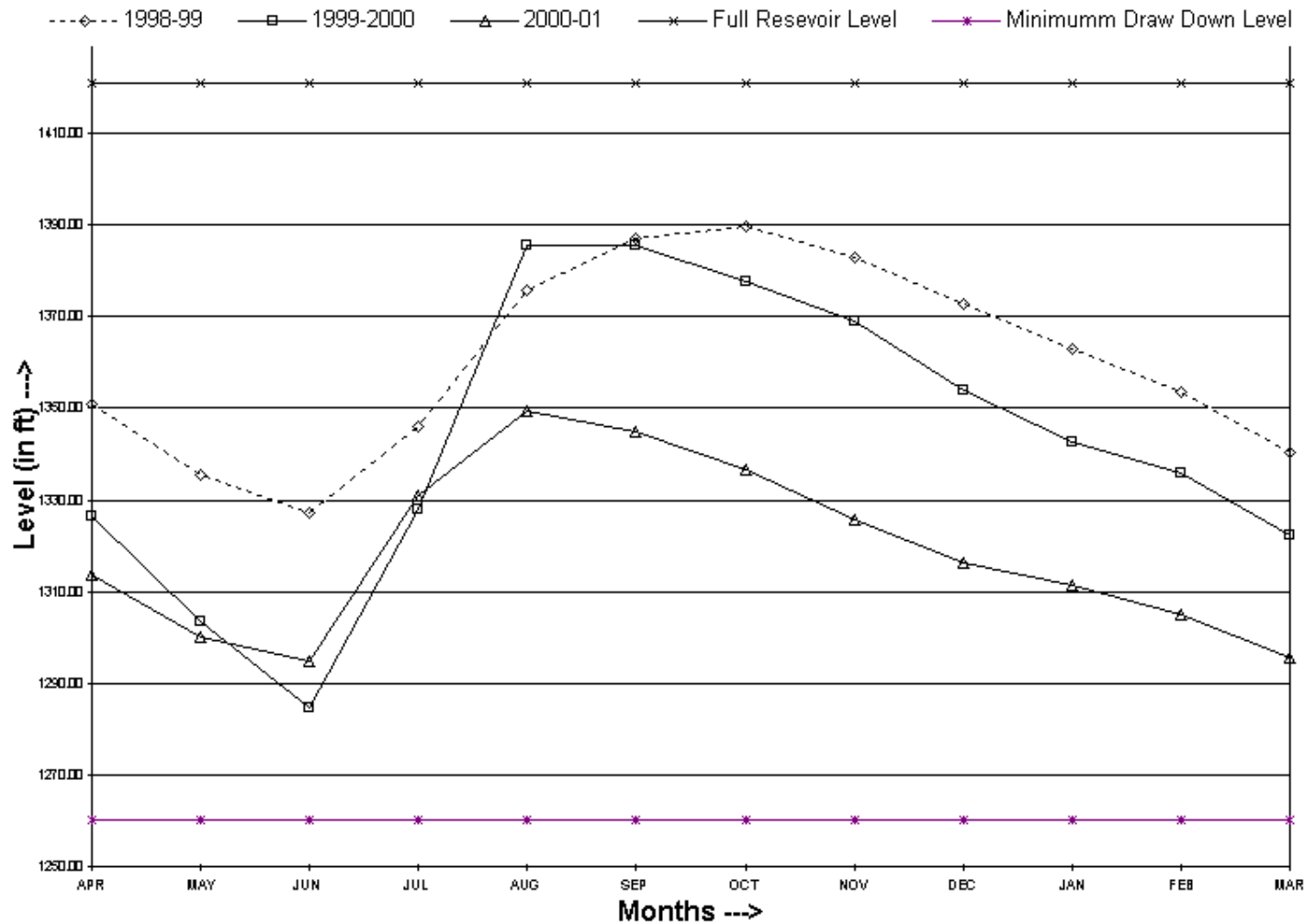
GRAPH-G10

Levels recorded at Bhakra reservoir during 1998-99,1999-2000 and 2000-01



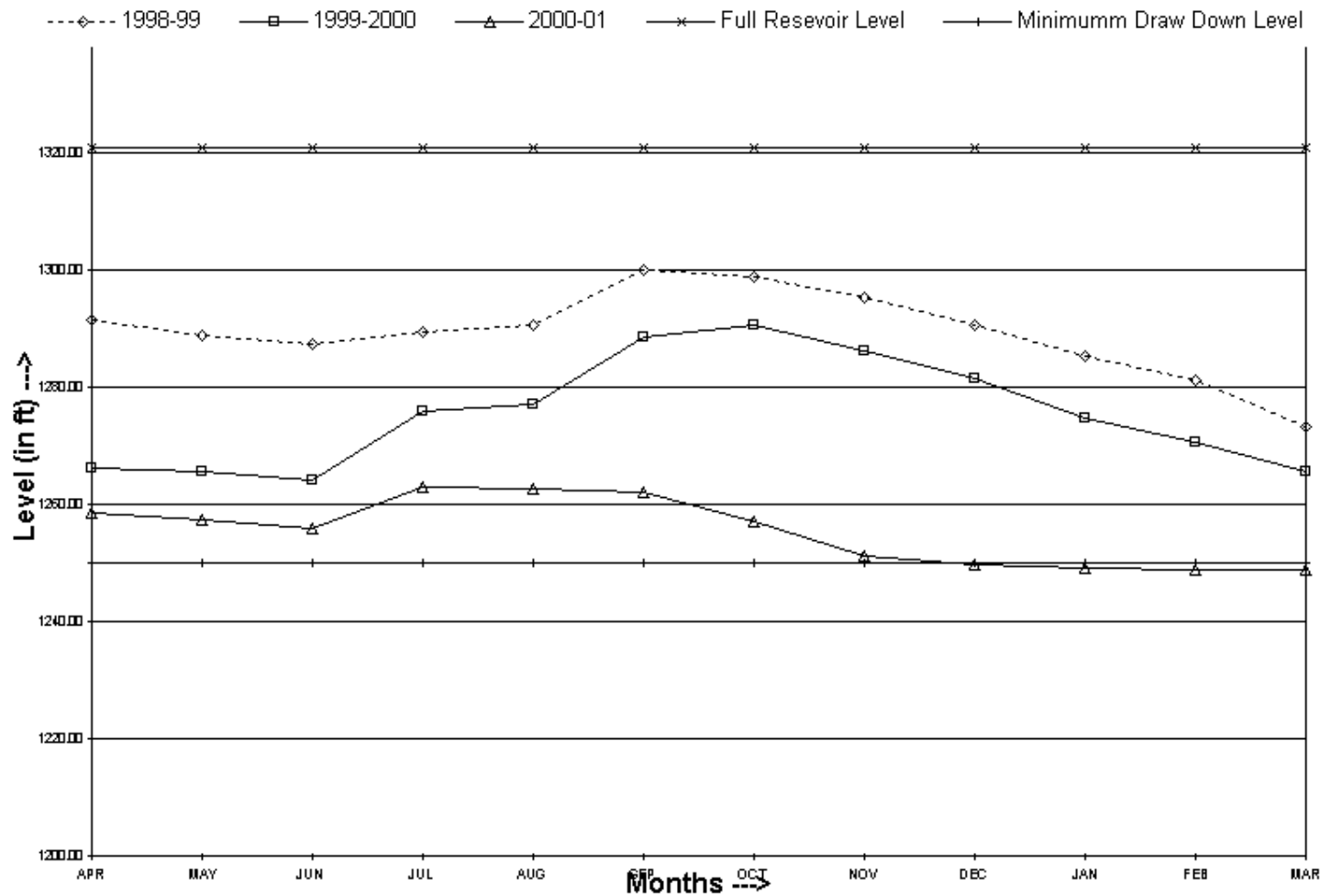
GRAPH-G11

Levels recorded at Pong reservoir during 1998-99,1999-2000 and 2000-01



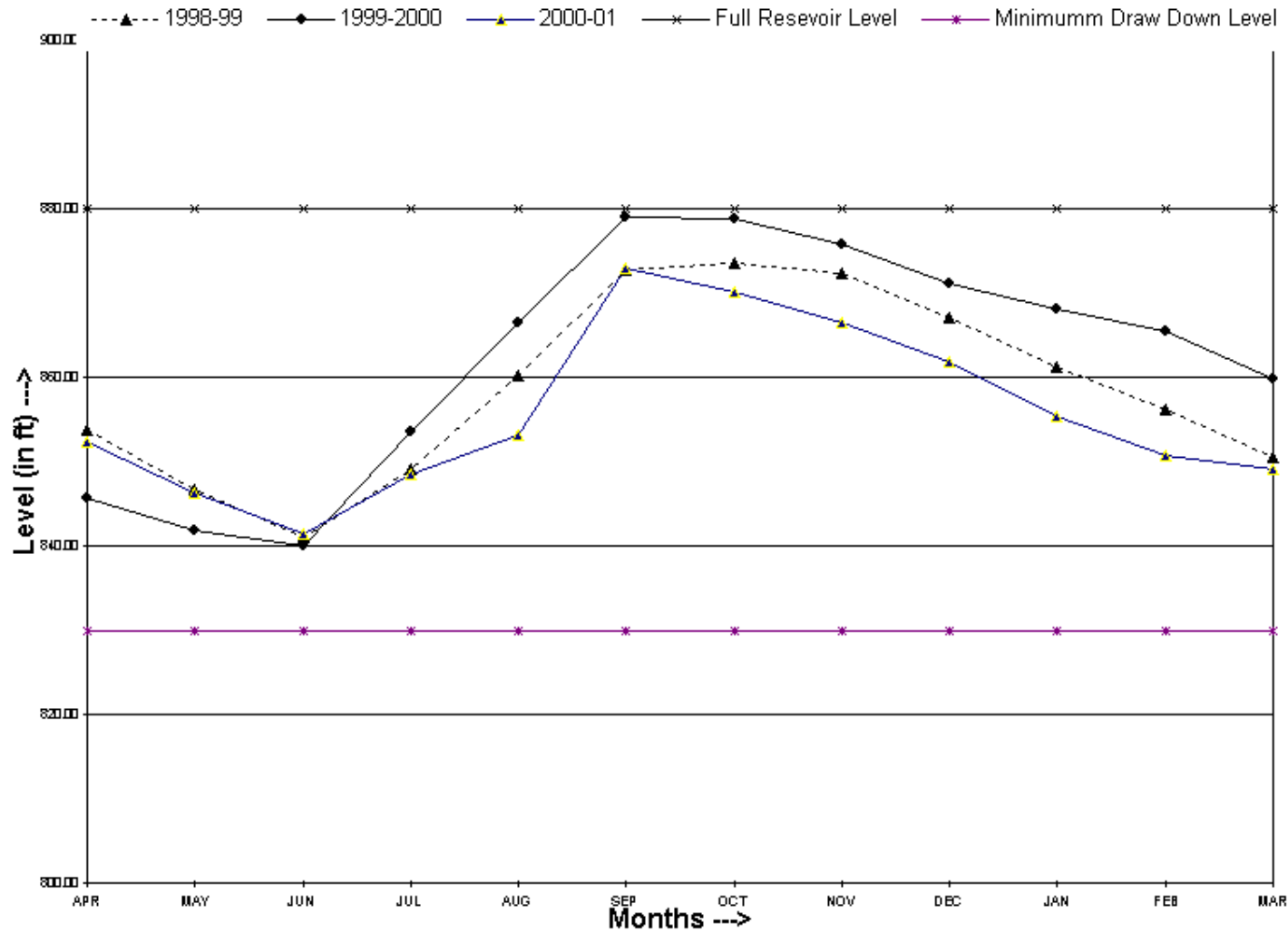
GRAPH-G12

Levels recorded at Gandhi Sagar reservoir during 1998-99,1999-2000 and 2000-01



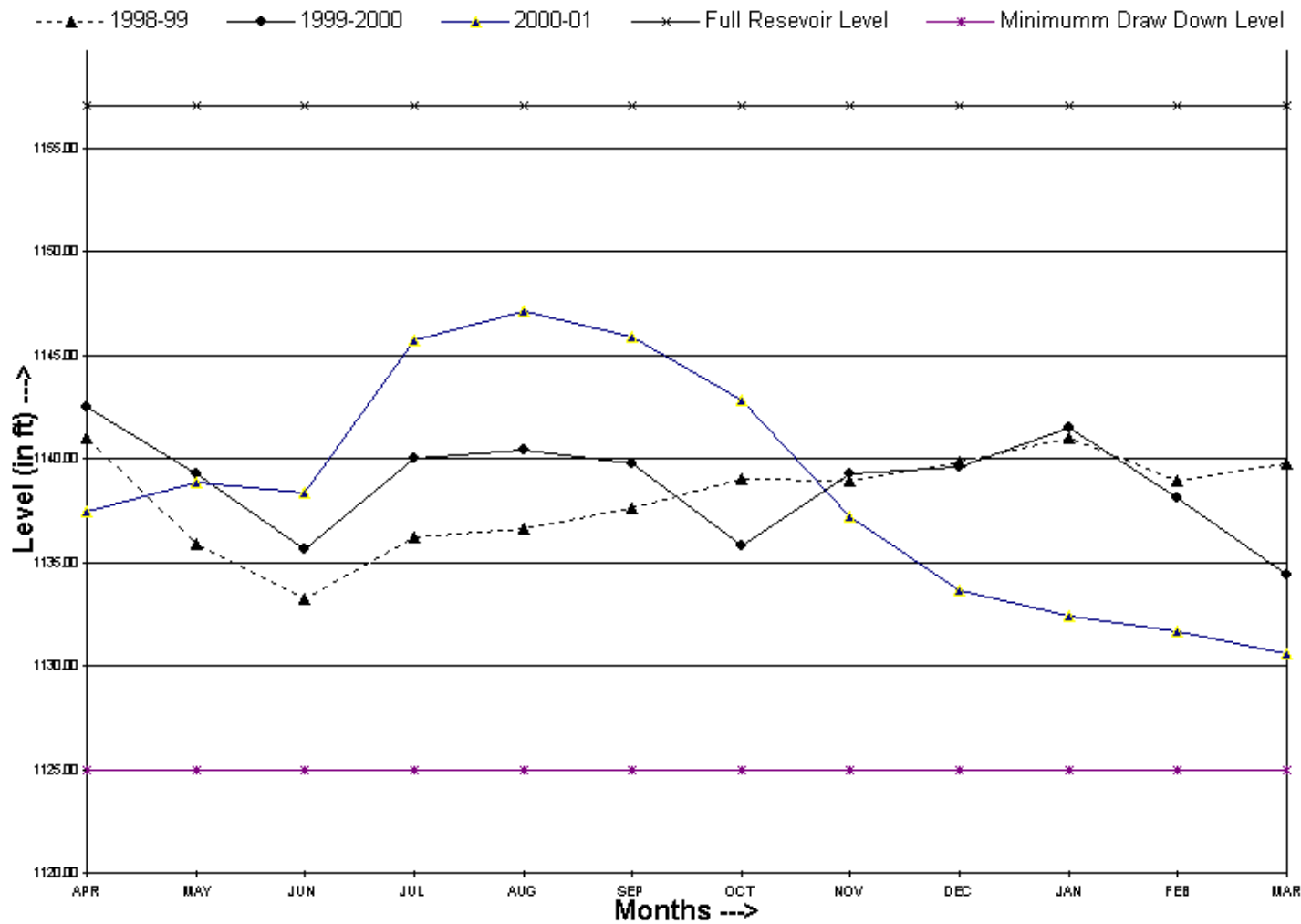
GRAPH-G13

Levels recorded at Rihand reservoir during 1998-99,1999-2000 and 2000-01



GRAPH-G14

Levels recorded at Rana Pratap Sagar during 1998-99,1999-2000 and 2000-01



ANNEXURES

GRID INCIDENT ON 14thAPRIL, 2000 **(NR/2000-2001/APR/01)**

- (i) Time of occurrence : 0820 hrs
- (ii) Area affected : Delhi
- (iii) Antecedent system conditions :
- | | |
|---------------------------------|----------------------|
| System frequency | 49.52 Hz. |
| 400 kV Dadri voltage | 404 kV |
| 220 kV BTPS voltage | 204 kV |
| IP generation (unit #3,4&5) | 135 MW |
| Rajghat generation (unit #2) | 65 MW |
| Delhi GT generation(#1,2&6) | 70 MW |
| BTPS generation (unit #1,3,4&5) | 520 MW |
| 220 kV BTPS – Alwar | under open condition |
| 220 kV Ballabhgarh–BTPS D/C | 220 MW. |
| 220 KV BTPS – Mehrauli D/C | 340 MW |
| 220 kV BTPS – Okhla D/C | 200 MW |
| 220 kV BTPS – IPext D/C | 200 MW |
- (iv) Incident : A flash over between corona ring and compressed air cylinder at the base of R-ph circuit breaker of unit # 3 caused the operation of bus differential protection of bus –1 at BTPS and resulted in tripping of all the feeders connected to it (circuit –1 of all lines and odd number units). Subsequently, circuit –2 of 220 kV BTPS – Ballabhgarh and BTPS – IPext tripped from Ballabhgarh and IPext end respectively on over current followed by complete blackout at BTPS. 220 kV IP – IPext D/C also tripped and resulted in tripping of all the Delhi GTs.
- (v) Restoration : Power supply was extended to BTPS at 0848 hrs from Ballabhgarh. By 1000 hrs all the circuits were normalised and BTPS unit #1, 5 & 4 were synchronised at 1240, 1310 & 1515 hrs respectively.
- (vi) Observation : The over current relay setting on the 220 kV Delhi ring main system needs a thorough review with the development in the Network. Suitable load throw off schemes at 66 kV Level at 220 kV substations are required to avert cascade tripping in the 220 kV Delhi ring main system.

GRID INCIDENT ON 12th MAY, 2000
(NR/2000-2001/MAY/02)

- (i) Time of occurrence : 2125 hrs
- (ii) Area affected : Punjab
- (iii) Antecedent system conditions : Stormy & rainy Weather conditions
System frequency 51.00 Hz.
220 kV Dehar – Ganguwal under shutdown.
Ropar generation (unit #1,2,4,5&6) 930 MW
GNDTP generation (unit #2,3&4) 275 MW
Lehra Mohabbat generation(#1&2) 320 MW
Several 400 /220 kV lines in Punjab/ BBMB area under outage condition due to storm (Namely 400 kV Moga – Hissar D/C, 220 kV Panipat – Dhulkote etc.)
- (iv) Incident : Tripping of all 220 kV circuits emanating from Lehra Mohabbat & GNDTP due to storm caused the tripping of units at these power stations on want of evacuation. Units # 1, 4, 5 &6 at Ropar are reported to have tripped on high frequency after separation of Pong, Bhakra with part of Punjab due to tripping of 220 kV Sangrur – Hissar D/C & 220 kV Jagadhari – Kurukhetra on over loading. Unit # 2 at Ropar tripped afterward on low frequency. Generation at all running hydro units of Punjab (439 MW), Chamra (450 MW) and Uri (230 MW) was also lost during the incident.
- (v) Restoration : The two systems were synchronised at Ganguwal by extending power supply on Panipat – Jagadhari – Ganguwal at 2305 hrs. First unit at GNDTP was synchronised at 2250 hrs and other units were synchronised subsequently.
- (vi) Observation : The free governor mode operation on all units can facilitate in avoiding tripping of units on high frequency.

GRID INCIDENT ON 27th MAY, 2000
(NR/2000-2001/MAY/03)

- (i)

Time of occurrence

:

1932 hrs
- (ii)

Area affected

:

Part of Punjab
- (iii)

Antecedent system conditions

:

Stormy & rainy Weather conditions

System frequency50.74 Hz.

RTP generation (unit #1,2,3,4,5&6)1255 MW

GNDTP generation (unit #2,3&4)295 MW

Lehra Mohabbat generation(#1&2)420 MW

220 kV RTP – Laltokalan circuit under shutdown
- (iv)

Incident

:

220 kV RTP – Govindgarh D/C tripped on earth fault along with 220 kV Govindgarh I – Govindgarh II D/C. Tripping of the above circuits resulted in tripping of other circuits emanating from RTP one after another on over load. 220 kV Malerkotla – Govindgarh was also tripped on overloading. On want of evacuation from RTP, all running units at station tripped on high frequency. Hydro units at Kotla power station of BBMB were also tripped during the incident.
- (v)

Restoration

:

First unit (unit # 6) at RTP was synchronised at 2240 hrs and other units were synchronised by 0555 hrs of 28th May 2000.
- (vi)

Observation

:

The free governor mode operation on all units can facilitate in avoiding tripping of units on high frequency.

GRID INCIDENT ON 30-31st MAY, 2000
(NR/2000-2001/MAY/04)

- (i) Time of occurrence : 2145 hrs, 2249 hrs, 2330 hrs & 0031 hrs of 31st May 2000
- (ii) Area affected : J&K and Punjab
- (iii) Antecedent system conditions : Stormy & rainy Weather
System frequency 49.96 Hz.
220 kV Dehar – Ganguwal under shutdown.
400 kV Dadri voltage 358 kV
400 kV Moga voltage 355 kV
220 kV BTPS voltage 173 kV
Regional Availability 18700 MW
220 kV RTP – Govindgarh D/C circuit under shutdown
- (iv) Incident : The high velocity winds caused tripping of all four circuits of 220 kV Sarna – Batala due tower collapse. After the above incidence, the tripping occurred in J&K and Punjab system as per details given below:

Time	Incident	Restoration
2145 hrs	400 kV Uri – Wagoora D/C alongwith units at Uri tripped. Kishenpur experienced Low voltage conditions and Unit #2 & 3 at Chamera tripped along with 400 kV Chamera – Kishenpur and 400 kV Chamera – Moga II. Due to above tripping J&K system separated & collapsed. Four units at Pong and unit # 2 at BTPS also tripped during the incident.	400 kV Chamera – Moga circuit was normalised at 2205 hrs. Chamera, Uri, Pong & BTPS units were normalised at 2215, 2204, 2158 & 2156 hrs respectively.
2249 hrs	All units of Chamera along with 400 kV Chamera – Kishenpur & 400 kV Chamera – Moga II tripped. Uri units along with 400 kV Uri – Wagoora D/C tripped.	400 kV Uri – Wagoora circuits were normalised by 2258 hrs and subsequently units at Uri & Chamera.
2321 hrs	All units of Uri and unit #2 & 3 of Chamera tripped.	Salal units were normalised by 0300 hrs. Uri units were normalised by 0525 hrs of 31 st May 2000.
2330	J&K system collapsed with tripping of all units at Salal.	
0031 hrs of 31 st May 2000	220 kV RTP – Sanehwal – Laltokalan I & II, 220 RTP – Goraya – Jamsher & 220 kV RTP –Jamsher reportedly tripped due to storm. 220 kV RTP – Mohali circuits tripped on overload resuling in tripping of all the units at RTP	First unit (unit # 2) of RTP was synchronised at o155 hrs of 31 st May 2000 and other units were synchronised subsequently.

GRID INCIDENT ON 4th JUNE, 2000
(NR/2000-2001/JUN/05)

- (i)

Time of occurrence

:

0840 hrs
- (ii)

Area affected

:

J&K, Punjab
- (iii)

Antecedent system conditions

:

System frequency51.20 Hz

400 kV Dadri Voltage392 kV

400 kV Kanpur Voltage392 kV

220 kV BTPS Voltage392 kV

Regional generation16200 MW

Stormy & rainy weather conditions, which caused tripping of a number of circuits & heavy load crash in Punjab system.
- (iv)

Incident

:

Due to tripping of number of 220 kV circuits in Punjab system, the system was in a depleted condition. Punjab, J&K & part of BBMB system separated out from rest of grid with the tripping of following circuits:

400/220 kV, 250 MVA ICT at Dehar

220 kV Ganguwal – Dhulkote D/C

220 kV Sangrur - Hissar D/C

220 kV Jagadhari - Kurukshetra S/C

The following circuits and units also tripped during the incident

400 kV Chamera – Kishenpur S/C

400 kV Chamera – Moga D/C

400 kV Uri – Wagoora D/C

All 4 running units at Uri (350 MW), Chamera 1 unit (90 MW), Ropar 5 units (840 MW), L. Mohabbat 1 unit (160 MW) & GNDTP one unit (85 MW).

Both the sub-systems so formed survived.
- (v)

Restoration

:

The two islands were synchronised at Dehar at 1008 hrs. Tripped units and other units were normalised subsequently.

GRID INCIDENT ON 17th JULY, 2000
(NR/2000-2001/JUL/06)

- (i)

Time of occurrence

:

1802 hrs
- (ii)

Area affected

:

NIL
- (iii)

Antecedent system conditions

:

System frequency50.04 Hz

400 kV Ballabhgarh Voltage405 kV

400/220 kV ICTs at Ballabhgarh450 MW

220 kV Ballabhgarh – BTPS D/C290 MW
- (iv)

Incident

:

400/220 kV ICT –2 at Ballabhgarh tripped due to bursting of 220 kV side B-ph LA on lightning. 440/220 kV ICT –1 & ICT –3 tripped on backup over current protection operation. This blast resulted in a fire and 220 kV side bushing of ICT –2 got damaged. Following 400 kV circuits were manually tripped at 1817 hrs as a precautionary measure (to avoid damage to other elements):

400 kV Ballabhgarh – Dadri D/C

400 kV Ballabhgarh – Kanpur S/C

400 kV Ballabhgarh – Agra S/C

400 kV Ballabhgarh – Bassi S/C

All 220 kV circuits from Samaypur (Ballabhgarh) were also manually tripped.
- (v)

Restoration

:

Following are the synchronisation time at Ballabhgarh:

400 kV Ballabhgarh – Dadri D/C21.10 hrs

400 kV Ballabhgarh – Kanpur S/C20.28 hrs

400 kV Ballabhgarh – Agra S/C20.20 hrs

400 kV Ballabhgarh – Bassi S/C20.22 hrs

400/220 kV ICT – 322.28 hrs

400/220 kV ICT – 122.30 hrs

ICT –2 is under replacement.

GRID INCIDENT ON 28th JULY, 2000
(NR/2000-2001/JUL/07)

- (i)

Time of occurrence

:

0245 hrs
- (ii)

Area affected

:

Whole region (Total blackout in Kashmir valley & Southern Rajasthan)
- (iii)

Antecedent system conditions

:

System frequency48.80 Hz

400 kV Dadri Voltage392 kV

400 kV Kanpur Voltage408 kV

220 kV BTPS Voltage194 kV

220 kV Salal Voltage194 kV

Regional availability17029 MW

220 kV BTPS – Alwar was kept out & 220 kV Salal – Jammu D/C was out since 0205 hrs.
- (iv)

Incident

:

The Y-phase wave trap jumper of 220 kV Kishenpur-Sarna-I snapped at Kishenpur and its hanging near B-phase of 220 kV busbar-I, got translated to a bus fault resulting in operation of busbar protection which caused tripping of all elements connected to 220 kV bus-I at Kishenpur. At about the same time, the 220 kV Salal-Kishenpur – II & IV (on bus –2 at Kishenpur) also tripped on account of the entire output from Salal being evacuated on these two 220 kV lines, resulting in the loss of Salal power station (generation 680 MW). At Pampore sub-station, 220 kV Kishenpur-Pampore – II (circuit – I already out after operation of busbar protection) is reported to have tripped on over-current resulting in isolation of the Kashmir valley power system. 400 kV Uri-Wagoora D/C line tripped around the same time on over-voltage protection operation at Uri end. These events resulted in a complete blackout in Kashmir valley power system.

In rest of the Northern grid, due to loss of approximately 1080 MW the frequency declined from 48.80 Hz to 47.80 Hz and following lines tripped on underfrequency relay operation and east –west separation as per the islanding scheme for the region: 400 kV Dadri-Muradnagar, 220 kV Auraiya-Agra D/C, 400 kV Kanpur-Agra, 400 kV Kanpur-Ballabgarh & 220 kV Agra-Bharatpur. The Southern Rajasthan system also separated from rest of the grid. However, UP system remained tied to the Delhi-BBMB-Northern Rajasthan system asynchronously over the Rihand-Dadri HVDC bipole (power order 600 MW). In Southern Rajasthan system, the frequency declined sharply after its separation from rest of the grid. Anta GPS units came on house load while all the running

units at Kota, RAPS-B and hydro units tripped due to low frequency/low voltage. Narora APS survived within the Uttar Pradesh system. In the Delhi-BBMB-Northern Rajasthan system the frequency remained around 48.20 Hz after separation. There was no loss of generation barring the Delhi GT station coming on house load.

- (v) Restoration : The Uttar Pradesh and the Delhi-BBMB-Northern Rajasthan system were synchronized at 0334 hours at Dadri over 400 kV Dadri-Muradnagar line. Startup supply extended from Khetri to KTPS (at 0312 hrs) to Kota GSS (at 0320 hours) to Anta (at 0351 hours). The units at Anta were progressively synchronized starting from 0351 hours. In Kashmir valley, power was extended from Kishenpur to Pampore to Wagoora 220 kV at 0340 hours. It was then extended to Uri over 400 kV Wagoora-Uri – I line at 0424 hours and the units at Uri synchronized to the grid progressively.
- (vi) Observation : The protective relay setting on 220 kV salal-Jammu-Hiranagar-Sarna section have to be properly coordinated and checked. The settings of the df/dt relay relays for load shedding and relays for islanding in the system needs to be thoroughly reviewed as proper operation of these relays could have avoided the severity of the incident. Units should be operated with free governor operation as recommended.

GRID INCIDENT ON 15th AUGUST, 2000
(NR/2000-2001/AUG/08)

- (i) Time of occurrence : 1928 hrs
- (ii) Area affected : NIL
- (iii) Antecedent system conditions : System frequency 49.92 Hz
400 kV Dadri Voltage 402 kV
220 kV BTPS Voltage 188 kV
400 kV Dadri – Mandola D/C 1405 MW
400 kV Mandola - Bawana D/C 815 MW
400/220 kV ICTs at Ballabhgarh 440 MW.
400/220 kV ICT –2 at Ballabhgarh under forced outage since 1802 hrs of 17th July 2000. 220 kV Panipat – Narela T/C was kept off by DVB & the 220 kV Delhi ring main system kept open at Narela.
- (iv) Incident : 400 kV Dadri – Mandola II tripped on operation of distance protection due to bursting of B-phase tie breaker CT of the diameter having above circuit at Mandola. At the same time 400 kV Dadri – Mandola I (circuit in different diameter) also tripped from Mandola end on mal-operation. As these circuits are an important trunk element for power supply to Delhi and part of Haryana, tripping of the same, led to severe change in power flows in and around Delhi. Consequently 400/220 kV ICTs at Ballabhgarh tripped on over-current. However there was no adverse effect on rest of the system & entire system remained integrated & survived.
- (v) Restoration : Attempts were made to restore 400 kV Dadri – Mandola circuits but the same did not materialise due to reported large difference in power angle at both ends. 400/220 kV ICT -1 and ICT –3 at Ballabhgarh (Samaypur) were charged radially (after opening 220 kV Samaypur – Dadri and 220 kV Samaypur – Ballabhgarh circuits) at 2352 and 2350 hrs respectively. 400 kV Dadri – Mandola I & II were finally restored at 0035 & 0034 hrs of 16th August 2000 respectively.
- (vi) Observation : Tripping of 400 kV Dadri – Mandola I, due to a mal-operation at Mandola requires investigation. The 400 kV Delhi ring main system is required to be completed at the earliest. (400 kV Bawana – Bamnauli – Ballabhgarh D/C section remaining still incomplete)

GRID INCIDENT ON 17th NOVEMBER, 2000
(NR/2000-2001/NOV/09)

- (i) Time of occurrence : 2122 hrs
- (ii) Area affected : Western UP
- (iii) Antecedent system conditions : System frequency 48.48 Hz
400 kV Dadri Voltage 403 kV
400 kV Dadri –Muradanagar 331 MW
400/220 kV Muradnagar ICT –1 (240 MVA) under shutdown.
- (iv) Incident : 400/220 kV ICT –2 (315 MVA) at Muradnagar tripped due to burning of R-ph jumper followed by tripping of 400/220 kV ICT –3 (240 MVA) on overcurrent. 400/220 kV ICT (315 MVA) at Agra (UPPCL) also tripped on overcurrent after tripping of transformer at Muradnagar. These trippings resulted in load throw off in UP system. Frequency of the system shot up to 51.30 Hz but voltages in western UP dipped to very low level. However no other trippings were reported and other parts of the system remained healthy.
- (v) Restoration : 400/220 kV ICT at Agra (UPPCL) was restored at 2155 hrs. 400/220 kV ICTs at Muradnagar were restored by 0327 hrs of 18.11.2000.
- (vi) Observation : Proper preventive maintenance of lines /substations is of prime importance to avoid such incidents. Suitable load throw off schemes at 220/132 kV level could be designed to take care of cascade trippings.

GRID INCIDENT ON 21st NOVEMBER, 2000
(NR/2000-2001/NOV/10)

- (i) Time of occurrence : 1410 hrs
- (ii) Area affected : UP
- (iii) Antecedent system conditions : System frequency 50.01 Hz
400 kV Kanpur – Panki-I under shutdown for testing.
- (iv) Incident : During testing of 400 kV Panki – Kanpur – I, due to human error at 400 kV Panki (UPPCL), bus bar protection operated and following circuits tripped:
400 kV Panki – Kanpur – II
400 kV Panki – Obra
400 kV Panki – Muradnagar
400 kV Panki – Unnao
400/220 kV ICT –1 (240 MVA) at Panki.
Power flow on other circuits got redistributed and there was no further tripping.
- (v) Restoration : 400 kV Panki – Obra was restored at 1445 hrs. Other circuits were restored by 1458 hrs.
- (vi) Observation : All precautions shall be taken during testing of relays to avoid such type of incidents. Proper analysis could not be carried out in view of non-availability of details of incident from UPPCL.

GRID INCIDENT ON 24th NOVEMBER, 2000
(NR/2000-2001/NOV/11)

- (i) Time of occurrence : 0913 hrs
- (ii) Area affected : Western UP
- (iii) Antecedent system conditions : System frequency 50.05 Hz
400 kV Dadri Voltage 381 kV
400 kV Dadri –Muradanagar 293 MW
400/220 kV Muradnagar ICT –1 (240 MVA) under shutdown.
- (iv) Incident : 400/220 kV ICT –2 (315 MVA) at Muradnagar tripped due to burning of clamp of R-ph isolator followed by tripping of 400/220 kV ICT –3 (240 MVA) on overcurrent. 400/220 kV ICT (315 MVA) at Agra (UPPCL) also tripped on overcurrent after tripping of transformer at Muradnagar. These tripping resulted in load throw off in UP system, frequency of the system shot up to 51.30 Hz but voltages in western UP dipped to very low level. The running unit (unit # 1) at NAPS tripped and poisoned out. However no other trippings were reported and other parts of the system remained healthy.
- (v) Restoration : 400/220 kV ICTs at Muradnagar/ Agra were restored by 1243 hrs of 24.11.2000.
- (vi) Observation : Proper preventive maintenance is of prime importance to avoid such incidents. Suitable load throw off schemes at 220/132 kV level could be designed to take care of cascade trippings.

GRID INCIDENT ON 29th NOVEMBER, 2000
(NR/2000-2001/NOV/12)

- (i)

Time of occurrence

:

1215 hrs
- (ii)

Area affected

:

J&K and Punjab
- (iii)

Antecedent system conditions :

System frequency50.00 Hz

400 kV Moga Voltage385 kV

400 kV Kishenpur Voltage386 kV

Salal generation115 MW

Uri generation40 MW

Chamera generation90 MW

400 kV Kishinpur – Moga, 400 kV Chamera – Jallandher –I, 220 kV Verpal – Patti, 220 kV Dasua-Sarna, 220 kV Dasua – Pong & 220 kV Jallandher – Dasua under shutdown. (220 kV bus at Dasua under shutdown)
- (iv)

Incident

:

400 kV Chamera – Kishenpur (flow 350 MW), 400 kV Jallandher – Chamera tripped due to mal-operation of relays at Chamera, resulting in tripping of 220 kV Jallandher – Butari on overcurrent and consequent separation & collapse of north-west Punjab /J&K system. 220 kV buses of Sarna, Verpal, Butari & Batala in Punjab system became dead.
- (v)

Restoration

:

Power supply extended from Jallandher to Sarna to Kishenpur, Salal by 1310 hrs. However during extension of power supply to Valley, there was repeated collapse of J&K system (tripping of Jallandher – Butari) due to sudden imposition of load in Valley. (400 kV link of Jallandher – Chamera – Kishenpur could not be normalised due to high voltages)

Supply extension to J&K	Collapse
1310 hrs	1345 hrs
1410 hrs	1450 hrs
1650 hrs (final)	

Salal units synchronised by 1750 hrs. 400 kV Chamera – Kishenpur also restored at 1809 hrs. Uri units synchronised by 1835 hrs.
- (vi)

Observation

:

The incident emphasises the importance of thorough checking & testing of protection system, meticulous outage planning and good coordination between various organisations involved in restoration.

GRID INCIDENT ON 19th DECEMBER, 2000
(NR/2000-2001/DEC/13)

- (i) Time of occurrence : 1355 hrs
- (ii) Area affected : Haryana
- (iii) Antecedent system conditions :

System frequency	49.60 Hz
Panipat (T) generation	380 MW
Faridabad (T) generation	140 MW
220 kV BTPS voltage	195 kV
- (iv) Incident : Bus coupler jumper at Panipat (BBMB) snapped, resulting in operation of bus bar protection at Panipat. All running units at Panipat TPS (unit # 1,2,3 & 5) tripped after tripping of circuits between Panipat (T) and Panipat (BBMB). 220 kV Panipat – Narela T/C also tripped and 30 kV drop in BTPS voltage was observed. Supply to Railways from Panipat was also affected.
- (v) Restoration : Panipat (T) units # 5 was revived at 1925 hrs of 19.12.2000 and other units were revived subsequently.
- (vi) Observation : Proper preventive maintenance is a must to avoid such incidents. There is need to strengthen the transmission system in Haryana by having more 220 kV outlets from 400 kV Abdullapur substation of POWERGRID (to be completed by HVPNL).

GRID INCIDENT ON 22nd DECEMBER, 2000
(NR/2000-2001/DEC/14)

- (i)

Time of occurrence

:

1740 hrs
- (ii)

Area affected

:

Delhi
- (iii)

Antecedent system conditions :

System frequency	50.14 Hz
400 kV Dadri voltage	392 kV
220 kV BTPS voltage	190 kV
IP generation	40 MW
Rajghat generation	113 MW
Delhi GTs generation	155 MW
- (iv)

Incident

:

220 kV IP - IPext II tripped due to snapping of conductor of B-ph line isolator at IP. Due to delayed clearing, 220 kV BTPS – IPext D/C and 220 Mandaula – Patparganj D/C tripped on distance protection in zone-2 and zone –3 respectively. Y-ph breaker of Mandaula – Patparganj I failed to operate properly and caused operation of LBB (Local Breaker Back-up) of bus-IV at Mandaula and consequently resulted in tripping of 220 kV Mandaula – Burari I and 400/220 kV ICT –3 at Mandaula. The running units at IP and Rajghat stations of Delhi tripped and Delhi GT islanded with NDMC load. (2 GTs also tripped in incident)
- (v)

Restoration

:

220 kV BTPS – IPext I was normalised at 1758 hrs. Other circuits were also normalised by 1842 hrs except IP –IPext II, which was normalised at 1955 hrs. IP unit was synchronised at 1925 hrs while Rajghat units were normalised by 2310 hrs.
- (vi)

Observation

:

Proper relay coordination and periodic testing of protective systems & breakers should be done to avert such trippings.

GRID INCIDENT ON 23rd DECEMBER, 2000
(NR/2000-2001/DEC/15)

- (i) Time of occurrence : 0242 hrs
- (ii) Area affected : Western UP
- (iii) Antecedent system conditions :

System frequency	50.68 Hz
400 kV Dadri voltage	416 kV
Dadri (T) generation	840 MW
Dadri (G) generation	425 MW
- (iv) Incident : 400/220 kV, 500 MVA ICT – 1 at Dadri (NTPC) tripped on earth fault and resulted in tripping of two 210 MW units (# 2 & 3) at Dadri (T). System frequency dipped to 48.70 Hz. Around same time, there were trippings reported in western UP and 400/220 kV ICTs at Muradnagar along with 400 kV Muradnagar – Rishikesh line tripped. Details of these tripping have not been provided by UPPCL.
- (v) Restoration : 400/220 kV ICT – 1 at Dadri was normalised at 0551 hrs and unit # 2 & # 3 at Dadri were normalised at 0540 & 0815 hrs respectively.
- (vi) Observation : Proper preventive maintenance is needed to avoid such trippings.

GRID INCIDENT ON 23rd DECEMBER, 2000
(NR/2000-2001/DEC/16)

- (i) Time of occurrence : 1224 hrs
- (ii) Area affected : Uttar Pradesh
- (iii) Antecedent system conditions :

System frequency	49.70 Hz
400 kV Kanpur voltage	393 kV
400 kV Dadri voltage	392 kV
- (iv) Incident : Simultaneous trippings of 220 kV Lucknow – Unnao D/C, 400/220 kV, 315 MVA ICT-1 at Unnao and 220 kV Unnao – Panki D/C was reported. 220 kV Kanpur (POWERGRID) – Panki also tripped during the incident. Details of these tripping have not been provided by UPPCL.
- (v) Restoration : 220 kV Kanpur – Panki normalised at 1305 hrs. 400/220 kV ICT –1 & 220 kV Unnao – Lucknow circuits were normalised at 1340 hrs.
- (vi) Observation : Kanpur/ Panki being a nodal point in the Northern Region, a proper investigation of the incident would be required so that the remedial measures could be taken accordingly. Poor information flow from UPPCL to NRLDC particularly for such incidents is a cause for concern & needs to be taken up in right earnest by UPPCL.

GRID INCIDENT ON 25th DECEMBER, 2000
(NR/2000-2001/DEC/17)

- (i) Time of occurrence : 0150 hrs
- (ii) Area affected : Uttar Pradesh
- (iii) Antecedent system conditions : System frequency 50.32 Hz
400 kV Singrauli voltage 417 kV
- (iv) Incident : 400 kV Sarnath – Mau, 400 kV Anpara – Sarnath (L3) and 400 kV Sarnath – Azamgarh lines tripped simultaneously due to reported problem in circuit breaker of 400 kV Anpara – Sarnath line at Sarnath. Increased power flow (430 to 500 MW) was observed on 400 kV Singrauli – Lucknow line. Details of these tripping have not been provided by UPPCL.
- (v) Restoration : 400 kV Mau – Sarnath & 400 kV Anpara – Sarnath lines were restored at 0355 & 0430 hrs respectively.
- (vi) Observation : Poor information flow from UPPCL to NRLDC particularly for such incidents is a cause for concern & needs to be taken up in right earnest by UPPCL.

GRID INCIDENT ON 27th DECEMBER, 2000
(NR/2000-2001/DEC/18)

- (i) Time of occurrence : 0710 hrs
- (ii) Area affected : Uttar Pradesh
- (iii) Antecedent system conditions :

System frequency	50.04 Hz
400 kV Dadri voltage	410 kV
400 kV Dadri – Muradnagar S/C	172 MW
- (iv) Incident : 400 kV Agra – Muradnagar & 400 kV Panki – Muradnagar tripped resulting into over loading of other parallel circuits. Power flow on 400 kV Kanpur – Agra increased to 760 MW. Prompt action was taken by NRLDC to control line loading by exporting power to Western Region and proper backing down at Singrauli/Rihand/Anpara complex. Details of these trippings have not been provided by UPPCL. A dip of 25 kV was observed at Dadri.
- (v) Restoration : 400 kV Agra – Muradnagar was normalised at 1145 hrs and 400 kV Panki – Muradnagar was restored at 1901 hrs.
- (vi) Observation : Poor information flow from UPPCL to NRLDC particularly for such incidents is a cause for concern & needs to be taken up in right earnest by UPPCL.

GRID INCIDENT ON 31st DECEMBER, 2000
(NR/2000-2001/DEC/19)

- (i) Time of occurrence : 2240 hrs
- (ii) Area affected : Nil
- (iii) Antecedent system conditions : System frequency 51.10 Hz
400 kV Dadri voltage 414 kV
400 kV Dadri – Mandaula D/C 868 MW
400 kV Bawana – Abdullapur I under off condition (manually opened to control voltage)
Rainy conditions resulting in low load on the system.
- (iv) Incident : 400 kV Mandaula – Bawana –II tripped at 2235 hrs on R-ph to ground earth fault (FLR – 35 % from Mandaula). 400 kV Mandaula – Bawana – I tripped at 2240 hrs on R & B-ph to ground earth fault (FLR – 24 % from Mandaula). Local Breaker Backup (LBB) protection operated at 400 kV Mandaula substation resulting in tripping of both circuits of 400 kV Dadri – Mandaula along with 400/220 kV, 315 MVA ICT – 1 at Mandaula. 400 kV Bhiwani – Bawana tripped on R-ph to ground fault in zone –2 and 400 kV Hissar – Bawana successfully auto reclosed. 400 kV Bawana – Bamnauli section also tripped during the incident. Power supply in DVB area was not affected due to light loading conditions.
- (v) Restoration : 400 kV Dadri – Mandaula – I & II were normalised at 2308 & 2318 hrs respectively. 400 kV Bhiwani – Bawana & 400 kV Mandaula – Bawana –I were normalised at 2334 hrs of 31.12.2000 & 0048 hrs of 01.01.2001 respectively.
- (vi) Observation : Proper preventive maintenance, relay coordination and relay testing must be ensured to avert such trippings.

GRID INCIDENT ON 2ND JANUARY, 2001
(NR/2000-2001/JAN/20)

- (i) Time of occurrence : 0437 hrs
- (ii) Area affected : Whole Region
- (iii) Antecedent system conditions : System frequency 50.16 Hz
Heavy fog conditions.
Depleted transmission capacity between eastern and western part of grid.
400 kV Dadri voltage 406 kV
220 kV B.T.P.S. Voltage 207 kV
HVDC Rihand-Dadri Pole-2 under outage, Pole-1 operating at 500 MW in Reduce Voltage Operation (RVO) mode. 400 kV Obra-Panki, 400 kV Panki-Muradnagar & 400 kV Unnao-Agra lines of UPPCL were out prior to the incident at 0437 hrs. A large number of successful autorecloses on several 400 kV Ac lines were also reported.
- (iv) Incident : Outage of the above mentioned circuits of UPCL resulted in reduced system security with no redundancy. Tripping of 400 kV Kanpur-Agra S/C line on fault at this stage resulted in cascade tripping of other parallel circuits viz. 400 kV Kanpur – Ballabgarh & 400 kV Lucknow – Moradabad. Eastern UP island was formed. Frequency of this island shot up to over 52.5 Hz and the island collapsed after nearly 8 minutes. In western part of grid frequency dropped to below 47.6 Hz, resulting formation of Delhi, Western UP, Southern Rajasthan & BBMB islands, all of which ultimately collapsed. Only RAPP-A island survived with load of Udaipur & a small part of Delhi system fed from GT station.
- (v) Restoration : Power supply availed from Western Region at Singrauli through Vindhyachal HVDC AC bypass (0510 hrs) and at Rajasthan through 132 kV Gandhi Sagar-R.P. Sagar. Bhakra (L) units were self-started (0615 hrs) and sub systems were built up. BBMB system collapsed at 1018 hrs while being built up. The BBMB island was again built up by starting units at Bhakra. The BBMB & UP system were synchronised at 1138 hrs through ICT –2 at Ballabgarh while Rajasthan system was synchronised with rest of the grid at 1418 hrs.
- (vi) Observation : The incident originated mainly due to transmission constraints caused by outage of multiple lines in same transmission corridor for which system is not generally

designed. However, the collapse of entire grid was avoidable & could have easily been averted if all the generating machines were free governor operation & adequate under frequency load shedding existed in the system. These factors had a bearing on the subsequent system restoration also.

GRID INCIDENT ON 6th FEBRUARY, 2001
(NR/2000-2001/FEB/21)

- (i) Time of occurrence : 1614 hrs
- (ii) Area affected : Haryana
- (iii) Antecedent system conditions :

System frequency	50.01 Hz
Faridabad (G) generation	350 MW
400/220 Ballabhgarh transformer flow	360 MW
400 kV Voltage at Ballabhgarh	398 kV
220 kV Voltage at BTPS	207 kV
BTPS generation	485 MW
220 kV Ballabhgarh-BTPS	150 MW
- (iv) Incident : Tripping of 220 kV FGPP-Samaypur circuit II due to snapping of jumper at location no 45, resulted in tripping of circuit-I on over current. These trippings resulted in islanding & subsequent tripping of all the running units at Faridabad (G). Regional grid remained unaffected.
- (v) Restoration : 220 kV FGPP- Samaypur- I was synchronised at 1659 hrs and units (GTs) at Faridabad (G) were synchronised at 1725 & 1802 hrs respectively.

GRID INCIDENT ON 11th FEBRUARY, 2001
(NR/2000-2001/FEB/22)

- (i) Time of occurrence : 1125 hrs
- (ii) Area affected : Uttar Pradesh
- (iii) Antecedent system conditions :
- | | | |
|---------------------------|-------|----|
| System frequency | 48.97 | Hz |
| Singrauli generation | 1973 | MW |
| Rihand generation | 1013 | MW |
| Anpara generation | 1085 | MW |
| Obra (T) generation | 700 | MW |
| 400 kV Singrauli – Anpara | 580 | MW |
| 400 kV singrauli voltage | 414 | kV |
- (iv) Incident : Lightning Arrestor (LA) at Obra on 400 kV Obra-Panki circuit burst, which resulted in bus fault at Obra. Consequently all the circuits from Obra [including all the running units at Obra (T)] tripped.
- (v) Restoration : 400 kV Obra – Anpara & Obra-Sultanpur lines were restored at 1432 & 1532 hrs respectively. Unit #9, #11 & #13 at Obra (T) were synchronised at 1357, 1320 & 2030 hrs respectively. Unit #10 at Obra (T) was taken under shutdown due to induced draft fan problem. 400 kV Obra- Panki was restored finally after LA replacement at 1648 hrs of 12.02.01
- (vi) Conclusion : In the absence of complete details, the incident could not be analysed properly. Constituents have to submit complete information to NRLDC in line with the Indian Electricity Grid Code (IEGC) stipulation.

GRID INCIDENT ON 22nd FEBRUARY, 2001
(NR/2000-2001/FEB/23)

- (i) Time of occurrence : 1120 hrs
- (ii) Area affected : Delhi & Haryana
- (iii) Antecedent system conditions :

System frequency	49.71 Hz
400 kV Voltage at Ballabhgarh	405 kV
220 kV Voltage at BTPS	194 kV
BTPS generation	695 MW
220 kV Ballabhgarh-BTPS	60 MW

Bus differential protection at Samaypur was out of service. 220 kV Samaypur –Palwal –I was shutdown for maintenance.
- (iv) Incident : During maintenance of Palwal-I bay at Samaypur, while shifting equipment, due to human error, bus fault occurred, resulting in tripping of all the circuits from 220 kV Samaypur. Inner ring of Delhi (including BTPS-IP-IPext.-Rajghat got islanded and survived. All running units at Faridabad (G), unit #1 & #3 at BTPS and unit #1 at Dadri (T) tripped during the incidence.
- (v) Restoration : Delhi island was synchronised with the rest of grid at 1209 hrs through 220 kV BTPS – Alwar at BTPS. All other tripped circuits were also restored by 1300 hrs. and tripped units were synchronised by 1648 hrs of 22.02.2001.
- (vi) Observation : Proper precautions & safety procedures must be followed. Also proper preventive maintenance and testing of all protection schemes is a must to avoid/ minimise occurrence of such incidents.

GRID INCIDENT ON 25th FEBRUARY, 2001
(NR/2000-2001/FEB/24)

- (i) Time of occurrence : 1109 hrs
- (ii) Area affected : Delhi & Haryana
- (iii) Antecedent system conditions :
System frequency 48.68 Hz
400 kV Dadri – Mandola D/C 1990 MW
400 kV Mandola – Bawana D/C 1270 MW
400/220 ICTs flow at Mandola 720 MW
400 kV Voltage at Dadri 394 kV
- (iv) Incident : Y-phase CT of 400 kV Mandola –I at Bawana burst, resulting in operation of busbar protection at Bawana. All lines from Bawana tripped. 400 kV Dadri – Mandola D/C tripped from Dadri (NTPC) end. These trippings resulted in tripping of all 400 & 220 kV feeders from 400/220 kV Mandola substation.
- (v) Restoration : 400 kV Dadri –Mandola I & II were restored at 1147 & 1126 hrs respectively. 220 kV circuits emanating from Mandola substation were restored by 1220 hrs of 25.02.2001. All circuits emanating from Bawana except 400 kV Mandola- I were also restored by 1220 hrs.
- (vi) Observation : The incident requires a detailed investigation into the failure of CT & operation of protection system at Bawana, Mandola & Dadri (NTPC).

GRID INCIDENT ON 8th MARCH, 2001
(NR/2000-2001/MAR/25)

- (i) Time of occurrence : 1657 hrs
- (ii) Area affected : Delhi & Haryana
- (iii) Antecedent system conditions : System frequency 49.62 Hz
400 kV Dadri – Mandola D/C 1720 MW
400 kV Mandola – Bawana D/C 1160 MW
400/220 kV ICTs flow at Mandola 560 MW
400/220 kV ICTs flow at Bawana 240 MW
- (iv) Incident : Y-phase & B-phase CTs of 400 kV Mandola –I line at Bawana burst, resulting in operation of busbar protection at Bawana. All lines from Bawana tripped. Non-operation of proper protection at 400 kV Dadri – Mandola feeders tripped from Dadri (NTPC) end. 400 kV Dadri-Ballabhgarh-I and unit #1 & #3 at Panipat (T) also tripped.
- (v) Restoration : 400 kV Dadri –Mandola D/C was restored by 1723 hrs. 400 kV Mandola-Bawana-II restored at 1913 hrs. Tripped units at Panipat (T) were also synchronised by 1750 hrs of 08.03.2001.
- (vi) Observation : The incident requires a detailed investigation into the failure of CT & operation of protection system at Bawana, Mandola & Dadri (NTPC).