Preliminary Report on Grid Disturbance in Northern Region at 12:51 hrs. of 12th October 2007

The Northern Region experienced a disturbance at 1251 hours of 12th October 2007 leading to power failure in Punjab, Haryana, Himachal Pradesh, Jammu & Kashmir, UT Chandigarh and some parts of Delhi.

1. Antecedent Condition at 1250 hrs:

a) System Frequency: 48.9 Hz
b) Northern Region Load: 22831 MW
c) HVDC Rihand Dadri Flow: 1200 MW
d) Total Inter Regional Import 2802 MW
e) Total Interregional schedule 1193 MW
f) Total Interregional overdrawal 1607 MW
g) States details:

State	**Punjab**	**Haryana**	**Rajasthan**	**Delhi**	**UP**	**Uttarakhand**	**HP**	**JK**	**UT** Chandigarh
Own Generation	2265	1241	2404	1149	3105	391	263	92	0
MW Schedule	1870	982	1430	1288	2564	254	196	585	133
MW Drawl	2162	1401	1549	1346	2947	342	320	929	80
MW Overdrawal	**292**	**468**	**119**	**58**	**383**	**88**	**124**	**344**	-53
Demand met	4428	2642	3952	2496	6052	734	584	1020	80

h) Voltages:

Station	**Voltage (kV)**	**Station**	**Voltage (kV)**
Dadri(Th)	400	Bassi	404
Mandaula	398	Hissar	391
Bawana	403	Abdullapur	403
Bamnauli	405	Dehar	409
Ballabgarh	400	Patiala	397
Panipat	404	Moga	393
Malerkotla	397	Jalandhar	400

i) 400 kV Mandaula-Bawana-II was under planned shutdown since 1141 hours of 12th October 2007 for maintenance.

2. Sequence of events:Tripping Sequence from the records at NRLDC

Sl No.	**HH:MM:SS**	**Event Description**
1	12:51:24	400 kV Mandaula Bawana-1
2	12:51:45	400 kV Ballabgarh Bamnauli-II
3	12:52:05	400 kV Ballabgarh Bamnauli-I
4	12:52:22	400 kV Dadri- Panipat I and II
5	12:52:22	220 kV Ballabgarh-Ch Dadri-II
6	12:52:22	400 kV Dadri-Malerkotla
7	12:52:22	220 kV Samaypur-Ch. Dadri

Sl No.	HH:MM:SS	Event Description
8	12:52:23	220 kV Khetri-Charkhi Dadri-I & II
9	12:52:23	220 kV Khetri-Hisar
10	12:52:23	400 kV Bassi- Hissar

The above trippings resulted in separation of Punjab, Haryana (except 220 kV Ballabgarh), HP, J&K, BBMB, UT Chandigarh and parts of Delhi fed from Bawana and Bamnauli 400 kV substation from rest of the Northern Grid. The deficit in this sub-system was of the order of 2800 MW and the frequency dropped sharply in this subsystem. The subsystem collapsed and there was a load loss of the order of 8500 MW and generation loss of 5700 MW.

The main Northern Grid survived along with the "NEW" grid. The frequency increased sharply to 50.7 Hz and unit no. 6 at Singrauli of 500 MW capacity tripped. No other loss of generation or load has been reported.

2.1. Restoration Sequence:

Voltage level	Line	Restoration time
400 kV	Mandola-Bawana-I	13:11
400 kV	Hisar-Bassi	13:12
400 kV	Bamnauli-Ballabgarh-I	13:16
400 kV	Bamnauli-Ballabgarh-II	13:19
400 kV	Dadri-Panipat-I	13:23
400 kV	Bawana-Bahadurgarh	13:26
400 kV	Hisar-Moga-I	13:27
400 kV	Hisar-Bhiwani	13:28
400 kV	Hisar-Kaithal	13:28
400 kV	Bamnauli-Bawana-I	13:29
400 kV	Bamnauli-Bawana-II	13:30
220 kV	Panipat-Dhulkote-I	13:31
	Bhakra # 7 blackstart	13:32
220 kV	Bhakra-Jamalpur-I	13:34
400 kV	Bhiwani-Bahadurgarh	13:34
220 kV	Dhulkote-Ganguwal-I	13:36
400 kV	Bawana-Abdullapur-I	13:37
400 kV	Hisar-Bawana	13:42
400 kV	Hisar-Patiala	13:45
	Bhakra island synchronized with Northern grid on 220 kV Bhakra-Ganguwal-IV at Bhakra (R)	13:48
400 kV	Abdullapur-Jhakri-I	13:50
400 kV	Moga-Jallundhar-I	14:10
400 kV	Mandola-Bawana-II	14:06
400 kV	Moga-Kishenpur-I	14:18
400 kV	Jhakri-Nalagarh-I	14:21
400 kV	Nalagarh-Patiala	14:26
400 kV	Abdullapur-Jhakri-II	14:27
400 kV	Abdullapur-Bawana-II	14:30
220 kV	Jallundhar-Hamirpur-II	14:42
220 kV	Kishenpur-Salal-I	14:43
220 kV	Salal-Jammu-I	14:46
400 kV	Nalagarh-Kaithal	14:55
400 kV	Jallundhar-Chamera-II	14:56
220 kV	Kishenpur-Udhampur-II	15:02

Voltage level	Line	Restoration time
220 kV	Kishenpur-Pampore-II	15:02
400 kV	Kishenpur-Wagoora-II	15:06
400 kV	Wagoora-Uri-II	15:08

At the time of this report (2000 hous of 12th October 2007, Northern Region is meeting a load of 23600 MW which is about 1000 MW lower than on a normal day. All thermal units that had tripped have been revived except 3 units at Bhatinda & 2 units at Ropar.

All the SLDCs, sub-stations and power stations have been advised to forward copies of the Disturbance Recorder (DR), Sequential Event Recorder (SER) outputs, details of operation of protective relays including Under Frequency Relays for a detailed analysis.

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