

Central Electricity Authority
Government of India
System Planning & Project Appraisal Division
Sewa Bhawan R K Puram,
New Delhi -110066

No.1/9/06-SP&PA/

Dated 27/10/08

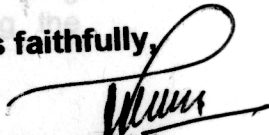
-As per List enclosed-

Sub: Summary Record of the 26th meeting of the Standing Committee on Transmission System Planning of Northern Region held on 13th October, 2008 at 1000 Hrs. in Chamba, Uttarakhand.

Sir,

Please find enclosed the minutes of the 26th meeting of the Standing Committee on Transmission System Planning of Northern Region held on 13th October, 2008 at 1000 Hrs. in Chamba, Uttarakhand.. This is for your kind information and further necessary action at your end please. **The minutes is also be available in CEA website under PS wing/standing committee meeting/NR.**

Yours faithfully,


(GOUTAM ROY)
Director (SP&PA)

Minutes of the Meeting of the 26th Standing Committee on power system planning of Northern Region held on 13th October 2008 at Chamba, Uttrakhand

List of the participants is at Annex-I.

- (i) MD, PTCUL welcomed the participants and expressed his happiness for the opportunity of holding the meeting of the Standing Committee in Uttrakhand.

Member (PS), CEA welcome the participants and thanked PTCUL for hosting the meeting at Chamba, Uttrakhand. He stated that large expansion of transmission network was being planned in inter-state as well as intra-state system and there was a need to conserve the ROW by adopting higher capacity lines at all voltage levels.

- (ii) In the context of adopting multi-conductor and multi-circuit transmission lines, the members from state utilities stated that if standard design of towers for such lines was made available, the execution of projects could be done expeditiously. It was suggested by the members that CEA may take-up to evolve standard designs for multi-circuit and multi conductor lines for 400kV and 220kV voltage levels and the states could fund this in a cooperative manner. The designs so finalized could be used by all the utilities. It was agreed that CEA would constitute a committee to take-up this suggestion further.
- (iii) There after discussion were held on agenda items.

1. Confirmation of minutes of 25th meeting held on 10.7.2008.

Minutes of 25rd meeting as issued vide letters dated 10.3.2008 together with corrigendum as brought out in agenda note for the 26th meeting were confirmed. Final minutes of 25th meeting incorporating the corrigendum is given in CEA website.

2. Intra-state Transmission System in Uttar Pradesh

- 2.1 Members noted the following intra-state transmission schemes of UP and the proposed connectivity with the regional system:

2.1.1 Evacuation System for Anpara C (2x500 MW) and Anpara D (2x500MW)

- i) Step-up of both Anpara-C and Anpara-D generation to 765kV
- ii) Anpara-C and Anpara-D both switchyards to have 765kV and 400kV levels with 1000MVA (4x333 MVA, 1 phase units) 765/400 ICTs at each of Anpara-C and Anpara-D.
- iii) Shifting of Anpara-B – Unnao 765kV S/C line charged at 400kV to Anpara-C 765kV switchyard and charging the line at 765kV.

- iv) Anpara-D – Unnao 765kV S/C line charged at 765kV.
- v) Interconnection of Anpara-C and Anpara-B at 400kV through contiguous 400kV bus.
- vi) Anpara-D – Anpara-B/C 400kV D/C line and/or 765kV S/C.
- vii) Upgrading Unnao substaion to 765kV with 2x1000MVA (7x333MVA, 1 phase units) 765kV/400kV ICTs
- viii) Unnao-Mainpur-Hapur S/C 765kV lines
- ix) Hapur 765/400kV substation with 2x1500 MVA (7x500MVA, 1 ph units) 765/400kV ICTs and 400/220kV 2x500 MVA

With the 765/400/220kV substation of UPPCL at Hapur, 400kV Hapur substation of PGCIL under regional scheme agreed in earlier meeting would not be required. CE, SP&PA stated that this had already been discussed with PGCIL.

2.1.2 Evacuation System for Bara TPS (3x660 MW), Meja TPS (3x660MW) and Karchana TPS(2x660 MW)

- i) Step-up of Bara generation to 765kV
- ii) Step-up of Karchana and Meja generation to 400kV
- iii) Bara switchyards to have 765kV and 400kV levels with 2x1500MVA (7x500 MVA, 1 phase units) 765/400 ICTs.
- iv) Establishment of 400kV substation at Reewa Road Allahabad with 400/220kV 2x315 MVA ICTs
- v) LILO of 400kV Obra-Panki line at Reewa Road Allahabad
- vi) Meja – Bara 400kV quad D/C line
- vii) Meja – Reewa Road Allahabad 400kV quad D/C line
- viii) Karchana – Bara 400kV quad D/C line
- ix) Karchana – Reewa Road Allahabad 400kV quad D/C line
- x) Bara-Mainpuri 765kV 2xS/C lines
- xi) Mainpuri – Agra (PGCIL) 765kV S/C
- xii) LILO of Agra - Meerut 765 kV S/C line of PGCIL at G. NOIDA
- xiii) Hapur – G.Noida 765kV S/C line
- xiv) New 765/400kV substation at Maipuri with 2x1000MVA (7x333 MVA, 1 phase units) ICTs
- xv) Mainpuri 765kV UPPCL – Mainpuri 400kV PGCIL 400kV quad D/C line
- xvi) New 765/400/220kV substation at G.Noida with 2x1500MVA (7x500MVA, 1 phase units) 765/400kV and 2x500MVA 400/220kV ICTs.
- xvii) Reewa Road Allahabad – Banda 400kV quad D/C line
- xviii) Banda – Orai 400kV quad D/C line
- xix) Orai – Mainpuri 765kV UPPCL 400kV quad D/C line
- xx) Establishment of 400kV substation at Banda with 400/220kV 2x315 MVA ICTs
- xxi) Establishment of 400kV substation at Orai with 400/220kV 2x315 MVA ICTs

In the above, works at (xi), (xii) and (xv) require interface with regional network of PGCIL.

CE, SP&PA stated that subsequently, UPPCL had intimated that it was proposed to have additional 2x660MW at Bara and 1x660MW at Karchana. In case the additional power is proposed to be utilized outside U.P., evacuation system for this additional 1980 MW would require one more 765kV line from Bara which could go to Fatehpur 765kV PG s/s and further network strengthening beyond Fatehpur. The system could be studied, evolved and firmed-up based on open access application. However, if the additional power was to be utilized within U.P., UPPCL would need to plan additional network. CE, SP&PA stated that POWERGRID should keep space for terminating additional 765kV bays at their Fatehpur substation. ED(Engg), POWERGRID stated that there was space constraint at their Agra substation and it might not be possible to have Mainpuri – Agra 765kV S/C line as proposed at even (xi) above. CE, SP&PA stated that POWERGRID should explore the possibility for accommodating one additional bay at their 765 kV Agra S/S for Mainpuri – Agra 765kV S/C line of UPPCL and in case found difficult the 765kV line from Mainpuri could be taken to G.Noida.

2.1.3 Evacuation System for Parichha TPS Extn. (2x250MW), Tanda Ext. (2x500MW), Harduaganj Extn (2x250MW) and new 400kV substations at Aligarh, Sikandarabad, Lucknow (Sultanpur Road), Nehtaur and Aurai

- Step-up Parichha Extn units at 400kV
- 400/220kV 2x315 MVA ICTs at Parichha extn
- Parichha Extn – Orai 400kV D/C
- Tanda – Gonda 400kV quad D/C line
- Gonda – Shahjahanpur(PG) –) 400kV quad D/C line
A new regional 400kV s/s at Shahjahanpur with 2x315 MVA 400/220kV is being proposed to be established by PGCIL in lieu of Hapur. The s/s is proposed by LILO of both circuits of LucknowPG-BareillyPG 400kV D/C line.
- LILO of Azamgarh – Sultanpur 400kV line at Tanda
- Establishment of 400kV substation at Gonda with 400/220kV 2x315 MVA ICTs
- Mainpuri 765kV UPPCL – Aligarh 400kV quad D/C line
- Aligarh – Sikandarabad 400kV quad D/C line
- Sikandarabad – G.Noida 765kV UPPCL 400kV quad D/C line
- LILO of Panki – Muradnagar 400kV line at Aligarh
- LILO of 400kV Sultanpur-Sarojininagar line at Lucknow(Sultanpur Road)
- LILO of 400kV Obra-Sultanpur line at Aurai
- LILO of 400kV Kashipur-Rishikesh line at Nehtaur
- Establishment of 400kV substation at Aligarh, Sikandarabad and Lucknow (Sultanpur Road) each with 400/220kV 2x500 MVA ICTs
- Establishment of 400/132kV substation at Nehtaur with 2x200MVA 400/132kV ICTs

- Establishment of 400kV substation at Aurai either with 2x315MVA 400/220kV or 2x200MVA 400/132kV ICTs. UPPCL may choose between 220kV and 132kV depending on their plan for downstream network from Aurai.
- Harduaganj – Jahangirpur 220kV D/C line
- Jahangirpur – Sikandarabad 220kV D/C line
- Establishment of 220kV substation at Jahangirpur with 2x160 MVA 220/132kV ICTs

2.1.4 **400kV ring system for Gaziabad and transmission network for G.Noida and Noida**

- LILO of Moradabad – Muradnagar 400kV line at Hapur with conductor of Muradnagar-Hapur section replaced with new conductor of higher capacity specification
- LILO of Muradnagar-Muzaffarnagar 400kV S/C line to Gaziabad with conductor of Muradnagar-Gaziabad section replaced with new conductor of higher capacity specification
- Hapur – Dasna 400kV quad D/C line
- Dasna – Indirapuram 400kV quad D/C line
- Indirapuram – Gaziabad 400kV quad D/C line
- Establishment of 400kV substation at Dasna with 400/220kV 2x315 MVA ICTs
- Establishment of 400kV substation at Indirapuram with 400/220kV 2x500 MVA ICTs
- Establishment of 400kV substation at Gaziabad with 400/220kV 2x500 MVA ICTs
- G.Noida 765kV – G.Noida existing 400kV quad D/C line (using multicircuit towers 400kV towers for entry to G.Noida)
- Additional 2x500MVA 400/220kV ICTs at G.Noida existing substation
- G.Noida 765kV – Noida sector-137 400kV quad D/C line (through river bed)
- Establishment of 400kV substation at Noida sector-137 with 400/220kV 2x500MVA 400/220kV ICTs

2.1.5 **Evacuation System for Rosa (2x300MW) TPS**

220kV D/C lines viz (i) Rosa – Shahjahanpur, (ii) Roza – Hardoi, and (iii) Rosa – Badaun

2.2 CE, SP&PA, stated that the above system was discussed with UPPCL. However, as representative from UPPCL was not present in the meeting, the above system could not be confirmed from UPPCL's side. As such, the proposal was noted and proposed connectivity with regional system was agreed in principle subject to observation on Mainpuri-Agra 765kV line.

2.3 MD, PTCUL stated that UPPCL and PTCUL girds were having a number of interconnections and whenever there were outages in UPPCLs lines at 132kV, PTCUL's lines were getting overloaded.

Therefore, it was necessary that required strengthening was done by UPPCL in their 220kV and 132kV network. It was decided that this issue would be further discussed between CEA, PTCUL and UPPCL.

3. Intra-state Transmission System in Haryana and Dedicated transmission lines of generator

3.1 Members noted the following transmission schemes for Haryana and concurred to the proposed connectivity with the regional system:

HVPNL's Transmission system for Jhajjar-I TPS for 50% of 1500MW, evacuation system for Hissar TPS (1200MW, new 400kV substations of HVPNL at Mohindergarh(Dhanonda) and Sonipat (Deepalpur), evacuation system for Jhajjar –II (2x660 MW through case-II bidding) and transmission system Adani power (1424MW) injected at Mohindergarh s/s of HVPNL

- i) Jhajjar-I – Daulatabad 400 kV D/C line
- ii) Daulatabad – Gurgaon 400 kV quad D/C line
- iii) Daulatabad 400kV substation with 3x315 MVA 400/220kV
- iv) Hissar(TPS) – Sirsa 400 kV D/C line
- v) LILO of one circuit of Hissar(TPS) – Sirsa 400kV line at Fatehabad(PG)
- vi) Hissar(TPS) – Hissar 400kV HVPNL 400kV D/C
- vii) Sirsa 400kV substation with 2x315 MVA 400/220kV
- viii) Hissar 400kV HVPNL s/s with 3x315 MVA 400/220kV
- ix) LILO of both ckts of Jind-Hissar IA 220kV D/C at Hissar 400kV HVPNL s/s with a new 220 kV S/S at Masudpur (Hansi) on 400 kV Hisar- Hisar IA section. 220 kV link between 400 kV Hisar- Masudpur shall be with moose conductor'.
- x) LILO of the one circuit of Bhiwadi-Moga 400kV D/C line at Mohindergarh HVPNL (Dhanonda)(the other circuit to be LILoed at Mohindergarh HVDC terminal S/S of Adani)
- xi) Mohindergarh (Dhanonda) 400kV s/s of HVPNL with 3x315MVA 400/220kV
- xii) LILO of the one circuit of Abdullapur-Bawana 400kV D/C line at Sonipat(Deepalpur)
- xiii) Sonipat (Deepalpur) 400kV s/s of HVPNL with 2x315MVA 400/220kV
- xiv) Jhajjar-II – Mahindergarh 400 kV D/C line
- xv) Jhajjar-II – Rohtak 400 kV quad D/C line
- xvi) Rohtak – Sonipat (Deepalpur)400 kV quad D/C line
- xvii) Rohtak 400kV substation with 2x315 MVA 400/220kV
- xviii) Mohindergarh(Dhanonda) – Daulatabd 400kV quad D/C
- xix) Daulatabad – Sector 20 Gurgaon 220 quad D/C (O/H line in outer areas and 220kV multi cables in city area where o/h line may not be feasible)
- xx) Enhancing 220/66 kV transformer capacity at Sector 20 Gurgaon substation and underlying 66kV system. It was proposed to have 400kV substation at sector 20. However, due to envisaged RoW problem in entering

sector 20 s/s through 400kV tower line, 220kV s/s with 220kV quad D/C line was proposed and in the areas tower line may not be feasible, 220kV cables could be adopted.

3.2 Members also noted the following dedicated transmission lines of Adani Power and Interconnecting system for Mohindergarh HVDC terminal sub-station of Adani Power and concurred to the proposed connectivity with the regional system:

- i) Adani Power would establish 2500MW HVDC bi-pole line from Mundra to Mohindergarh with necessary facilities.
- ii) Mohindergarh terminal would be connected to HVPNL's Mohindergarh substation through 400kV D/C line. For delivery of power to HVPNL, Mohindergarh (Adani HVDC) – Mohindergarh (Dhanonda) HVPNL 400kV D/C line has been proposed. For delivery of 1424 MW of power, this line should be with triple moose conductors so that outage of one circuit could be met.
- iii) For the power over and above the power to be supplied to Haryana, connectivity with CTU network through LILO of one circuit of Bhiwadi-Moga 400kV D/C line should be provided. This LILO should be on the circuit other than the one which would be LILOfed at Mohindergarh (Dhanonda) HVPNL. For tying-up connectivity and open access to CTU network, Adani Power would need to seek open access and PGCIL may process their application for approval as per the above arrangements.

3.3 **Third 400kV substation for Gurgaon (at Sector 52 by ITP)**

CE, SP&PA, CEA stated that two 400kV s/s for Gurgaon viz. Sector-72 of PGCIL and Daulatabad were already planned/under construction. Another 400kV s/s for Gurgaon was provided under North Karanpura Transmission Scheme under process by implementation by private sector through a SPV of REC. He stated that HVPNL should facilitate in the process of finalization of site and procurement of land for the ITP's 400kV GIS substation for Gurgaon at a location so that connectivity to their 220kV sector 52 substation could be provided by HVPNL in a cost effective manner. Director, HVPNL agreed for the same.

The transformer capacity at the substation was agreed as 2x500MVA (7x166.7MVA single phase units) 400/220kV with space for future one more 500MVA (3x166.7 MVA single phase units). HVPNL agreed to plan 220kV outlets accordingly.

3.4 Director, DTL stated that with 400kV substations at Rohtak and Gurgaon, the 66kV line of HVPNL from Rohtak Road S/S to Gurgaon may not remain useful for them. This line could be used by DTL with some augmentation. He requested HVPNL to hand over the line to

them at cost Member (PS), CEA stated that HVPNL should consider the proposal favorably. Director, HVPNL stated that DTL might send the proposal to them and assured to consider it favorably.

4. Intra-state Transmission System in Punjab

4.1 Members noted the following transmission schemes for Punjab and concurred to the proposed connectivity with the regional system:

- i) Talwandi Sabo - Muktsar 400 kV D/C line
- ii) Muktsar - Patti - Nakodar 400 kV D/C
- iii) Patti - Amritsar (PGCIL) 400 kV D/C line
- iv) Talwandi Sabo - Nakodar 400 kV D/C (one ckt to be LILOOed at Moga 400kV PGCIL s/s)
- v) Talwandi Sabo - Dhuri 400 kV D/C
- vi) Dhuri - Rajpura 400 kV D/C
- vii) Rajpura - Rajpura TPS 400kV D/C
- viii) Rajpura TPS - Nakodar 400kV D/C
- ix) Establishment of 400/220 kV S/S by PSEB at Muktsar, Patt and Nakodar with 2x315 MVA 400/220kV trf at each
- x) Establishment of 400/220 kV S/S by PSEB at Rajpura and Dhuri with 2x500 MVA 400/220kV trf at each

In the above, works at (iii) and (iv) require interface with regional network of PGCIL.

5. 765kV System for the Central part of Northern Grid.

5.1 CE, SP&PA, CEA stated that proposal for the 765kV system around Delhi was re-discussed in the last meeting of Standing Committee (25th meeting held on 10-7-2008) when it was decided to review the proposal in view of injection of Bawana, Jhajjar and Dadri-II power. Subsequently, Jhajjar-II and injection of Adani Power at Mohindergarh have also necessitated review of the scheme based on further detailed studies. Accordingly, studies have been done considering all the additional schemes and also the increased demand that could be met through addition of planned generation. In this, reconfiguration of Delhi ring was also considered so as to address the short circuit level issue. The following scheme was proposed:

- Establishment of 765kV, 2x1500MVA 765/400kV substation at Meerut
- Agra-Meerut 765kV S/C (also proposed to be LILOOed at G.Noida of UPPCL)
- Agra-Jatikalán mor(Delhi) 765kV S/C
- Establishment of New 765kV 2x1000MVA 765/400kV and 2x315MVA 400/220kV substation at Bhiwani and New 765kV S/S at Jatikalán mor with 4x1500MVA 765/400kV ICT
- Jatikalán mor-Bhiwani 765kV S/C
- Meerut-Bhiwani 765kv S/C

- Bhiwani-Moga 765kV S/C
- Upgrading Moga S/S to 765kV /400kV 2x1500 MVA, 765/400 kV ICT
- Augmentation of Agra 765kV s/s for bays
- Necessary Reactive Compensation – bus and line reactors

- LILO of both circuits of Bawana/Bahaduragh-Hissar 400kV D/C at Bhiwani
- LILO of both circuits of Mundka-Bamnouli 400kV D/C at Jatikalan mor
- LILO of both circuits of Bareilly-Mandola 400kV D/C line at Meerut so as get four number of 400kV circuits between Mandola anmd Meerut.

- 400kV bus at Jatikalan to be split in two parts with 2x1500 MVA 765/400kV ICT on the Bamnoui side and 2x1500 MVA 765/400kV ICT on Mundka side.

- Mandola 400kV bus also to be split with two circuits to Meerut and two circuits to Bawana on one side and other two circuits to Meerut and Dadri circuits to be on other side.

With the above arrangement, Delhi 400kV system would become Dadri – Mandola – Meerut – Mandola – Bawana – Mundka - Jatikalan 400kV – Jatikalan 765kV – Jatikalan 400kV – Bamnoli – Samaypur and Dadri – G.Noida / Maharanibagh – Nawada(HVPLN) – Samaypur

**** Dadri –G. Noida/M.bag – Nawada – Samaypur 400 kV to be kept open from Delhi ring at Samaypur.**

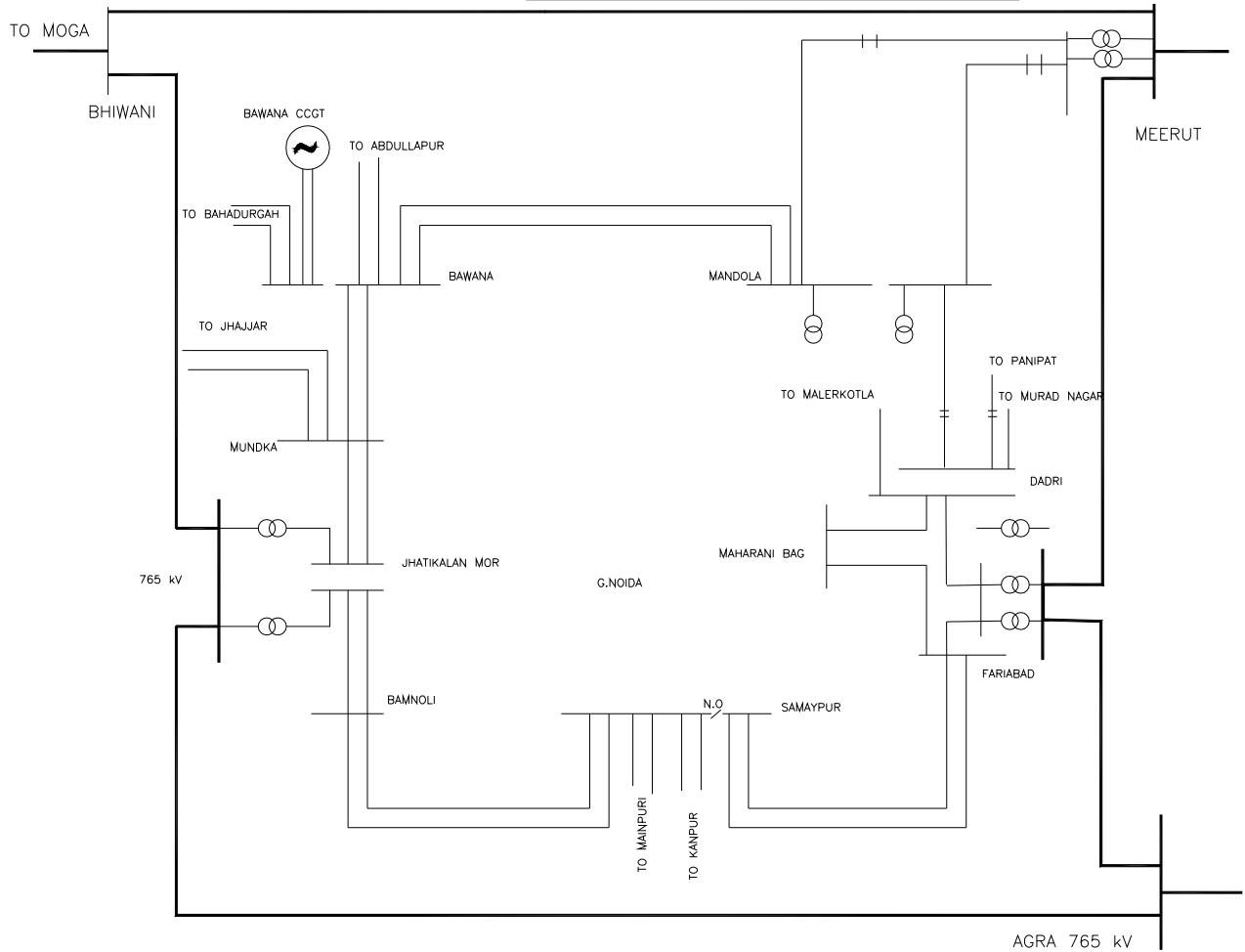
With above arrangements, 400 kV Jhijhar-MundkaD/C line could be connected to 400kV Mundka S/S on 400kV Delhi ring keeping the short circuit /load remaining within limits.

5.2 As desired by the members the short circuit studies for Delhi system and the load flow Study Case with the 765 kV system given as under.

The results of short circuit studies before splitting of Delhi 400 kV ring is as below:

Substation	Fault current (kA)	Substation	Fault current (kA)
Dadri	41.7	Mandaula	48.8
Bawana	46.7	Mundka	16.7
Ballabgarh	45.4	Jattikalan mor	53.2
Bamnoli	50.7		

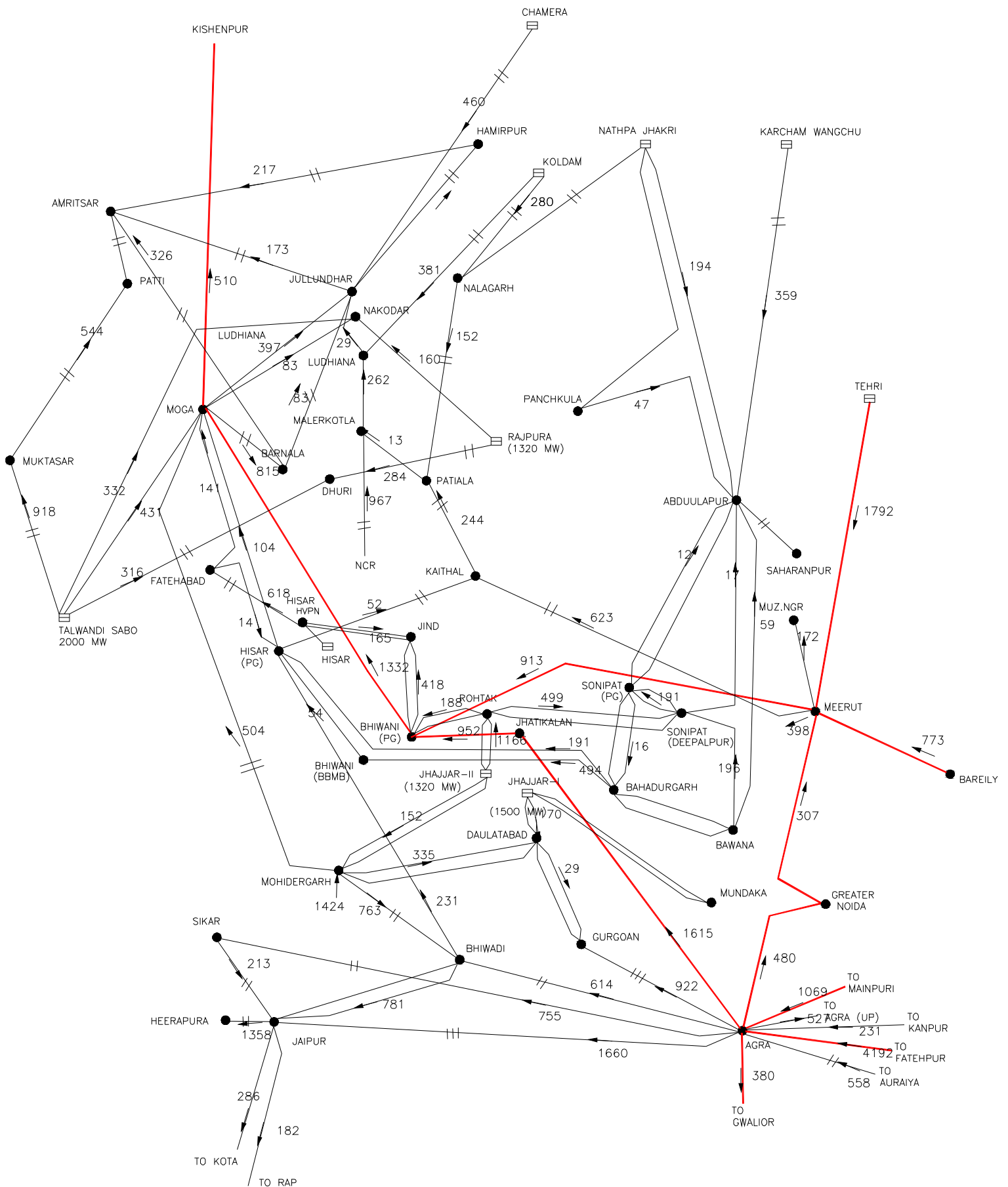
765 kV RING ALOG NCR



With splitting of Drhi ring as above the result of the short circuit level of Delhi system is as under:

Substation	Fault current (kA)	Substation	Fault current (kA)
Dadri	30.7	Mandaula	30
Bawana	31.8	Mundka	29.2
Ballabhgarh	27.9	Jattikalan mor	28
Bamnauli	28.3		

765kV System for the Central part of Northern Grid.



- 5.3 Director, HVPNL stated that 400/220kV transformer should also be provided at Bhiwani 765kV s/s. The same was agreed. The list under para 5.1 above includes this.
- 5.4 Members of the Standing Committee Studies applauded the work done by CEA and POWERGRID engineers in evolving solution to the system planning problem particularly with respect to development of 765kV system as well as addressing the issue of high short circuit level.
- 5.5 After discussions, the system as detailed in para 5.1 above, was concurred by the Standing Committee.

6.0 New Regional Schemes

6.1 The following new regional system strengthening schemes were concurred by the Standing committee::

- (1) Provision for 3rd 400/220 kV ICT at Bhiwadi to provide connectivity to Haryana through LILO 2nd 200 kV line from Badshapur – Riwari of HVPNL
- (2) 2 nos. of additional 220 kV bays at Panchkula , Sonipat(PG) and Gurgaon sec-72 s/s of PGCIL for HVPNL as per the decision taken in the 23rd SCM to have 6 bays with first two 400/220 kV , 315 MVA ICT. The bays are to be utilized by HVPNL for meeting load demand of that area.
- (3) With Bhiwani 765/400kV substation

Regional scheme of PGCIL

- Bhiwani-Jind 400kV D/C
- Jind 400/220kV 2x315 MVA substation

To be constructed by HVPNL at their own cost

- Bhiwani-Rohtak 400kV D/C
- Jind-Hissar HVPN 400kV s/s D/C

- (4) 400 kV S/S at Sohawal with 2x315 MVA ICT 2 nos. to be established by LILO of both the circuit of Balia - Lucknow 400 kV D/C line

UPPCL has proposed the above s/s for meeting load demand in Faizabad area.

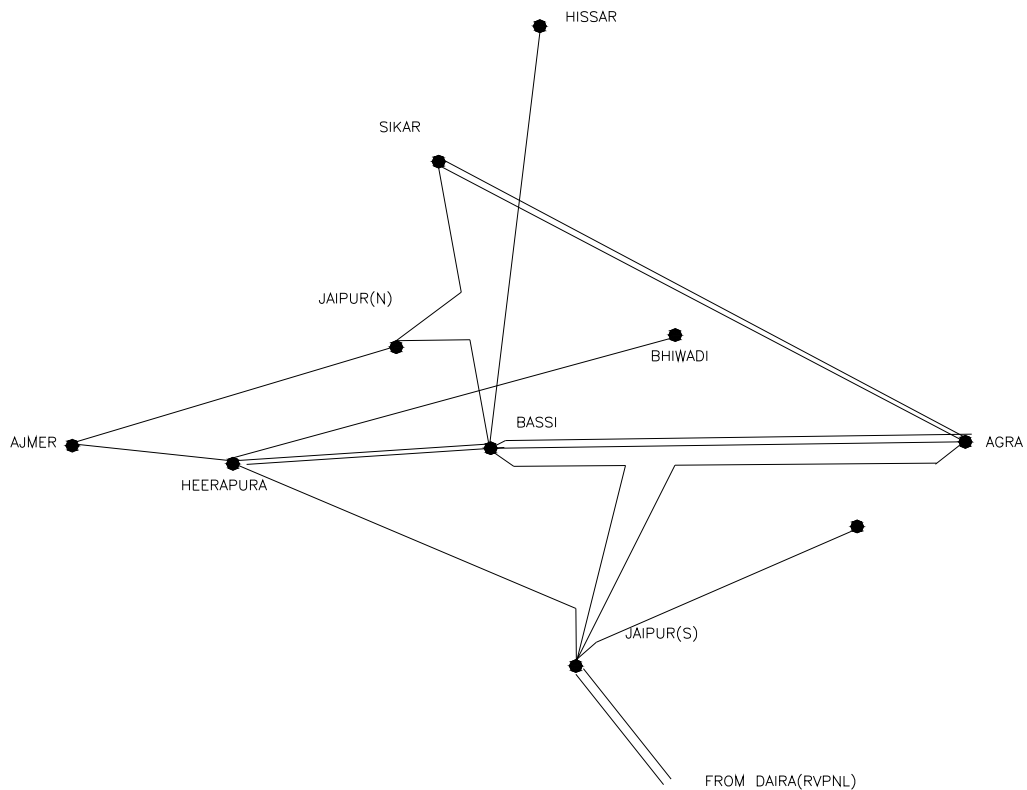
- (5) Saharanpur 400 kV S/S with 2x315 MVA ICT to be established by LILO of both the ckt of Dehradun - Baghpat 400 kV quad line UPPCL has proposed the above s/s for meeting load demand in Saharanpur area.

- (6) Shahjahanpur 400 kV S/S with 2x315 MVA ICT to be established by LILO of both the ckt of Lucknow (PG) – Bareilly (PG) 400 kV D/C line. UPPCL had proposed the above s/s for meeting load demand in Shahajahanpur area. This regional s/s is proposed in lieu of Hapur s/s agreed earlier under regional scheme. Now 765/400/220 s/s at Hapur would be established by UPPCI.
- (7) Creation of new 220/400 kV S/S at Jaipur (South) with 2x500 MVA transformer to be created by LILO of Agra - Jaipur line at Jaipur. The new substation at Jaipur would help in mitigating the heavy loading on the existing 400 kV S/S at Jaipur

RVPNL also proposed for creation of 765/400 kV S/S in North of Jaipur. The proposal was discussed and it was opined that the 765 kV S/S could be located in Northern part of Jaipur and a 400 kV ring could be formed around Jaipur in the following manner

- LILO of Bassi – Sikar 400 kV at Jaipur North(N)
- Termination of one of the line from Ajmer – Heerapura D/C line to Jaipur (N)
- Termination of both the line from Daira – Jaipur South(S) instead of Heerapura
- LILO of Hindaun –Heerapura S/C line at Jaipur(S)

With this arrangement the system around Jaipur would be as Bassi – Jaipur(N) – Ajmer – Heerapura – Jaipur(S) – Bassi along with Bassi - Heerapura D/C line



However, the location for the same could be ascertained after proper survey by RVPNL along with CEA and Powergrid Engineers.

- (8) RVPNL have stated that they intend to establish three nos. new 220 kV S/S around Jaipur at Indra Nagar, SEZ-1 and Bagru (by 2009-10 time frame). The above S/S would be established in the following manner

Name of the proposed 220 kV GSS S/S	Proposed Transmission system
Indra Nagar, Jagatpura(Jaipur) 220/132 kV , 1x100 MVA	By LILO of one circuit of the Bassi - Heerapura 220 kV D/C line
SEZ-1	LILO of 220 kV Jagatpura - Heerapura section of Bassi – Heerapura line
Bagru	LILO of Bassi Phulera line

RVPNL had proposed that the expenditure to be incurred for the LILO would be totally borne by them and they could also take up the maintenance of the entire Bassi a- Heerapura line. The proposal was discussed and concurred by the committee and RVPNL would required to finalise the modalities regarding maintenance of Bassi –Heerapura line with Powergrid.

- (9) Powergrid stated that RVPNL has indicated non-availability of space/R-O-W problem for taking up 220 kV D/C line from Sikar 400 kV PGCIL to 220 kV Sikar RVPNL which was agreed as a part of transmission system for absorption of power from Sasan/ Mundra UMPP. It was stated that instead of the Sikar(PG) - Sikar 220 kV D/C line the existing 220 kV D/c line from Sikar - Ratangarh of RVPNL may be LILOed at Sikar (PG). The proposal was agreed by the Committee.

- (10) Creation of 220/400 kV 2x500 MVA S/S at Ramban by LILO of the 400 kV line from Kishenpur to New Wangpoh – Wagoora to evacuate power from Chenab basin project in J&K as well as for disbursal of power at 220 kV in Jammu region was discussed. SE, Jammu stated that Jammu area needs a feed at 400 kV as existing 400 kV S/S at Kishenpur does not have any adequate space for expansion. He stated that Ramban is in the North of Jammu and it would be difficult from there to take line to Jammu at 220 kV. As such the committee should consider a 400 kV S/S at Samba at the first instance and a pooling station at Ramban could be considered with the generations at Chenab basin. The committee agreed for the same and decided that a 400/220 kV S/S with 2x315 MVA ICT would be created at Samba, Jammu. However, the feeding line for the S/S with the 400 kV regional network would be decided after a survey of the area by PGCIL along with PDD, J&K engineers.

6.2 Member (PS), CEA stated that to take care of the integrated system planned by UP, Punjab and Haryana for evacuation of power from their generation project where outage of one of the 765 kV line in U.P. network might affect the other regional network and vice versa. Since the topology of the grid was changing, there was a need for proper training of the operational people specially at the SLDC level who must be made aware not only about their system, but also about the regional as well as national transmission networks. Accordingly he emphasized the need for simulator based training/discussion of the engineers at NRLDC as well as SLDC level. Managing Director, PTCUL as well as Director, DTL also supported the idea and suggested that NLDC should arrange for training programme/discussion in this regard for the operation people of SLDC. It was suggested that since the grid was going for a major change so the changed scenario should be reflected and intimated from time to time to the engineers/operators so that the engineers/operational peoples were aware of the changed scenario. Director(OP.), DTL proposed for the need for Special Protection Scheme (SPS) during the planning stage itself so that later on the grid do not face the operational difficulty. CE (SP&PA), CEA stated that the SPS has been planned in a case-to-case basis with the new proposals wherever it was required and specially in the case of U.P since there was no requirement for SPS and the same had not been included. However, the proposal can be made as a part of the planning process. Director, RVPNL stated that considering the major change in the network topology message should go to all the states to come out with their schemes of the 12th plan so that CEA could include them in their planning process. The members of the committee concurred with the above proposals.

6.3 Director(OP.), DTL stated that with the increase in the loading of the existing 220 kV line the 220 kV lines with Zebra conductor needs to be replaced with twin Aluminium conductor of high temperature rating. This would enable effective utilization the exist sting corridor. He also suggested for change in the standardization and specifications in the transformer test and amendment in BIS as per IEC. He also requested the committee to take a view on the utility of 3rd 220 circuit between Muradnagar- Patparganj under present scenario. Member(PS.), CEA agreeing with the proposal stated that the 3rd 220 circuit between Muradnagar- Patparganj as well as 220 Samaypur – Mehrauli 220 Kv D/C line were agreed earlier, but with the change in the grid topology the utility for both these lines for power supply to Delhi does not exists. As such both these lines might be deleted/dropped from the plan proposals of Delhi. The members of the committee concurred with the above proposals.

7. Power Evacuation from Parbati and Koldam HEP

7.1 Chief Engineer (SP&PA), CEA stated that Parbati Koldam Transmission Company Limited (PKTCL), a joint venture of Reliance and PGCIL was developing part of the evacuation system of Parbati

and Koldam HEP. The scope of work entrusted with M/s. PKTCL was as under:-

S.No.	Transmission lines	Voltage level and line length
1.	Parbati - Koldam	400 kV Quad
a.	Single Circuit line -I	75 km
b.	Double circuit line -II	3.5 km
c.	Single Circuit line-II	75 km
2.	Koldam - Ludhiana	400 kV D/C triple snowbird, 150 kms.

7.2 The evacuation system from Parbati-II/III, Koldam and Allain Duhangan and Malana II HEP was planned in a composite manner and it was proposed to establish a pooling station at Panarsa, where power from Allain Duhangan and Malana II HEP was proposed to be pooled. The above proposal was agreed in the 14th and 15th meeting of the Standing Committee for transmission system planning in Northern Region. The above transmission system was developed considering that Parbati II would be commissioned first followed by Koldam HEP and Parbati III. However Parbati II generation has got delayed and now the indications were that Parbati II would be available not before 2012-13 time frame. Since, the formation of the joint venture for taking up the construction of Parbati II Koldam 2xS/C line took long time and commission Schedule for Allain Duhangan /Malana-II were in 2008-09, so for ensuring power evacuation from Allain Duhangan, 220 kV D/C line from Allain Duhangan to Nalagarh was agreed. Power from Malana-II was also to be evacuated through the same line by creating 220/132 kV s/s on one of the circuit.

7.3 CE, SP&PA, CEA further stated that for evacuation of power from Koldam HEP, 400kV D/C line from Koldam to Nalagarh was under execution by Powergrid and was to be made available matching with commissioning of Koldam HEP. In view the delay in commissioning of Parbati-II HEP and also the power evacuation requirement from the Chandrabhaga Basin projects in Himachal Pradesh, the 400 kV Parbati – Koldam 2xS/C line needed to be constructed as D/C in those stretches between Panarsa and Koldam where the terrain was very difficult. Also, the time frame for execution of the Koldam - Ludhiana 400 kV D/C line was required to be revisited. With Koldam – Nalagarh D/C line, Parbati-Panarsa–Koldam line along with Panarsa –Amritsar D/C line, the evacuation of part of power from Koldam HEP (800MW) as well as Parbati-III (520 MW generating only 170MW till the commissioning of Parbati II) could be done meeting the N-1 contingency condition. In view of this, Koldam-Ludhiana 400kV D/C line could be programmed for commissioning after commissioning of Koldam HEP but before Parbati-II. Considering the Koldam HEP schedule to be March 2011, as indicated by NTPC, Koldam –Ludhiana 400 kV D/C could be scheduled for commissioning by December 2011. However, in case Koldam HEP gets delayed even beyond December 2011, commissioning of Koldam – Ludhiana 400 kV D/C line would

also need to be revised after obtaining the commissioning schedule of Koldam HEP from NTPC corresponding to maximum possible delay.

7.4 After discussion the above proposals were agreed with following stipulations:

- (1) M/s PKTCL in consultation with HPSEB and CEA would survey the corridor and identify the stretches between Panarsa and Koldam where Parbati-Koldam 400kV 2xS/C lines would need to be constructed as D/C line.
- (2) The commercial operation date (COD) of 400kV D/C Koldam - Ludhiana line should be nine months after the commissioning schedule of Koldam HEP but not later than commissioning schedule of Parbati-II. For finalizing the COD of Koldam - Ludhiana line, NTPC would inform the realistic scheduled date for Koldam HEP and NHPC would inform possible date of commissioning of Parbati-II HEP. If NTPC confirms March 2011 as commissioning date for Koldam HEP, COD of Koldam-Ludhiana line could be December 2011 without the need of any indemnification for the Koldam-Ludhiana line.
- (3) Parbati-III-Panarsa-Koldam section of one of the two S/C lines between Parbati-II and Koldam would be commissioned matching with Parbati-III HEP and the balance portion of the line between Parbati-II and Parbati-III and the second line between Parbati-II and Koldam (via Panarsa) would be commissioned matching with Parbati-II. For retaining the feasibility of constructing the second S/C line at a later date without the need of closing Parbati-III generation, the Parbati-III – Panarsa section and the two circuits connecting to Parbati-III would be on separate towers without any D/C portion.

8. Power evacuation system from Sainj HEP (100 MW) by HPPGCL

8.1 CE (SP&PA), CEA stated that the generation at Sainj HEP could be evacuated through 132 kV D/C and injected into Parbati II/III transmission system by creating a 132/400 kV sub-station which could be connected at 400 kV through a 400 kV LILO from Parbati-II – Parbati –III 400kV S/C line or through a 400 kV S/C line either to Parbati –III or to Parbati-II in which case one additional 400 kV bay would be required at Parbati-III/Parbati-II. SE, HPSEB informed that since Sainj was in the upstream of Parbati II PH, it would be better to create the 132/400 kV sub-station near Parbati-II and the 400 kV S/C line from 132/400 kV S/S to Parbati-II. The matter was further discussed and it was decided that NHPC would review the availability of space for additional 400 kV bay at Parbati II as well as Parbati III and intimate the position to CEA as well as HPSEB. Further, HPSEB would carry out site survey to suggest the proposal taking in to account these inputs.

9. Proposal for loop in loop out of 220 kV Jullundhur - Hamirpur line near Gagret 220/132 kV S/S of Himachal Pradesh

9.1 CE (SP&PA) stated that HPSEB had proposed to loop in loop out one circuit of the 220 kV Jullundhur - Hamirpur Central sector line at their Gagret 220/132 kV S/S to meet the load demand in that area. He stated that considering distribution of load in both the Jullundhur - Hamirpur D/C line after the loop in loop out it was advisable that HPSEB may consider loop in loop out of both the circuit instead of one circuit as proposed. The matter was agreed by all the members.

10. Transmission system associated with Dadri II TPS (2x490 MW)

10.1 CE (SP&PA) stated that the evacuation system for Dadri II TPS was agreed in the 21st and 22nd meeting of the Standing Committee and it was proposed to have a 400 kV D/C line from Dadri to Bamnoli routed via Badarpur/Mehrauli, utilizing the corridor of 220 kV Badarpur-Mehrauli-Bamnoli line which could be upgraded to multi-circuit tower accommodating the 400 kV D/C as well as the 220 kV D/C lines on the same towers. However from the route alignment proposed by PGCIL it was seen that it was not as per the proposal agreed in the standing committee. It was observed that the route proposed by POWERGRID was passing through congested area of Delhi and Gurgaon where there would be severe constraints in obtaining R-O-W for construction of the line.

10.2 Director(OP.)DTL stated that they would not need any power at Bamnoli as there was already a proposal for Bamnoli CCGT and it would be better if the Dadri II power was injected to Loni Road. It was further informed that DTL had already identified the land near Nand Nagari at Loni Road and had also given application to DDA under section 17 for acquisition of the land. The NIT for construction of the S/S would be invited by December 2008 and final placement of contact would take about six more months with the completion schedule of 18 months from the date of award of contact. It was opined that instead of the earlier proposal the 400 kV D./C line from Dadri II might be taken to Nand Nagari/ Loni Road(DTL). The proposal was agreed by the members of the Committee. NTPC stated that the first unit of Dadri was expected in 2009 and the second at 2010 and as such they do not have any objection to the proposal, however they would like to be assured that the fault level at Dadri with this arrangement was within the limit. Accordingly it was decided that PGCIL would carry out study that 2009-10 condition for studying the impact of the Dadri generation on the fault level at Dadri with the above transmission system.

11. Requirement of shifting of Sasaram HVDC module.

11.1 Member (PS), CEA stated that Sasaram HVDC module was proposed to be shifted to Kolhapur under the SR-WR scheme with 50% transmission charges agreed by SR but WR agreeing to only 25%

charges and asking NR to share the balance 25%. The proposal was earlier discussed in the 25th meeting of the Standing Committee but NR constituents had not agreed for sharing transmission charges for SR-WR link without having firm power allocations from that route. He stated that since the Sasaram HVDC module was to be bypassed and shifted to other location to accommodate creation of 765 kV S/S at Sasaram, NR constituents could give their consent providing assurance for 25% transmission charges to POWERGRID and CEA would discuss the issue in Southern Region where IPPs have sought open-access which would require transmission through SR-WR route. Once the IPPs in SR agree to share the balance 25% transmission charges for the SR-WR inter-regional link, the NR constituents would be relieved of the responsibility of payment of transmission charges for SR-WR link.

11.2 In view of urgency to shift HVDC b-t-b module from Sasaram to create space for 765kV, all the constituents of NR agreed to the proposal. RVPNL suggested that alternate of shifting HVDC b-t-b to Bhinmal could also be considered. The proposal was deliberated in details, it was pointed by CEA that Bhinmal does not appear an appropriate location for the HVDC. Further, acquisition of alternative land at Bhinmal would be required which would be time consuming. As PGCIL had already initiated action for procurement land at Kolhapur, it was decided that HVDC module from Sasaram would be shifted to SR-WR system. The constituents agreed to the proposal of CEA. RVPNL wanted to have further discussion. The matter was subsequently discussed by M(PS), CEA with Director(OP.), RVPNL and RVPNL had also given their consent for CEA's proposal.

(i) **Long Term Open Access for transfer of power from Reliance Industries Ltd generation project located in Jhajjar, Haryana**

POWERGRID have intimated that they have received letter from M/s. Reliance Industries Ltd for grant of Long Term Open Access(LTOA) for transfer of power from their proposed 2100 MW Gas Power Plant to be set up in Jhajjar, Haryana. It was mentioned that the quantum of power to be transferred would be increased progressively from 255 MW (peak) commencing from 2010-11 to 1300 MW by 2015-16. It was intimated that the application of RIL for LTOA was discussed in the Standing Committee meeting held on 16.02.08. However, in that meeting HVPN informed that they have not received the application for transfer of power from the project which was required for finalisation of the transmission system. Accordingly, it was decided that RIL would provide complete information about the LTOA for evacuation of power to Powergrid as well as HVPN so that optimal transmission system could be considered for granting LTOA for evacuation of power from RIL projects at Jhajjar. RIL had now furnished the application for evacuation of 700 MW (2 units) and have indicated that a capacity beyond 700 MW would be considered later. RIL indicated the following allocation of power on their first unit :-

Year	Plant Cap. (MW)	Haryana	Punjab	Delhi	Rajasthan	U.P.	Total
2010-11	350	60	90	135	30	0	315
2011-12	700	125	125	135	95	160	550*

* the concurrent peak power transfer from the power plant/SEZ is likely to be limited to this value.

It has been intimated that 100 MW load with one unit and about 250 MW with two units have been considered to be fed to SEZ directly from the generation project. For evacuation of power from the generation project following systems have been proposed :-

- RIL Jhajjar Power project - SEZ 220 kV substation 220 kV D/C (Twin Moose conductor)
- LILO of Manesar - Daulatabad 220 kV D/c line at SEZ 220 kV substation
- RIL Jhajjar Power project - Bahadurgarh 220 kV D/c (with twin moose conductor)
- The above transmission elements shall be established by Reliance Industries as dedicated transmission for immediate evacuation of power from Reliance Jhajjar TPS
- All the associated 220 kV bays shall be in the scope of Reliance Industries.

It was intimated that RIL had agreed to pay regional transmission charges as per CERC norms and in regard to the sharing of transmission charges it was mentioned that power to the SEZ shall be delivered through their dedicated 220 kV D/C line and power to Haryana shall be delivered through LILO of Daulatabad - Manesar 220 kV D/C line at their RIL SEZ substation and power to other states shall be transferred through regional network of POWERGRID through the connectivity of the generation project to Bahadurgarh (Powergrid) 400/220 kV substation at 220 kV level. Powergrid had intimated with the above proposals studies carried out shows no overloading on any of the line even under contingency outage conditions.

The members concurred with the proposal. However RIL was informed that incase of outage of Daulatabad - Gurgaon 400 kV D/C line the priority for evacuation of power through Daulatabad - Manesar line would be first given to HVPN and the evacuation of power from RIL would be subject to the availability of margins available in the Daulatabad - Manesar line.

(ii) **Proposal for Long Term Open Access for M/s. Pragati Power Corporation Ltd for transfer of power from Bawana combined power project.**

Powergrid stated that they have received letter from M/s. Pragati power Corporation Ltd. (PPCL) for grant of Long Term Open Access(LTOA) for transfer of power from their proposed 1200 MW Gas Power Plant to be set up at Bawana in Delhi. It was informed that 10% of power from Bawana would go to Punjab, about 20% would be given to Haryana and IPGCL would sell 10% of the power in open market and

about 60% of Bawana generation around 900 MW would be available for consumption of Delhi. For evacuation of power from Bawana CCGT a new Bawana generation S/Y would be constructed by IPGCL and the same would be kept isolated from Delhi ring and the 400 kV lines from Bahadurgarh would be transferred to Bawana CCGT bus and LOTA to Punjab and Haryana would be through this line. The shifting of the line from Bahadurgarh from Bawana 400 kV to Bawana CCGT bus would be carried out after the completion of Bahadurgarh-Sonepat-Abdullapur 400 kV D/C line. The proposal was discussed and agreed in the 25th SCM of NR. The constituents concurred with the above proposal, however open access for transfer of 10% of the merchant power from this project would be subject to the availability of margins in the transmission system. M/S PPCL would require to sign BPTA for payment of NR transmission charges which would be as per CERC norms.

Annex-I

List of participants for the 26th meeting of Standing Committee for Transmission System Development of Northern Region held on 13.10.08 at Chamba.

		Designation
CEA		
1.	Sh V Ramakrishna	Member(PS)
2.	Sh. A.K. Asthana	Chief Engineer(SP&PA)
3.	Sh. Goutam Roy	Director (SP&PA)
4.	Sh. Rajeev Kumar	Dy. Director (SP&PA)
PGCIL		
1.	Sh. D. Chowdhury	ED (Engg)
2.	Sh. Pankaj Kumar	GM (Engg)
3.	Sh. U.K. Tyagi	AGM (Comml)
4.	Sh. S.S. Vindal	DGM (CP)
5.	Sh. Mukesh Khanna	CDE (Engg)
NTPC		
1.	Sh. A.K. Gupta	GM (PE - Elect)
NHPC		
1.	Sh. Kamal Kapoor	ED (NHPC)
PTCUL		
1.	Sh. S. Mohan Ram	MD
2.	Sh. A.K. Gupta	ED (Projects)
3.	Sh. A.K. Gupta	CGM
4.	Sh. D.N. Joshi	GM (Projects)
5.	Sh. A.C. Goel	GM
DTL		
1.	Sh. S.R. Sethi	Director (Operations)
2.	Sh. A.K. Kaul	GM, SLDC
RRVPL		
1.	Sh. Y.K. Raizada	Director (Tech)
2.	Sh. Umesh Gupta	Chief Engineer (PPM)

3. Sh. L.N. Nimawat Addl. SE (PSS)

HVPNL

1. Sh. S.K. Mittal Director (Projects)
2. Sh. T.K. Dhingra CE (Planning)
3. Sh. J.K. Juneja SE (Planning)

HPSEB

1. Sh. S.P. Sharma Director (SP)
2. Sh. A.K. Vaidya Director (I/S)

PSEB

1. Sh. I.S. Anand CE (Planning)
2. Sh. K.S. Jolly Advisor

PDD, J&K

1. Sh. Vikramjit SE

PKTCL

1. Sh. S.K. Deb MD
2. Sh. Ramesh Bahri Dir (Proj)
3. Sh. Subroto Bhattacharya Addl. V.P.