

Summary record of the 16th Standing Committee Meeting on Transmission System Planning in Northern Region held in NREB on 24.03.04

List of the participants annexed.

Welcoming the participants of the meeting, Chief Engineer (SP&PA) thanked MS(NREB) for arranging the meeting at a short notice. He stated that the agenda for the meeting mostly covers the transmission system from the hydro projects of Northern Region. He stated that many hydro projects in Uttaranchal, Himachal Pradesh and J&K were being envisaged, for benefits in the 11th plan/ early 12th plan time frame. CEA was in the process of framing a master plan for evolving the transmission system from these generation projects so that phased development of transmission system for evacuation of power from generating projects can be taken up, so as to dovetail into ultimate transmission system planning for Northern Region. He asked Director (SP&PA) to proceed with the agenda items.

Item No. 1 - Evacuation system from Chamera III HEP

Director (SP&PA) stated that Chamera III (231 MW) would be located adjacent to existing stages of Chamera I and Chamera II in Ravi Basin. Besides Chamera III other contemporary hydro project like Kutehar (260 MW), Bharmour (45 MW), Kugti (45 MW), Budhil (70 MW) in the upstream of Chamera III were also envisaged in the Ravi Basin. Power from Chamera III was proposed to be evacuated at 220 kV.

He stated that three alternative system as indicated in the agenda were considered for evacuation of power from Chamera III. In alternative I pooling point near Chamera III and 400 kV therefrom to Jullundhar was proposed. The pooling point was also proposed to be connected to Chamera II at 400 kV. In alternate II 220 kV evacuation upto Hamirpur and there after evacuation through existing 220 kV Hamirpur – Jullundher lines was proposed. In alternate III 220 kV evacuation upto pooling point near Hamirpur and 400 kV lines thereafter to Jullundhar was proposed. Of these option Alternative-3 was considered to be better option due to the following reasons:-

- (i) Difficulty in locating of adequate/.suitable land for construction of pooling point in hilly region.
- (ii) Interconnection of Chamera III with the existing stages of Chamera would create deloading of the existing Kishenpur – Moga 765 kV line operated at 400 kV.
- (iii) Considering the number of projects envisaged in Ravi basin a 400/220 kV pooling point was required to be established which would serve the purpose of evacuation of power from Ravi as well as Beas basin projects.

- (iv) Evacuation at 400 kV from pooling point in hills to the load center would create an over voltage/stability problem due to long line length and less load absorption capacity in the nearby area.
- (v) With 220 kV evacuation option as per alternative II, the requirements for future projects of HP would call for additional network, leading to sub-optimal development.

He stated that considering the above facts a 400/220 kV pooling point near Hamirpur had been envisaged, the location of which was to be finalised depending on the alignment of the line crossing of Chamera to Jullundhar viz-a-viz Parbati III to Amritsar line. He stated that with the commissioning of other upstream Ravi basin hydro projects, Kuthar would be interconnected with Chamera III by SC line and 220 kV D/C line from Kuthar would be taken to Hamirpur pooling point. The Hamirpur – Jullandhar section charged at 220 kV with Chamera III would then be charged at 400 kV.

Addl. SE (Planning), HPSEB stated that other hydro projects like Hadsar (60 MW), Kugti (45 MW), Chamba (125 MW) and Baratunga (200 MW) were also envisaged in the same basin and these should also be considered to ascertain the adequacy of the transmission system. Director (SP&PA) stated that the projects upstream of Chamera III considered in the study were taken based on the information given by HPSEB earlier and if the projects being indicated by HPSEB were also envisaged then the 220kV line from Kuthar to Hamirpur could be constructed with Quad conductor.

Chief Engineer, RVPNL stated that the system envisaged from Chamera III indicates strengthening of the transmission portion upto Hamirpur / Jullandhar. However, further strengthening of the transmission system beyond Jullandhar had not been shown. Chief Engineer (SP&PA) stated that the studies were conducted for all India basis considering the requirement for evacuation of power from the generation projects as well as Regional and intra/inter regional transmission requirements. Wherever strengthening required was either covered as a part of works under strengthening of transmission system or evacuation system with other projects of Northern Grid. The existing transmission system beyond Jullandhar was adequate for evacuation of power from Chamera III as well as other projects envisaged in that valley. As such, no further strengthening of the transmission system beyond Jullandhar would be required.

Concluding the discussion Chief Engineer (SP&PA) stated that following system were recommended with Chamera III/ Kuthar HEP.

Transmission system associated with Chamera III

- Generation of Chamera III power at 220 kV level
- Creation of 400/220 kV pooling point near Hamirpur at suitable location.
- Chamera III – Hamirpur pooling point 220 kV D/C line with 2x0.5 conductor
- Additional 1 no. 220 kV bay at Chamera III for 220 kV S/C line from Kuthar
- Hamirpur – Jullandhar 400 kV D/C line(operated at 220 kV)

- POWERGRID to locate and purchase requisite land for Hamirpur S/S corresponding to requirement of 400 kV S/S

Transmission system from Kutehar

- Kutehar – Hamirpur 220 kV D/C with 2x0.5 conductor
- Kutehar – Chamera III 220 kV D/C with 2x0.5 conductor bunched into S/C
- Additional 2 nos. 220 kV bays at Kutehar for 220 kV lines from upstream projects
- LILO of Parbati Amritsar 400 kV D/C line at Hamirpur Pooling Point
- 400 kV operation of Hamirpur – Jullundhar D/C line

The members of the committee agreed for the proposal.

Item 2 - Power Evacuation system associated with Parbati-II (800 MW) and Koldam HEP(4x200 MW)

Director (SP&PA) stated that the evacuation system from Parbati II – Koldam HEP were agreed in the 14th Standing Committee Meeting wherein following evacuation system were envisaged.

Parbati II

- Parbati II to Koldam site 2xS/C with Quad Conductor

Koldam HEP

- Koldam – Nalagarh 400 kV D/C with Quad Conductor
- 400 kV Koldam – Ludhiana 400 kV D/C line with triple conductor
- 2 nos. of 400 kV bay for Koldam – Nalagarh/Parbati II lines.

System under northern region strengthening scheme
400 kV S/S at Ludhiana with 3x315 MVA ICT

He stated that the system envisaged in 14th Standing Committee Meeting considered commissioning of Koldam HEP ahead of Parbati II HEP. However subsequent indication was that, Parbati II was expected during 2007-08 time frame while Koldam was expected around 2008-09 time frame. Considering the uncertainty in the commissioning programme of the hydro projects, the following was suggested.

Transmission system common to Parbati II and Koldam which is to be programmed for commissioning matching with whichever comes first:

- Koldam – Nalagarh 400 kV D/C line with Quad conductor
(in this, the provision for 400kV bays is to be kept for Nalagarh end only.
The bays at other end get covered under Koldam or Parbati-II HEP)

Transmission System for Koldam HEP

- 2 nos. 400kV bays for Koldam-Nalagarh/Parbati-II lines.
- Koldam – Ludhiana 400 kV D/C line with Triple ‘Snowbird’ conductor

Transmission System for Parbati-II HEP

- Parbati II – Koldam 400kV 2xS/C lines with Quad conductor.
(in this, the provision for 400kV bays is to be kept for Parbati-II end only.
The bays at Kaldam/Nalagarh ends get covered under Koldam/ Common works)

The members of the standing committee agreed with the proposal.

DGM, POWERGRID stated that their study indicates that Koldam - Ludhiana line might not required to be constructed with triple conductor as twin conductor would be adequate and it would incur saving in the cost of transmission line. Director (SP&PA) stated that as suggested by DGM, POWERGRID the Koldam – Ludhiana could be constructed with twin conductor instead of triple conductor as envisaged earlier.

Item 3 - Evacuation system from Parbati III HEP (520 MW)

Director (SP&PA) stated that for evacuation of power from Parbati III HEP, a 400 kV S/C line between Parabti III and Parabti pooling point was considered and one of the line from Parbati to Koldam D/C line was to be LILOed at Parbati pooling point. Further from Parbati Pooling point 400 kV D/C line to Amritsar was envisaged. In view of serious R-O-W constraint experienced in the Parbati valley, it had been proposed to LILO both the circuits from Parbati III to Koldam at Parbati pooling point and dispensing with the additional circuit from Parbati III - Parbati pooling point. He further stated that for further evacuation of power 400 kV D/C line from Parbati Pooling point - Amritsar was proposed.

After deliberation, Chief Engineer (SP&PA) stated that following system were recommended with Parabti III HEP:-

- (i) Stepping up the generation of Parbati III at 400 kV
- (ii) Creation of 400kV pooling point at Parbati (**Panarsa**)
- (iii) LILO of both line from Parbati to Koldam at Parabti Pooling point(**Panarsa**)
- (iv) Parbati Pooling point - Amritsar 400 kV D/C line

The members of the Standing Committee agreed the above proposal

Item 4 - Evacuation system from Allain Dhuangan (192 MW) and Malana II (100 MW)

CE (SP&PA) stated that evacuation system with Allain Dhuangan /Malana II HEP was agreed in the 14th SCM of NR. However, due to some apprehension indicated by the promoters of the Allain Dhuangan /Malan II HEP regarding the availability of evacuation system matching with the commissioning of their projects a review meeting held on 23.02.04 in CEA with promoters of the company along with POWERGRID, NHPC as well as NTPC, discussed on the issue. In the meeting a view emerged that since Parbati II system would be available during the time frame of commissioning of Allain Dhuangan / Malana II projects so the power from these projects would be injected at Parbati pooling point and from there power would be evacuated to Northern Regional grid. The 220 kV transmission system from Allain Dhuangan/ Malana II and

also 400/220 kV augmentation at Parbati pooling viz. including 400/220 kV ICTs, ICT bays on 400 kV side and total 220 kV switchyard would be at the cost of Allain Dhuangan/ Malana II project authorities and pooled wheeling charges for Northern Regional grid would be applicable for use of transmission system beyond Parbati Pooling point.

Item 5 - Power evacuation system from Koteshwar HEP

Director (SP&PA) stated that as a part of Tehri St I and Koteshwar HEP evacuation system, a 765/400 kV pooling point was to be created near Tehri and power from Koteshwar as well as Tehri was to be pooled at Tehri pooling point. From Tehri pooling point power was to be stepped up at 765 kV and evacuated through Tehri – Meerut 765 kV 2xS/C line to the NR grid. However the creation of 765 / 400 kV pooling point in Uttaranchal hill had come under question as adequate land for creation of conventional 765/400 kV switchyard. Teams including officers from POWERGRID, CEA and THDC visited different sites and located land where GIS S/S could be constructed.

Accordingly the following evacuation system from and following system now proposed with Koteshwar HEP was being proposed.

- (i) Creation of 400 kV GIS pooling point by LILO of Tehri – Meerut 765 kV 2xS/C line to be charged at 400 kV
- (ii) Koteshwar to Tehri pooling point 400 kV D/C line
- (iii) Creation of 400 kV S/S at Roorkee with 2x315 MVA ICT by LILO of Rishikesh – Moradnagar line
- (iv) 400kV S/C line from Meerut towards Roorkee – Muzaffarnagar section of Rishikesh – Moradnagar section of the line so as to have
 - Meerut – Roorkee 400 kV S/C
 - Meerut – Muzaffarnagar 400 kV S/C line (covered by Tehri St- I)
 - Muzaffarnagar – Moradnagar S/C line
- (v) Provision of 50% series compensation of Tehri – Meerut 2xS/C line initially charged at 400 kV.

Director (SP&PA) stated that above system would be adequate for evacuation of power from Tehri St I as well as Koteshwar HEP. However with the commissioning of Tehri St II and upstream projects like Pala Maneri and Lahori Nagpala HEP there would be a need to upgrade the 400kV Tehri /Koteshwar GIS pooling point and Meerut S/S to 765 kV and charge the Tehri /Koteshwar pooling point – Meerut 765 kV 2xS/C line at 765 kV. For establishment of 765/400 kV S/S at Tehri /Koteshwar pooling point space would need to be created at a different tier in the hill.

CE (SP&PA) stated that 400 kV Muzaffarnagar – Roorkee portion of the Rishikesh – Moradnagar line which belongs to UPPCL could create a maintenance problem for POWERGRID. As such he suggested that POWERGRID should take necessary measures for acquiring the line from UPPCL so that future maintenance problem of the line could

be avoided. Concluding the discussion CE (SP&PA) stated that following system have been agreed with Koteshwar HEP.

- i) Creation of 400 kV GIS pooling point by LILO of Tehri – Meerut 765 kV 2xS/C line to be charged at 400 kV
- ii) Koteshwar to Tehri pooling point 400 kV D/C line
- iii) Creation of 400 kV S/S at Roorkee with 2x315 MVA ICT by LILO of Rishikesh – Moradnagar line
- iv) 400kV S/C line from Meerut towards Roorkee – Muzaffarnagar section of Rishikesh – Moradnagar section of the line so as to have
 - Meerut – Roorkee 400 kV S/C
 - Meerut – Muzaffarnagar 400 kV S/C line (covered by Tehri St- I)
 - Muzaffarnagar – Moradnagar S/C line
- (v) Provision of 50% series compensation of Tehri – Meerut 2xS/C line initially charged at 400 kV
- (vi) POWERGRID should initiate action for acquiring Roorkee – Muzaffarnagar section of Rishikesh – Moradnagar 400 kV S/C line from UPPCL.

All the members of the Standing Committee agreed with the proposal.

Item 6 Creation of 400/220 kV Maharani Bagh GIS S/S

CE(SP&PA) stated that 400/220 kV Maharani Bagh S/S was envisaged as a part of Tala transmission system. Initially DTL had to face lot of problem in acquiring adequate land for construction of 400/220 kV S/S in Delhi. However when they acquired land it was found that a portion of it was encroached by temple which could create problem in construction of the conventional type 400 kV S/S. Considering the recent reduction in cost for GIS S/S, as well as benefit in terms of reliability, it was proposed to construct 400/220 kV GIS S/S at Maharani Bagh in place of conventional type of 400 V S/S.

Members of the standing committee agreed with the proposal.

Additional SE, PSEB stated that the 400/220 kV S/S proposed at Amritsar with Tala envisaged only one ICT. However with the commissioning of other generation as well as increase in load at Amritsar, their studies shows requirement of second ICT at Amritsar. He requested the Standing Committee to consider the proposal for creation of second ICT at Amritsar. The committee agreed for the same and it was decided that 2nd 400/220 kV ICT at Amritsar would be provided as a part of strengthening works of Northern Region Grid.

Item – 7 Deferring LILO of Kanpur – Agra 400 kV S/C at Auraiya

Director (SP&PA) stated that in the 15th Standing Committee meeting LILO of 400 kV Kanpur to Agra S/C line at Auraiya and 400 kV Kanpur – Auraiya D/C line was agreed. However after subsequent re-assessment it was found that with 400 kV Kanpur – Auraiya D/C line in place the LILO of Kanpur – Agra S/C line at Auraiya can be deferred for reconsideration in future.

The proposal was agreed by the Committee.

Item 8 Balia – Bhiwadi HVDC bi-pole line

Director (SP&PA) stated that the 400 kV Balia – Bhiwadi HVDC line which forms a part of Barh evacuation system was agreed in the 15th Standing Committee meeting of NR. However the capacity of the line was to be decided. POWERGRID had suggested capacity for 2500 MW. The additional cost on account of incremental capacity from 2000 to 2500 MW for terminal equipments , upgradation to higher size conductor (lap wing) could be order of 250 crs. The additional capacity would be advantageous for import of additional power from Eastern/ North Eastern Region in future. Increase in the capacity would also help in loss reduction in transmission system. As such the capacity of 2500 MW for HVDC e Balia – Bhiwadi bipolar terminal line was recommended. Members of the Standing committee agreed for the same.

Item 9 – Transmission system associated with Unchahar

CE (SP&PA) stated that the matter referred to creation of 220 kV S/S at Rai Bareilly. However, since no representative from UPPCL was present in the meeting, so the matter could be deferred and discussed in a subsequent meeting with UPPCL. However, NHPC should keep a provision for one no. of 220 kV line bay at 220 kV Unchahar. This was agreed.

Item 10 - Evacuation system from Uri II HEP (240 MW)

Director (SP&PA) stated that Uri I & II HEP were located close to border area and there were serious R-O-W as well as land availability problem for creation of switchyard with 2 voltage level. Considering this evacuation from Uri II at 400 kV by LILO of one of the existing Uri Wagoora D/C line at Uri II was suggested. POWERGRID had suggested another outlet at 220 kV from Uri for meeting contingency tower outage condition. GM, NHPC stated that it would be very difficult to obtain any additional space at Uri II. However he would check the space provision at Uri I and if available one line at 220 kV could be taken from Uri I.

Chief Engineer (SP&PA) stated that the proposed system by LILO of one circuit of Uri I – Wagoora at Uri II could be agreed. However, for exploring the possibility for 220 kV outlet from Uri a team from NHPC, POWERGRID and CEA could visit the Uri site.

Members of the committee agreed with the above proposal.

Item 11- Maithon transmission system

Director (SP&PA) stated that evacuation system from Maithon TPS was agreed in the 15th Standing Committee Meeting. However decision regarding the voltage level of Agra –Meerut line was pending. He stated that POWERGRID had proposed for 400kV D/C line. However under present circumstances when the commissioning schedule of Maithon TPS was uncertain the decision regarding Agra –Meerut line could to be deferred.

Members of the Standing committee committee agreed for the same.

Additional agenda :-

Item 1 Inter regional links for increased connectivity between Northern region and Western Region.

Director (SP&PA) stated that from the point of view of development of All India National Grid, Agra – Gwalior 765 S/C 2nd line with 400 kV operation, and Kankroli – Zerda 400 kV D/c line was agreed in the Standing Committee meeting of western region held in January 2004. He stated that the above links would provide increased power transfer capacity between NR and WR besides providing stability, reliability and operational flexibility to the grid. Under HVDC pole outage on Balia – Bhiwadi line, the proposed inter regional links would help in wheeling power of ER to the NR via WR. He intimated that since benefit of the line would be accrued equally by NR as well as WR constituents so the cost of the above link lines would have to be shared between NR and WR on 50:50 basis.

Members of the Standing committee committee agreed with the above proposal

Item 2 Evacuation system from Sewa II HEP (120 MW) in J&K

Director (SP&PA) stated that evacuation system from Sewa II HEP (120 MW) in J&K was agreed in the 15th Standing Committee meeting of NR. Following transmission lines were agreed with Sewa II HEP :-

- (i) Sewa II HEP – Hiranagar 132 kV D/C
- (ii) Sewa II – Kathua 132 kV D/C line

Kathua - Mahanpur 132 kV S/C on D/C line was under construction by PDD, J&K. POWERGRID had suggested that PDD, J&K should construct the line between Kathua – Mahanpur as D/C instead of S/C. So that POWERGRID construct line between Sewa II – Mahanpur and terminate the one circuit at Mahanpur and connecting other circuits to one of the Kathua – Mahanpur line to J&K bypassing Mahanpur S/S so as to form

- Sewa II – Mahanpur – Kathua 132 kV line

- Sewa II – Kathua 132 kV line

SE PDD, J&K stated that at this stage it would be difficult to construct line as D/C. Considering this CE (SP&PA) stated that PDD may construct the line between Kathua – Mahanpur as S/C on D/C and POWERGRID should take over the line from J&k after completion and then construct the second circuit on the line and have the line from Sewa to Mahanpur and to Kathua as envisaged.

The Members of the Committee agreed with the proposal.

Item 3 Transmission system for RAPP

Director (SP&PA) stated that the evacuation system from RAPP St 5,6,7 & 8 was agreed in the 14th Standing Committee Meeting of the NR. Wherein a portion of the RRVPN system ie, Kota- Kankroli 400 kV S/C was to be utilized for evacuation of power from RAPP stage 5,6,7 & 8. RRVPN had intimated POWERGRID their inability to construct the Kota – Kankroli lines as well as Kankroli – Bhinmal line matching with the RAPP timeframe. In view of this the proposal for RAPP was reviewed and following was suggested.

With RAPP unit 5&6

Changes in earlier proposal

- Instead of work relating to upgradation of Kota – Kankroli line for 400 kV operation, it would be 220 kV D/C lines for connection POWERGRID S/S at Kota and Kankroli to RVPNL S/S
- 2x315 MVA 400/220 kV transformer at Kota in place of earlier proposal of 3x250 MVA

Additional transmission lines

- Kota – Merta 400 kV D/C line
- Kankroli – Jodhpur 400 kV S/C line

With RAPP unit 7&8

- RAPP – Jaipur 400 kV D/C line of which one circuit to be LILOed at Kota
- RAPP – Nagda (WR) 400 kV D/C (NR: WR :: 50:50)

Chief Engineer, RRVPN stated that since RRVPN was constructing Hirapur – Merta – Jodhpur line and the same was scheduled for 2005-06 time frame therefore it would be beneficial for Rajashtan and also for the grid to consider creation of 400/220 kV Beawar S/S and take the line from Kota to Merta via Beawar. CE (SP&PA) stated that the 400/220 kV Beawar S/S earlier formed the part of Anta St II transmission system and was located in a close vicinity to Merta 400 kV S/S which is under construction by RRVPN. As such if RRVPN fees any need for creating 400 kV Beawar S/S at this stage they should consider creation of the same at their own expense.

Concluding the discussion CE(SP&PA) stated that following system were Recommended with RAPP C & D.

With RAPP unit 5 & 6

- i) RAPP – Kankroli 400 kV D/C
- ii) Kankroli – Jodhpur 400 kV S/C
- iii) RAPP – Kota 400 kV S/C
- iv) Kota – Merta 400 kV D/C
- v) Creation of 2x315 MVA and 3x315 MVA S/S at Kota and Kankroli respectively

With RAPP unit 7 & 8

- i)
RAPP – Jaipur 400 kV D/C line of which one circuit to be LILOed at Kota
- ii) RAPP – Nagda (WR) 400 kV D/C (NR: WR :: 50:50)

The Members of the Committee agreed with the proposal.

List of Participants of the 16th Standing Committee meeting held in NREB, Katwaria Sarai New Delhi on 24.03.2004

S/SHRI

Name **Designation**

CEA

V. Ramakrishna Chief Engineer
A.K. Asthana Director
Gautam Roy Dy. Director

NREB

A K Malik SE(Op.)
Prahlad Meena Exec. Engineer
Vikram Singh Astt. Engg.

NTPC

A.K. Gupta HOD (Elect.)

NHPC

Raj Kumar GM(Elect.)

POWERGRID

R.N. Nayak E.D. (Engg.)
Y K Sehgal DGM (Engg.)
M. Khanna CDE (Engg.)
V Thiagrajan DCDE(Engg.)

NPCIL

NSM Rao GM (Trans.)

Delhi Transco Ltd.

Raj Bhartiya D.GM (Plg.)

RVPN Ltd.

Y K Raizada CE(PPM&R)
L.N. Nimawat XEN (PSS)

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I.S. Anand Addl. S.E./Plg.

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S R Singla CE(Plg.)
T.K. Dhingra S.E./Plg.

HPSEB

P C Sharma Addl. SE
V K Kaprate Addl. SE

PDD J&K

K L Bhagat SE

BBMB

A S Chugh CE
A L Wadhawan Dy. CE

UPCL

Mahesh Chandra DGM (SO.)