Agenda for 18th Meeting of the Standing Committee on Transmission System Planning in Northern Region

Item – I Confirmation of the minutes of 17th Standing Committee on Power System Planning in Northern Region held on 10.08.2004 at NREB, New Delhi.

1.1 The minutes of the 17th meeting of Standing Committee on Power System Planning in Northern Region held on 10.08.2004 at New Delhi, were circulated vide CEA letter No. 1/9/2004-SP&PA/ 749-764 dated 25.08.2004. No Comments from any constituent states have been received.

1.2 The minutes of the meeting may please be confirmed.

Item – II Proposal for acquiring section of Rishikesh – Muradabad line of Uttat Pradesh (UPPCL).

2.1 In the 16th meeting of the standing committee for transmission planning of Northern Region following works for system strengthening proposal in Roorkee area was agreed

- Creation of 400/220 kV Substation at Roorkee with 2x315 MVA ICT by LILO of Rishikesh – Muradnagar Section of the line at Roorkee
- 400 kV S/C line from Meerut to Roorkee for which Muzaffarnagar - Rishikesh section of UPPCL line could be used.

2.2 POWRERGRID vide letter dated 7/04/2005 have intimated that UPPCL have suggested that POWERGRID may construct Roorkee – Meerut 400 kV S/C line and their Rishikesh – Muzaffarnagar 400 kV line may be retained so that the link between Uttaranchal and U.P is mentained. The matter was examined in and was also found feasible and reliable and as such can be agreed.

Members of the committee may discuss and concur on this issue.

Item –III Evacuation system from Chamera III HEP (231 MW)

3.1 The evacuation system from Chamera III was agreed in the 16th meeting of the standing committee for transmission planning of Northern Region with the following associated transmission system

Transmission system associated with Chamera III

- Generation of Chamera III power at 220 kV level
- Creation of 400/220 kV pooling point at the location close to the alignment of Chamera-Jullundhar and Parbati-Amritsar lines. In the Chamera-III time frame, this would be only 220kV switching station which would be upgraded to 400kV in future.
- Chamera III – Pooling station 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 Kutehar
- Pooling station – Jullandher 400 kV D/C line(operated at 220 kV)
- POWERGRID to locate and purchase requisite land for Pooling station corresponding to requirement of 400 kV S/S

Transmission system from Kutehar

- Kutehar – Pooling station 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 Pooling station
- 400 kV operation of Pooling station – Jullundhar D/C line

3.2 POWERGRID in their letter dated 19th April 2005 have intimated that during route survey for the transmission system from Chamera III it was observed that line from Ravi basin towards Hamirpur shall have to transverse through high altitude Dhauladhar hill of about 4000m to 4500m high. Another route through JOT valley was surveyed, however through this route the length of the line would increase and it would be possible to construct only a limited number of transmission lines. In view it have been proposd by POWERGRID to construct a GIS 400/220 kV pooling station in Chamba valley close to Chamera III generation and construct 400 kV D/c line to Jullandhar via JOT valley. The proposal has an advantage of for injection of power from other Hydro projects in in Ravi basin into Chamba pooling point at 220 kV.

3.3 The above issues as highlighted by POWERGRID have been examined and following three alternative evacuation options are put up for consideration of the Members of the committee.

Alternative –I

- Creation of 400/220 kV, 2x315 MVA GIS pooling station near Chamba
- Chamera III – Pooling point 220 kV D/C line
- Pooling station near Chamba – Jullandhar 400 kV D/C line

Alternative -II

- Creation of 400/220 kV pooling station near Hamirpur at the location close to the alignment of Chamera-Jullundhar and Parbati-Amritsar line, with LILO of Parbati – Amritsar 400 kV line at pooling station near Hamirpur.
- Chamera III – Pooling point near Hamirpur 220 kV D/C line with twin conductor on multi circuit tower (4 ckts.) for accommodating 220 kV D/C line from Kuther HEP
- Additional 1 no. 220 kV bay at Chamera III for 220 kV S/C line from Kutehar
- Pooling station near Hamirpur – Jullandher 400 kV D/C line

Alternative -III

- Creation of 400/220 kV, 2x315 MVA GIS pooling station near Chamba
- Chamera III – Pooling point 220 kV D/C line
- Pooling station near Chamba – hamirpur - Jullandhar 400 kV D/C line
- Creation of 400/220 kV S/S at a suitable location near Hamirpur(Same as in Alternate II)
- LILO of Chamera I – Jullandhar 400 kV D/C line at pooling station to be constructed in the plains as and when required

Item - IV Power evacuation system from Uri II HEP

4.1 The evacuation system from Uri II was agreed/finalized in the 16th SCM for transmission system planning of of Northern Region. Following works were agreed as a part of transmission system associated with Uri II system

i) Uri I – Wagoora 400 kV S/C line
ii) Uri II – Wagoora 400 kV S/C line

4.2 POWERGRID in their correspondence to CEA dated 19th April 2005 have informed that NHPC have requested them to provide 400 kV bay at Uri –I switchyard under the scope of transmission system as TEC cleared cost of Uri II does not have cost provision for additional 400 kV GIS bay at Uri I.

4.3 As per practice, generation end bays used for evacuation of power are covered in the generation project. However, as the bay at Uri I is required for evacuation of power Uri II, the cost provision for the same may be included in the scheme for associated transmission with Uri II HEP by POWERGRID.

Members of the committee may discuss and concur on this issue.

Item – V Evacuation system from Rampur HEP (434 MW) of Satluj Jal Vidyut Nigam Ltd.

5.1 POWERGRID have proposed for transmission system associated from Rampur HEP. The hydro project is to be constructed by M/s Satluj Jal Vidyut Nigam Ltd. in Himachal Pradesh and would be located in district Kinnaur of Himachal Pradesh on river Sutlej in the downstream of Nathpa Jhakri HEP. The project envisages installation of 3 units of 144.67 capacity totaling to 434 MW with an overload capacity of 10%. Power form the project would be generated at 11 kV and subsequently stepped up to 400 kV. For evacuation of power from the project POWERGRID have proposed the following evacuation system

- LILO of Nathpa Jhakri – Nalagarh 400 kV D/C at Rampur
- Abdullapur – Patiala 400 kV D/C
- LILO of Patiala – Hissar 400 kV line at Kaithal
- LILO of Nalagarh – Kaithal 400 kV line at Patiala

The result of the studies furnished by POWERGRID are enclosed in **Exhibit I to Exhibit IV**.

5.2 The proposal of POWERGRID have been examined and it is observed that the proposal have been studied for end of 11 plan condition taking into consideration the benefit of the other major projects viz. Karchem wangtoo(1000 MW) proposed in that area. POWERGRID may present the studies.

Members of the committee may discuss and decide.

Item – VI System Strengthening in Northern Region to augment the over-all 400/220kV transformer capacity of the regional system.

6.1 With increasing power injection into the regional grid, there is a need to augment the over-all step down transformer capacity from 400kV network of the regional grid system so that the additional power being injected into the inter-state system could be dispersed and delivered to the state grid networks. For this purpose, following capacity augmentation and new S/S along with connectivity lines have been identified based on inputs from State Utilities and POWERGRID:

- One additional 315 MVA 400/220kV transformers each at Ludhiana (3rd), Hissar (3rd) and Maharani Bagh (3rd)
- Converting switching station to 400/220kV s/s by providing 2x315 MVA 1st & 2nd transformers along with 220kV bay and 220kV LILO lines for connecting to underlying 220kV network at Bareilly and Agra.
- New 400/220kV s/s with 2x315 MVA transformers along with 220kV bay and 220kV LILO lines for connecting to underlying 220kV network at:
  - Gurgaon by LILO of Bhiwadi-Samaypur 400kV S/C line. In view of space constraints GIS/undergroud s/s may be considered at Gurgaon.
  - Bhinmal by LILO of one circuit of Kankroli-Zerda 400kV D/C line.

Members of the committee may discuss and decide.

6.2 The following system strengthening are also under consideration:

- Creation of 400/220 kV Saharanpur S/S with 2x315 MVA ICT. This could be through LILO of Roorkee-Abdullapur 400kV D/C line being proposed with Srinagar HEP transmission system.

- Gurgoan – Khetri – Ratangarh 400 kV D/C line with 400/220kV s/s at Khetri

- Future augmentation of transformer capacity at Jaipur and Agra.

It is proposed to discuss and decide these in subsequent meeting. Members may like to supplement on this.

Item–VII Transmission System for Evacuation of Power from Subansiri HEP (2000 MW), North Karanpura (1980 MW) and Maithon RB (1000 MW).

7.1 The Issue:

Northern Region and Western Region would need to import substantial power to meet their growing demand. Based on the programme of generation capacity addition and growth in demand, projections show that Northern Region would need to import up to 8700 MW during winters and Western Region up to 6300 MW during summers of 11th plan end time frame. Details of the projects are at Annex. For completeness of information, the projections for all the regions in the country have been included in the Annex.

Subansiri HEP (2000 MW) of NHPC in North Eastern Region is scheduled for completion during 2010. NHPC have signed MOU with beneficiaries from Eastern Region. ER is already surplus in power and new projects, mainly thermal, with a total capacity of about 18000 MW are planned to be added by 2011-12. Similarly, in NER, about 6000 MW would be added. Therefore, about 15000 MW to 17000 MW of surplus power would be available to be exported from ER-NER complex.

As the monsoon months of North-eastern region are extended over five-six months, the hydro power of NER can be utilized in NR and WR for meeting the demand in the months of May, June, July, October and November. During the months of July and August, NR/WR may avail NER power provided it is offered at low rates so that some of the generation with in the NR/WR could be backed down cost effectively.

The transmission system for evacuation of power from Subansiri project is yet to be tied up. Surplus power from this project can be exported to NR states (and also to WR), which would have peak power deficits during majority of months of summer and winter seasons during 11th plan period.

North Karanpura (1980 MW) of NTPC and Maithon RB (1000 MW) of DVC are thermal projects in Eastern Region. DVC have indicated that NR constituents would be he beneficiaries of power from Maithon. North Karanpura power is likely to be allocated to beneficiaries in NR, WR and ER.

7.2 The Proposal:

I. Following associated transmission system is proposed for Subansiri HEP:

(i) Subansiri - BiswanathChariyali (pooling point near Balipara in NER), 400kV D/C Quad line. Transmission charges for this to be shared by the beneficiaries having allocated power from the Subansiri generation project..

(ii) BiswanathChariyali – Agra, HVDC Bipole, +/- 600kV, 4000 MW. Transmission charges to be shared by the constituents of NR and WR in 50: 50 ratio and the sharing of transmission charges with in the regional beneficiaries to be as per existing method of regional transmission system.

II Following associated transmission system is proposed for Mathon RB:

(i) Maithon RB- Maithon 400kV D/C, Maithon RB – Ranchi 400kV D/C and Biharsharif – Sasaram 400kV D/C. Transmission charges for this to be shared by the beneficiaries having allocated power from the Subansiri generation project.
(ii) Sasaram-Fatehpur-Agra 765kV S/C (initially operated at 400kV) with 400/220kV 2x315 MVA s/s at Fatehpur (to be later upgraded to 765kV) and LILO of two 400kV circuits of Singrauli/Allahabad-Kanpur/Mainpuri lines at Fatehpur and Agra-Gurgaon 400kV D/C line. Transmission charges to be shared by NER beneficiaries.

III Following associated system is proposed for North Karanpura:

(i) North Karanpur-Ranchi 400kV D/C. Transmission charges for this to be shared by the beneficiaries having allocated power from the Subansiri generation project.
(ii) North Karanpura-Sasaram 765 kV S/C, operation of Sasaram-Fatehpur-Agra line to 765kV, 765/400kV s/s at Sasaram(2 transformers), Fatehpur(2 transformers) and Agra (1 transformer) (transformer capacity to be 1000MVA or 1200MVA each to be decided by POWERGRID based on optimization/standardization). Transmission charges to be shared by NR beneficiaries.
(iii) North Karanpura- WR pooling point-Seoni and Sipat-WR, 765kV S/C and WR pooling station. Transmission charges to be shared by WR beneficiaries.

7.3 Constituents of NR and WR would share cost of BiswanathChariyali – Agra HVDC Bipole. Cost of other lines associated with Subansiri would be shared by identified beneficiaries. Up to the 2011-12 scenario, HVDC Capacity of 3500 MW from NER to NR/WR would be required. In the 12th Plan and the 13th Plan, a number of hydro projects are to be developed in the NER. The total hydro potential in NER is of the order of 30000-35000 MW. Most of this would have to be transmitted to NR/WR where there is load growth and this power could be utilized to meet the demand. Additional potential of the order of 10000-12000 MW in Bhutan would also need to be transmitted to NR/WR. The optimum transmission for this over the distance exceeding 2500 kms would be hybrid of HVDC and high capacity AC. In view of RoW constraints in the chicken-neck area and also to conserve RoW in other areas and also to minimize losses, high voltage HVDC has been identified as the right option. At present, the HVDC highest voltage in the country is ± 500 kV and in the world it is ± 600kV. Higher voltage level of ± 800kV HVDC is also feasible and the technology is in developing. Considering these factors, it is proposed to develop the first NER-NR HVDC bi-pole line that is the proposed BiswanathChariali-Agra HVDC bi-pole line to be of 4000 MW capacity and at ± 600kV. POWERGRID have proposed that the transmission line for this bi-pole be constructed for ± 600kV specification so that later when ± 800kV technology is available, this line could be upgraded to ± 800kV and 6000 MW capacity. The other option is to keep this first line at ± 600kV and 4000 MW and plan for ± 800kV on the second bi-pole line from NER when that is planned. Phasing of investment vis-à-vis advantage in loss reduction would need to be considered.

7.4 Need for a Direct HVDC Link up to NR/WR from NER:

The installed capacity in NR is planned to be enhanced from the present value of 33000 MW (Thermal-21000 MW, Hydro-12000 MW) to about 54000 MW (Thermal-29500 MW and Hydro-25000 MW) by the end of 11th plan period. A list of expected capacity additions during this period is given at Table-I & Table-II. Peak demand during the same period would increase from 27000 MW to 44800 MW. Peaking availability analysis shows that there would be a deficit between 2600 MW to 8800 MW under different seasonal and operating scenario. Similarly, installed capacity in Western Region would increase from present value of 32000 MW to about 58500 MW and peak demand from 31200 MW to 51800 MW by 2011-12. This would leave a gap of 5000 MW to 6000 MW in meeting peak demand in WR.

7.5 Surplus Scenario in Eastern and Northeastern Regions:

On the other hand, similar analysis for Eastern Region indicates a surplus of 12000 MW to 13000 MW during same seasonal and operating scenarios by 2011-12. And likewise, the Northeastern Region would also be surplus in the range of 2400 MW to 4400 MW. A list of major projects coming in NER is given at Table-III.

7.6 System Studies:

The above discussion establishes a need for providing transmission system to evacuate about 15000 MW from ER-NER complex by the end of 11th Plan. Also, there is need for providing transmission system for importing about 8500 MW in Northern Region and 5500 MW in Western Region by 2011-12. Transmission system for Subansiri, would therefore, be part of the total all-India inter-regional system to be planned and designed to meet these bulk import and export requirements of all the regions.

Power from Subansiri and other NER surplus may be evacuated by a direct HVDC link from a pooling point in NER to a suitable point in NR/WR. The pooling point in NER would be so located as to pool surplus power from Kameng, Siang, Bhareli and Subansiri projects. The landing point in NR/WR could be either Agra or Gwalior. Though both the points are close, Agra is being preferred from system operation point of view. The already planned Agra – Gwalior 765kV lines and associated systems, would provide the necessary transmission facility for transferring power between NR and WR, that would be received from ER-NER.

Following load flow cases are presented for perusal and discussion of members.

Summer Scenario:

Sl. No.	Operating Scenario / Case	Exhibit No.	Remarks
1	Summer Peak Base Case Export-Import Scenario: NR (-) 2600 MW WR (-) 6300 MW SR (-) 1360 MW ER 6420 MW NER 3840 MW	SP-001	Full dispatch of 2000 MW is considered at Subansiri. Requirement of import of power for NR is less and for WR is more. Flow on Biswath – Agra HVDC is 3500 MW. A power of 1615 MW flows from NR to WR over the Agra-Gwalior 765kV lines.
2	Summer Peak Outage Case Export-Import Scenario: (same as in base case above)	SP-002	Outage of one pole of Biswanath-Agra is taken and 2000 MW is flowing on the healthy pole. Flow from Agra to Gwalior is 1329 MW.

Winter Scenario:

Sl. No.	Operating Scenario / Case	Exhibit No.	Remarks
3	Winter Peak Base Case Export-Import Scenario: NR (-) 8770 MW WR (-) 3560 MW SR (-) 2620 MW ER 12510 MW NER 2440 MW	WP-003	Only 1000 MW of power is dispatched from Subansiri. Requirement of import of power for NR is more and for WR is less. Flow on Biswath – Agra HVDC is 1500 MW. A power of 449 MW flows from WR to NR over the Agra-Gwalior 765kV lines.
4	Winter Peak Outage Case Export-Import Scenario: (same as in base case above)	WP-004	Outage of one pole of Biswanath-Agra is taken and 750 MW is flowing on the healthy pole. A power of 603 MW flows from WR to NR over the Agra-Gwalior 765kV lines.

Monsoon Scenario:

Sl. No.	Operating Scenario / Case	Exhibit No.	Remarks
5	Monsoon Peak Base Case Export-Import Scenario: NR 1220 MW WR (-) 5630 MW SR (-) 1340 MW ER 1700 MW NER 4050 MW	MP-005	Full dispatch of 2000 MW is taken at Subansiri. NR is in a position to export power whereas WR is importing power. Flow on Biswath – Agra HVDC is 3500 MW. A power of 2215 MW flows from NR to WR over the Agra-Gwalior 765kV lines.
6	Monsoon Peak Outage Case Export-Import Scenario: (same as in base case above)	MP-006	Outage of one pole of Biswanath-Agra is taken and 2000 MW is flowing on the healthy pole. Flow from Agra to Gwalior is 1945 MW.

7.7 **M**embers may discuss and decide.

Table-I

Capacity Addition in Northern Region – during 2005-07 (remaining of 10th Plan)

Sector / State / Agency	**Project**	**T/H**	**Capacity, MW**
Central Sector			
NHPC	Sewa-II	H	120
NTPC	Rihand-II	T	500
	Unchahar III	T	210
THDC	Tehri I	T	250
State Sector			
Haryana	Yamunanagar	T	300
Himachal Pradesh.	Largi	H	126
J&K	Baghalihar	H	450
Punjab	GHG TPP -II	T	500
Rajasthan	Dholpur	T	330
	Giral	T	125
Utter Pradesh	Parichha Extn.	T	420
Uttaranchal	Manerbhali-II	H	304
Private Sector			
Uttaranchal	Vishnu Prayag	H	400

Table-II

Capacity Addition in Northern Region – during 2007-12 (11th Plan)

Sector / State / Agency	Project	T/H	Capacity, MW
Central Sector			
NHPC	Parbati-II	H	800
	Parbati-III	H	520
	Nimbobazgo	H	45
	Chamera III	H	231
	Uri -II	H	240
	Kishanganga	H	330
	Chutak	H	44
	Lakhwar Vyasi	H	420
	Kotlibahal	H	960
SJVNL	Rampur	H	434
	Luhri	H	465
THDC	Vishnu Pipalkoti	H	440
	Koteshwar	H	400
	Tehri PSS	H	1000
NTPC	Koldam	H	800
	Lohari Nagpala	H	600
	Tapovan V Garh	H	520
NLC	Barisngsar	T	250
NPC	RAPP 5&6	T	440
State Sector			
Himachal Pradesh	Uhl-III	H	100
	Kashang I + II	H	126
J&K	Parni	H	38
	Sawalkot	H	600
	Ans-II	H	30
	L. Kalnai	H	50
Punjab	Shahpurkhandi	H	168
	UBDC-III	H	75
Haryana	Yamuna Nagar U2	T	300
Utter Pradesh	Anpara C	T	1000
Rajasthan	Giral U2	T	125
	Mathania ISCC	T	140
Uttaranchal	Tuinipalasu	H	42
	Bawala N Prayag	H	132
	Arkot Tuini	H	70
Private Sector			
Himachal Pradesh	Allain Dhungan	H	190
	Karcham Wangtoo	H	1000
	Dhamvari Sonda	H	70
Utter Pradesh	Reliance Dadri	T	3740
Uttaranchal	Srinagar	H	330

Table-III

Capacity Addition in North-Eastern Region – during 2005-07 (remaining 10th Plan)

Sector / State / Agency	Project	T/H	Capacity, MW
During 2005-07 (remaining part of 10th Plan)			
Central Sector			
	- nil -		
State Sector			
Tripura	Rokhila GT	T	21
Nagaland	Dimapur DG	T	23
Assam	Karbi Langpi	H	100
During 2007-12 (11th Plan)			
Central Sector			
NEEPCO	Kameng	H	600
	Tuivai hydro	H	210
	Turial	H	60
	Ranganadi II	H	130
	Dikrong	H	110
	Bhareli L Dam II	H	600
	Kapak Leyak	H	160
	Kameng Dam	H	150
	Lower Kopili	H	150
	Monarchak CCGT	T	280
NHPC	Subansiri Lower	H	2000
	Siang Middle	H	1000
State Sector			
Meghalaya	Myntdu St-I + Uiamtru-V	H	120
Mizoram	Bairabi Dam	H	80
	Namrup EXT	T	100
Private Sector			
Asaam	Amguri CCGT	T	100

Item – VIII Evacuation system from Kishenganga HEP in J&K.

8.1 The evacuation system from Kishenganga was discussed and deliberated in the 17th meeting of standing committee for transmission planning of Northern Region with the following associated transmission system

i) 220 kV Kishenganga – New Wanpoh D/C line
ii) 220 kV Kishenganga – Zainkote D/C line

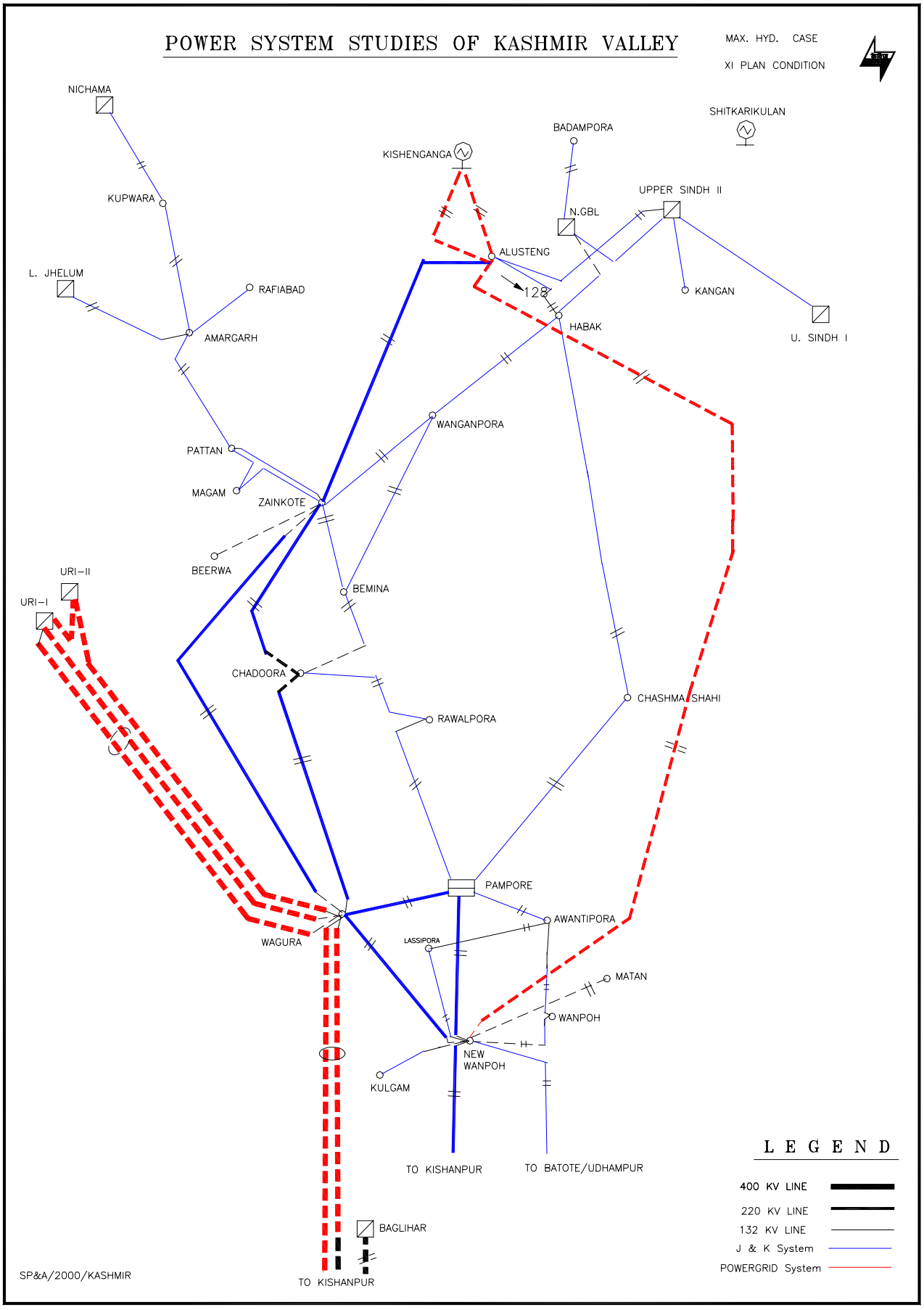
Both the above lines were to be LILOed at 220/132 kV Alistang S/S of PDD J&K subsequently.

8.2 PDD J&K have covered the proposal of Alistang – Zainkote 220 kV D/C line along with the proposal for 220/132 kV Alistang S/S under the infrastructure development of transmission and distribution system of J&K, As it is proposed to delete the above from the scope of Kishenganga transmission system. In light of above, the revised scope of Kishenganga transmission system would be as under

i) 220 kV Kishenganga – New Wanpoh D/C line (the line to be LILOed at Alistang S/s of J&K)
ii) 220 kV Kishenganga – Alistang D/C line

The revised scope of works is shown in diagram below

Members of the committee may take note and concur on this issue.


POWER SYSTEM STUDIES OF KASHMIR VALLEY
MAX. HYD. CASE
XI PLAN CONDITION
NICHAMA
KUPWARA
L. JHELUM
RAFIABAD
AMARGARH
KISHENGANGA
BADAMPORA
SHITKARIKULAN
UPPER SINDH II
N.GBL
ALUSTENG
KANGAN
HABAK
U. SINDH I
WANGANPORA
PATTAN
MAGAM
ZAINKOTE
BEERWA
BEMINA
URI-II
URI-I
CHADOORA
RAWALPORA
CHASHMA SHAHI
PAMPORE
AWANTIPORA
LASSIPORA
WAGURA
MATAN
WANPOH
NEW WANPOH
KULGAM
TO KISHANPUR
TO BATOTE/UDHAMPUR
BAGLIHAR
TO KISHANPUR
SP&A/2000/KASHMIR
L E G E N D
400 KV LINE
220 KV LINE
132 KV LINE
J & K System
POWERGRID System

Item IX Transmission System from Hydro Projects in Uttaranchal

Comprehensive transmission plan together with programme for phased development of project specific transmission system is needed for evacuation of power from the various hydro projects in Uttranchal where a number of hydro projects are to be developed to exploit the hydro potential. Based on discussion with NTPC, NHPC, THDC, Uttranchal Power Transmission Corp., and taking input from draft Plan evolved by CEA, POWERGRID have carried out studies and evolved tentative proposal. Subsequently, based on further discussion with POWERGRID, the following proposals have been evolved.

A. Tehri PSP(1000 MW)

Tehri PSP(1000 MW) would be a extension of Tehri St I(1000 MW). Since Tehri and Koteshwar HEP are contiguous to each other so a consolidated evacuation system was evolved for evacuation of power from Tehri and Koteshwar HEP. Since there is a gap between the commissioning of generation at Tehri I, Tehri II and Koteshwar HEP, so a phased development of these system was planned. Accordingly, following system development plan has evolved:

With Tehri St-I (almost completed)

- Tehri Meerut 765 kV 2xS/C (op. at 400 kV)
- Meerut – Mondaula 400 kV D/C line
- Meerut – Muzaffarnagar 400 kV S/C

With Koteshwar HEP (agreed in the 16th SCM of NR)

- Creation of 400 kV GIS Tehri Pooling Station by LILO of Tehri – Meerut 765 kV 2xS/C line
- Koteshwar to Tehri pooling point 400 kV D/C line
- Provision of 50% series compensation of Tehri – Meerut 2xS/C line initially charged at 400 kV

With Tehri St-II (proposed)

- Tehri – Tehri Pooling station 400 kV S/C (Quad)
- LILO of Bareilly-Mandaula 400 kV D/C line at 400 kV Meerut S/S
- Charging of Tehri Pooling point – Meerut line at 765 kV by establishment of 765/400 kV, 3x1500 MVA (or 3x1200 MVA, decision of 1500 MVAvs 1200 MVA to be taken by POWERGRID based on feasibility and cost analysis) S/S at Tehri pooling Station(GIS) and Meerut
- Modification of Series capacitor on Tehri Meerut line for operation at 765 kV level

The above proposal was already considered and found the optimal solution at the time of evolving and finalizing transmission system for Tehri-I and Koteshwar which has already been concurred by the Committee.

B. Evacuation system from Lohari Nagpala HEP(4x150 MW) and Pala Maneri HEP(416 MW)

Loharinag Pala HEP to be developed by NTPC would be located in the upstream of Tehri. Another hydro project viz. Pala Maneri HEP(416 MW) was also envisaged in the close vicinity to Loharinag Pala HEP. Beside these many other generation potential has also been identified by CEA in Uttarkashi district of Uttarnachal. Considering this, an integrated evacuation system from these projects was envisaged keeping in view the scarcity of R-O-W in hilly terrain and optimization of the existing/under construction/planned transmission network. Since most of these projects in upper Ganga basins would be developed in different time frame so the development of evacuation system from these projects have been evolved in such a manner so as to cater the evacuation requirement from each of the generation projects in the basin. Following part system for evacuation of power from Loharinag Pala HEP were agreed

- Generation of Loharinag Pala HEP power at 400 kV level
- Loharinag Pala HEP – Tehri/Koteshwar Pooling stationt 400 kV D/C line with triple conductor
- Meerut-Agra 765kV S/C
- 2nd 765/400kV transformer at Agra 765kV S/S.

The above system was discussed in the earlier meeting (17th SCM) in connection with evacuation of power from Loharinag Pala HEP and the national grid network in NR. The issue was weather to have the interconnection between Meerut and Agra at 400kV or 765kV. In view of 765 kV level at Meerut as well as Agra, it would be better to have interconnection at 765kV as this would allow to plan 765/400kV transformers at these S/S taking advantage of interconnection and fit better in the long-term Nation Grid Plan.

For evacuation of power from Pala Maneri HEP (416 MW) the existing system from Loharinag Pala HEP could be utalised. Considering this following evacuation arrangements are proposed for evacuation of power from Pala Maneri HEP

- LILO of one circuit of Loharinag Pala HEP – Tehri/Koteshwar Pooling station 400 kV D/C line at Lohari Nagpala HEP
- Provision for 4th 765/400 kV ICI capacity each at Tehri pooling station.

C. Evacuation system from Tapovan Vishnugad HEP (4x130 MW)

Tapovan - Vishnugad HEP is one of the projects in Alaknanda basin being taken up by NTPC. The project was expected in 11th /12th plan time frame. The evacuation system associated with Tapovan - Vishnugad HEP was taken in the 17th meeting of standing committee of Northern Region, However no consensus on the evacuation arrangement from this project could be reached. As such a modified evacuation system from Tapovan - Vishnugad HEP is put up for consideration of the committee

- Stepping up the generation from Tapovan Vishnugad HEP at 400 kV.
- Tapovan Vishnugad - Roorkee 400 kV D/C line (the line to be routed via Kuwari pass where a 400/132kV pooling station is proposed for future projects).

D. Evacuation system from Lata Tapovan HEP (108 MW)

Lata Tapovan HEP would be executed by NTPC upstream of Tapovan Vishnugad HEP. Considering the quantum of power required to be evacuated following evacuation system from the project is proposed

- Stepping up the generation from Lata Tapovan HEP at 400 kV.
- LILO of one circuit of Tapovan Vishnugad – Roorkee 400kV D/C at Lata Tapovan.

E. Evacuation system from Srinagar HEP (4x130 MW)

- Srinagar HEP – Srinagar 400/132 kV S/S 400kV D/C line. (400/132kV S/S at Srinagar is to be established by UPCL by LILO of one circuit of Vishnupryag-Muzaffarnagar D/C line and a 400kV S/C line from Srinagar 400/132kV s/s to Kashipur 400kV S/S is also to be constructed.)
- 2nd 400/132kV Trf Srinagar S/S
- Roorkee -Abdullapur 400 kV D/C line

Members may discuss and decide.