

## Agenda note for 22<sup>nd</sup> meeting of the Standing Committee Meeting on Power System Planning of Northern Region

### (1) **Confirmation of the minutes of 21<sup>st</sup> meeting of the Standing Committee held on 3.11.2006 at NRPC Conference Hall, Katwaria Sarai, New Delhi.**

The minutes of the 21<sup>st</sup> meeting of Standing Committee on Power System Planning in Northern Region held on 3.11.2006 at NRPC Conference Hall, Katwaria Sarai, New Delhi, were circulated vide CEA letter No. 1/9/2006-SP&PA/740-55 dated 27.11.06. POWERGRID vide their letter have indicated the following

- 1.1 As part of Northern region System strengthening scheme –XI, a 400kV D/C line from Meerut to Kaithal had been agreed in the 21<sup>st</sup> meeting of Standing committee for Northern Region. As many new generation projects in Uttaranchal, DVC and Ultra Mega Power Projects are coming up in future, from these projects a large quantum of power would required to be transferred to load centers around Delhi, Punjab and Haryana etc. in the western part of Northern Region. For delivering the share of power to the beneficiary from the proposed generation, loading on proposed Meerut - Kaithal 400kV D/C line becomes high and with conventional Moose conductor the loading on the line may get critical. Considering this Meerut - Kaithal 400kV D/C line may be constructed with Quad bundle conductor as a High Surge Impedance Loading line. The issue have been studied under the scenario of import of power from DVC to Delhi, Haryana and Punjab and also with the generation expected in Uttaranchal during that time frame. It is observed that the loading on the line remains of the order of about 450 MW on each circuit and in the event of outage of one circuit the other line gets over loaded. As such we may agree for construction of the line with Quad bundle conductor instead of conversational Moose conductor.

As such the work under **NR Strengthening Scheme XI required with Loharinagpala HEP or Sasan UMTF or Mundra UMTF whichever is earliest agreed in the 21 SCM of NR may be read as**

400 kV Meerut – Kaithal D/C line with quad bundle conductor

- 1.2 In the 21<sup>st</sup> meeting of the standing committee, while discussing the issue of Transmission system for power evacuation from Sasan and Mundra Ultra Mega Projects representatives from RVPNL and PSEB opined that with the transmission of the share of the power of Sasan and Mundra by displacement to NR through ER, the capacity created for transmission of power from the projects located in ER as well as NER would be eaten up causing transmission constraint in that corridor. As such they suggested that instead of utilizing the existing ROW another transmission corridor through Gujarat – Rajasthan –Moga in Punjab be crated for transmission of the share of power from Mundra TPP to the states of Northern region. This would strengthen the Western part of NR and help in reducing loading in the heavily loaded east-west corridor of the Northern Region.

The matter was discussed in details and it was informed that, with the inter-regional transmission system created and being created with Tala HEP, Barh TPS, Kahalgoan Extn., North Karanpura TPS, Mithon RB, Palatna CCGT, lower Subernsri HEP etc. and additional inter-regional transmission system proposed with Sasan and Mundra UMPS, adequate transmission capacity would be available. It was also informed that the proposals of PSEB and RVPNL would not be justified under the Sasan and Mundra time frame as there would not be adequate flow on the proposed line section.

RVPNL now vide their letter dated 18/11/06 to CE (SP&PA) have proposed to consider the following system

**with Mundra UMPP**

- i) 400 kV D/C line from Bhinmal(PG) to 400 kV GSS at Barmer(RVPNL)
- ii) 400 kV D/C line from Barmer to Bikaner(RVPN)
- iii) 400 kV D/C line from Suratgarh (STPS) to Moga(PG)

**With Sasan UMPP**

400 kV GSS on 400 kV D/C Jaipur(PG) – Suratgarh line should be located at Sikar instead of Reengus as Sikar is the load center of Jaipur.

- 1.3 The proposal of RVPNL with Mundra have been studied and it is found that flow on the section between Kankroli – Jodhpur and Stratgarh – Moga is of the order of 50 to 100 MW . As such the feasibility of the proposal is not justified (Exhibit) during Sasan / Mundra time frame. The proposal would however be reviewed in appropriate time.
- 1.4 No Comments from any other constituent states have been received.

**The minutes of the meeting may please be confirmed.**

**(2) Transmission system from the new generation capacity planned by DVC for supply of power to Delhi, Punjab and Haryana including review of transmission system associated with North Karanpura MPP**

DVC have undertaken generation addition programme of 4700 MW at Durgapur Steel Plant(2x500 MW), Bokaro A (1x500 MW), Raghunathpur TPS(2x500 MW+20%), Koderma TPS Stage – I (2x500 MW), Mejia B TPS Unit 7 & 8 (2x500 MW). Out of the above 3600 MW and 500 MW would be exported to Northern and Western Region respectively. Beside this at Mithon B generation of 2x500 MW of DVC is under execution, the project is expected by 2010, of which DVC have executed MoU with Tata power for 700 MW of power (NDPL- 400 MW) and rest 300 MW would be consumed by DVC. In a meeting taken by Secretary (P), on 18.12.06 regarding transmission system from the new generation capacity planned by DVC it was emphasized to keep the generation of Mejia TPS Extn. And Kodarma TPS on fast track so that power from this project is available to Delhi before Commonwealth game to be held in Delhi in 2010.

DVC have informed that Mejia TPS phase II (2x500 MW) would be expected by mid of 2010 and other projects like Kodarma TPS, Bokaro TPS ext., Raghunathpur and Durgapur are also planned by 11<sup>th</sup> plan. Long Term PPAs have been signed with Delhi, Haryana, Punjab for 2500 MW, 700 MW and 200 MW respectively.

The other generation projects in Eastern region which are likely to yield benefit during 11<sup>th</sup> /early 12<sup>th</sup> plan time frame are Barh TPS, North Karanpura MPP and Mithon RB ect. Barh Generation is expected during the time frame of Mejia and Kodarma time frame, while North Karanpura may get delayed further. The transmission system from North Karanpura MPP and Mithon RB considered in the 18<sup>th</sup> Meeting of Northern Region with the following system

**With North Karanpura:**

- (i) North Karanpura – Sasaram 765kV S/C line with 2x1500MVA, 765/400kV s/s at Sasaram
- (ii) North Karanpura – Ranchi 400kV D/C line
- (iii) North Karanpura – WR pooling Station near Sipat 765kV S/C line with 2x1500MVA, 765/400kV s/s at WR pooling station near Sipat
- (iv) WR pooling station near Sipat – Sipat 765kV S/C line
- (v) WR pooling station near Sipat – Seoni 765kV S/C line

**With Maithon RB:**

- (vi) Maithon RB-Maithon PG 400kV D/C line
- (vii) Maithon RB – Ranchi 400kV D/C line
- (viii) Biharsharif – Sasaram 400kV D/C line

With North Karanpura or Maithon RB for the Northern Region:

- (ix) Sasaram-Fatehpur-Agra 765kV S/C lines with 765kV s/s at Agra having 2x1500 MVA 765/400kV transformers and 765/400kV s/s at Fatehpur having 2x1500 MVA 765/400kV & 2x315 MVA 400/220 kV transformer and LILOs of Singrauli/Allahabad – Kanpur/Mainpuri 400kv lines at Fatehpur.

**If N. Karanpura comes first:**

With N.Karanpura: Sasaram-Fatehpur-Agra 765kV charged at 400kV; 400/220kV 2x315 MVA s/s at Fatehpur; LILO of Singrauli-Kanpur 400kV S/C and LILO of one circuit of Allahabad-Kanpur 400kV line at Fatehpur

**With Maithon RB:**Charging of Sasaram-Fatehpur-Agra line at 765kV with upgrading Fatehpur and Agra s/s by providing 2x1500 MVA 764/400kV transformers; LILO of Allahabad-Mainpuri 400kV D/C line at Fatehpur

**If Maithon RB comes first:**

**With Maithon RB:** Sasaram-Fatehpur-Agra 765kV charged at 400kV; 400/220kV 2x315 MVA s/s at Fatehpur; LILO of Singrauli-Kanpur 400kV S/C and LILO of one circuit of Allahabad-Kanpur 400kV line at Fatehpur

**With N.Karanpura:**Charging of Sasaram-Fatehpur-Agra line at 765kV with upgrading Fatehpur and Agra s/s by providing 2x1500 MVA 764/400kV transformers; LILO of Allahabad-Mainpuri 400kV D/C line at Fatehpur

- (x) Sasaram–Balialia 400kV D/C (quad) line (with N.Karanpura or Maithon RB whichever comes first)
- (xi) Agra – Gurgaon 400kV D/C line (with N.Karanpura or Maithon RB whichever comes first)

It is observed that the generations of North Karanpura TPS was envisaged in the 11<sup>th</sup> plan timeframe of early 12<sup>th</sup> plan time frame and the DVC projects were scheduled for before commonwealth Game i.e. on or before 2010 and the transmission corridor for power from the Projects in Eastern Region to Northern Region is same for both N.Karanpura and new generation capacity planned in DVC so there is a need to review the evacuation system already agreed from North Karanpura TPS in order to avoid transmission bottleneck for DVC power to NR.

As such it necessitated revision of the transmission system associated with North Karanpura TPS. Accordingly, for transmission of power from Eastern Region to Northern Region an integrated system planning study identifying the transmission system associated with each individual generation projects have been carried out for transmission of power from these projects from Eastern Region to the beneficiaries in the Northern Region. For power

transfer to Northern region following transmission options alternatives were considered.

- **Alternative – I**

1. Maithon RB-Maithon PG 400 kV D/C line
2. Maithon RB-Ranchi 400kVD/C line
3. Biharshariff-Sasaram 400kV quad D/C line
4. Bokaro-Biharshariff (routed via Kodarma)400kV D/C line, twin moose from Bokaro upto Kodarma and quad moose from Kodarma to Biharshariff
5. LILO of both circuits of Bokaro-Biharshariff 400kV D/C line at Kodarma (400kV 2xD/C LILO line)
6. Kodarma -Gaya 400kV quad D/C line
7. LILO of one ckt of Maithon-Jamshedpur 400kV line at Mejia (400kV D/C Lilo line)
8. Mejia-Maithon PG 400kV D/C line
9. Sasaram-Fatehpur (PG 765 kV S/S) 765 kV S/c line
10. Fatehpur (PG 765 kV s/s) -Agra 765 kV S/C line
11. Fatehpur (PG 765 kV s/s)- Fatehpur (ITP 400kV s/s)400kV quad D/C line
12. LILO of Singrauli-Kanpur 400kV line at Fatehpur (400kV D/C LILO line)
13. LILO of both circuits of Fatehpur -Kanpur 220kV lines at Fatehpur (220kV 2xD/C LILO lines)
14. Fatehpur 400/220 kV, 2x315 MVA substation
  1. LILO of one ckt of Durgapur (PG)-Jamshedpur 400kV line at Durgapur (400 kVD/C lilo line)
  2. LILO of one ckt of Maithon(PG)-Ranchi 400kV line at Ragunathpur (400kV D/C lilo line)
  3. Durgapur (Gen) - Raghunathpur-Ranchi 400kV quad D/C line

**Common scheme for 765 kV pooling station and network (common for Sasan UMPP+NKP+Maion/Kodarma/Mejia/Bokaro+)**

1. Series capacitor at Balia end for 40% compensation on Barh-Balia 400kV quad D/C line
2. Series capacitor at Biharshariff end for 40% compensation on Biharshariff -Balialia 400kV quad D/C

3. LILO of both circuits of Allahabad -Mainpuri 400kV D/C line at Fatehpur (PG 765kv s/s)(400kV 2xD/C lilo lines)
4. Gaya-Sasaram 765 kV S/C line
4. Maithon PG- Gaya 400kV quad D/C line
5. Gaya-Balia-Lucknow 765 kV S/C
6. Ranchi-Sipat/Korba(pooling) 765 kV S/C with 30% series compensation at Ranchi end

#### **765 kV substations of the ER-NR High Grid**

1. Gaya, Sasaram, Ranchi, Fatehpur, Agra,Balia., Lucknow & Bareilly 765 kV substations

#### **Delhi 765 kV Substations**

1. Agra -Mundka-Meerut -Agra 765 kV S/C
2. 765 kV s/sat Mundka

#### **NR Strengthening**

1. Mundka -Moga 765 kV S/C
2. 765 kV s/s at Moga

#### **Evacuation system for North Karanpura (1980 MW)**

Scope of works for North Karanpura transmission ITP's scheme

1. North Karanpura-Gaya 765 kV S/C line
2. North Karanpura - Ranchi 765 kV S/C line
3. Sipat-Korba(pooling) - Seoni 765 kV S/C line
4. Lucknow-Bareilly 765 kV S/C line
5. Bareilly -Meerut 765 kV S/C line
6. Agra -Gurgaon(ITP)-Gurgaon (PG) 400 kV quad D/C line
7. Gurgaon 400/220kV ,2x315 MVA GIS substation

The result of the studies is given in Exhibit-I. The result of the studies indicates normal loading on all the lines.

### **Alternative – II**

System as in Alternate-I, with 3<sup>rd</sup> circuit between Sasaram - Fatehpur -Agra 765 kV S/C line and without for Gaya-Balia -Lucknow – Bareilly - Meerut 765 kV S/C line

The result of the studies is given in Exhibit-II. The flow on the other circuit is within limit

### **Alternative – III**

System as in Alternate-I, with Gaya -Balialucknow – Bareilly - Meerut considered as 400 kV D/C line instead of 765 kV S/C line

The result of the studies is given in Exhibit-III

The HVDC alternative was not considered as HVDC interconnection of  $\pm 500$  kV, 2500 MW between Balialucknow – Bhawadi has been proposed between East – West of Northern region and  $\pm 800$  kV, 6000MW, Bishanath Charayali – Agra I between NER – NR has already been proposed/under construction.

From the above alternatives, it is found that Alternative I & Alternative-II are equally comparable in terms of losses, however with Alternative III the NR system losses is high. However Alternative I would be the most suitable from reliability considerations. As this alternative extends the development of the East – North of NR 765 kV corridor. Thus enabling creation of a strong 765 kV ring between Gaya-Sasaram-Fatehpur-Agra-Mundka-Meerut-Bareilly-Lucknow-Balia-Gaya interconnecting Eastern and Northern –Western region at 765 kV.

The alternative has also been tested with the following contingency outage.

- Outage of one 765 kV line section between Sasaram – Fatehpur – Agra 765 kV S/C line (Exhibit-IV)



- Outage of one 765 kV line section between Balia – Lucknow – Meerut 765 kV S/C line(Exhibit-V)

Under both the outage condition the loading on the other 765 kV sections were and 400 kV lines were found to be with in limits.

As such following system are proposed as a part of transmission system associated with the new generation capacity planned by DVC for supply of power to Delhi, Punjab and Haryana

**1. Evacuation system for Maithon RB (1000 MW), Kodarma(1000 MW), Mejia (1000 MW) and Bokaro Ex (500 MW)**

**Scope of works for Maithon/Kodarma/Mejia/Bokaro Transmission ITP's scheme**

- 1 Maithon RB-Maithon PG 400 kV D/C line
- 2 Maithon RB-Ranchi 400kVD/C line
- 3 Biharshariff-Sasaram 400kV quad D/C line
- 4 Bokaro-Biharshariff (routed via Kodarma)400kV D/C line, twin moose from Bokaro upto Kodarma and quad moose from Kodarma to Biharshariff
  - LILO of both circuits of Bokaro-Biharshariff 400kV D/C line at Kodarma (400kV 2xD/C LILO line)
  - Kodarma -Gaya 400kV quad D/C line
  - LILO of one ckt of Maithon-Jamshedpur 400kV line at Mejia (400kV D/C Lilo line)
  - Mejia-Maithon PG 400kV D/C line
    - Fatehpur (PG 765 kV s/s)- Fatehpur (ITP 400kV s/s)400kV quad D/C line
  - LILO of Singrauli-Kanpur 400kV line at Fatehpur (400kV D/C LILO line)
- 11 LILO of both circuits of Fatehpur -Kanpur 220kV lines at Fatehpur (220kV 2xD/C LILO lines)
- 12 Fatehpur 400/220 kV substation
- 13 400/220kV transformers : 2x315 MVA
- 14 400kV line bays : 2 nos of which one to be with 50 MVAR switchable reactors for Singrauli line
- 15 220 kV line bays : 4 nos.
- 16 400kV : 1½ breaker scheme, 220kVdouble main & transfer bus

**Generation switchyard provisions and PGCIL transmission schemes associated with Private sector REC/PFC SPV scheme**

**2. Evacuation system for Rangunathpur (1000 MW) & Durgapur (1000 MW)**

- I LILO of one ckt of Durgapur (PG)-Jamshedpur 400kV line at Durgapur (400 kVD/C lilo line)
- ii LILO of one ckt of Maithon(PG)-Ranchi 400kV line at Rangunathpur (400kV D/C lilo line)
- iii Durgapur (Gen) - Rangunathpur-Ranchi 400kV quad D/C line

**3. Common scheme for 765 kV pooling station and network (common for Sasan UMPP+NKP+Maion/Kodarma/Mejia/Bokaro+)**

- I Series capacitor at Balia end for 40% compensation on Barh-Balia 400kV quad D/C line
- ii Series capacitor at Biharshariff end for 40% compensation on Biharshariff -Balia 400kV quad D/C
- iii LILO of both circuits of Allahabad -Mainpuri 400kV D/C line at Fatehpur (PG 765kvs/s)(400kV 2xD/C lilo lines)
- iv Gaya-Sasaram 765 kV S/C line
- v Maithon PG- Gaya 400kV quad D/C line
- vi Gaya-Balia-Lucknow 765 kV S/C
- vii Ranchi-Sipat/Korba(pooling) 765 kV S/C with 30% series compensation at Ranchi end

**4. 765 kV substations of the ER-NR High Grid**

- 2. Gaya, Sasaram, Ranchi, Fathepur, Agra, Balia., Lucknow & Bareli 765 kV substations

**5. Delhi 765 kV Substations**

3. Agra -Mundka-Meerut -Agra 765 kV S/C
4. 765 kV s/s at Mundka

## **6. NR Strengthening**

3. Mundka -Moga 765 kV S/C
4. 765 kV s/s at Moga

### **Transmission for Private Sector through REC/PFC SPVs**

#### **Transmission schemes for SPVs through REC Evacuation system for North Karanpura (1980 MW)**

Scope of works for North Karanpura transmission ITP's scheme

- I. North Karanpura-Gaya 765 kV S/C line
- II. North Karanpura - Ranchi 765 kV S/C line
- III. Sipat-Korba(pooling) - Seoni 765 kV S/C line
- IV. Lucknow-Bareilly 765 kV S/C line
- V. Bareilly -Meerut 765 kV S/C line
- VI. Agra -Gurgaon(ITP)-Gurgaon (PG) 400 kV quad D/C line
- VII. Gurgaon 400/220kV GIS substation  
400/220kV transformers 2x315 MVA  
400kV line bays, 4 nos of which 2 nos to be with 50 MVAR switchable reactors for Agra lines  
220 kV line bays, 4 nos.  
400kV: 1½ breaker scheme, 220 kV double bus scheme

#### **North Karanpura Generation switchyard scope of**

1. 765 kV line bays - 2 nos, each with 240 MVA switchable line reactors
2. 765 kV bus reactor of 240 MVAR  
**765 kV : 1½ breaker scheme**

With the above arrangement it has been found that the transmission system is adequate for evacuation of power from DVC to the beneficiaries of NR. Punjab would avail its share of 200 MW from DVC through Mundka - Moga line and Haryana would absorb its share of power from DVC through displacement from Mundka. The 400 kV Gurgaon substation as a part of North Karanpura under Private Sector through REC/PFC, SPVs would be utilized to feed power to a proposed 400 kV S/S near south Delhi beside feeding the Gurgaon load. From the proposed 400 kV S/S near south Delhi the load of Delhi(south) would be fed on radial mode at 220 kV.

Regarding sharing of the transmission charges for the lines it is proposed that since the generation projects of DVC and North Karanpura MPP would feed the load of ER, NR and WR constituents so the transmission charges for the lines emanating from these projects to NR and WR need to be shared by these states in the ratio of their share from these projects. The sharing of transmission charges for the lines from DVC generations and North Karanpura be considered as given in Annex-I.

The above system for transmission of DVC power to Northern Region along with revised Evacuation system for North Karanpura (1980 MW) is put up to the Standing Committees for ratification.

Members of the Committee deliberated on this issue.

**(3) Evacuation of power from Jhajjar TPS (1500 MW)**

Jhajjar TPS (1500 MW) will be constructed by NTPC in the west of Delhi near Jhajjar in Haryana. The power from the project is to be stepped at 400kV and the beneficiaries of the power from the Jhajjar are Delhi and Haryana in a ratio of 50:50. Considering the power requirement in Delhi for the ensuing Commonwealth Games, it has been decided to construct the Jhajjar TPS so that the benefit of the evacuation system is available to Delhi before the Commonwealth Games.

Following transmission system have been evolved for transmission of power from Jhajjar TPS to Delhi as well as Haryana.

- (i) Jhajjar - Mundka 400kV D/C line
- (ii) Jhajjar - Daulatabad (Gurgoan) 400kV D/C

The result of the studies is given in Exhibit I. The above system is found to be adequate for evacuation of power from Jhajjar TPS. From Mundka power to Delhi system at 220 kV would be fed radially.

Members of the Committee deliberated on this issue.

**(4) Evacuation of power from Badarpur TPS (2x500 MW)**

Badarpur (2x490 MW) would be constructed by NTPC. It has been decided to put up the new units adjoining to the existing power plant. Considering the increased load demand for the Commonwealth Games to be held in Delhi during 2010 the machines are scheduled for commissioning before the Commonwealth Games. Due to the sensitive short circuit level circuit level of 220 kV Delhi system as well at Badarpur, it is found prudent to step up BTPS (2x500 MW) generation of at 400kV and evacuate the same by LILO of one circuit of Maharani Bagh - Samaypur line at Badarpur 400kV switchyard and Delhi would the power of BTPS through 400kV Maharani Bagh S/S. To avoid further excursion of fault level at 200 kV BTPS switchyard, there would not be any interconnection between 400 kV BTPS switchyard and 220 kV BTPS switchyard.

Members of the committee may concur on the issue.

**5) Northern Region System Strengthening Scheme**

In the 21<sup>st</sup> SCM of NR creation of 400/220 kV, 2x315 MVA substation at Sonapat & Bahadurgarh – Sonapat 400 kV D/c line was agreed under the transmission scheme of Sasan and Mundra UMPP in Northern Region. Considering the fast pace of development in Delhi and NCR region Specially at Gurgaon, Ghaziabad and Sonapat areas the load demand of at Sonapat is increasing heavily and is slated to grow further in the coming years. Considering this it is requested that creation of 400/220 kV, 2x315 MVA substation at Sonapat & Bahadurgarh – Sonapat 400 kV D/c line may be taken up as a separate System strengthening scheme viz **Northern Region System Strengthening Scheme – XII.**

In addition this provision for two nos. of 220 kV bays at Nalagarh for HPSEB was also agreed under regional strengthening scheme. Considering the small scope of work it is proposed that these two bays be clubbed under Northern Region

Strengthening – XII. As such it is suggested that the following works be covered under **Northern Region Strengthening – XII:**

- Bahadurgarh – Sonapat 400 kV D/c line (Triple Conductor)
- Establishment of 400/220 kV, 2x315 MVA substation at Sonapat
- Two nos. of 220 kV bays at Nalagarh for HPSEB

**(6) Creation of 400/220 kV S/S at Sikar instead of at Reengus**

As a part of System strengthening scheme in Northern Region for power evacuation from Sasan and Mundra Ultra Mega Projects, Creation of 400 kV Reengus S/S along with LILO of Jaipur (PG) – Suratgarh D/C line at Reengus was agreed in the 21<sup>st</sup> SCM held on 3-11-06. Director (technical), RVPNL vide letter dated 18/11/06 has suggested that since Sikar is close to load center so instead of Reengus, 400/220 kV S/S be created at Sikar by LILO of 400 kV Jaipur(PG) – Suratgarh D/C line.

In this context it may be stated that location at Reengus was considered for carrying out the study for power evacuation from Sasan and Mundra Ultra Mega Projects, however if RVPNL feels that Sikar to be a better location from the consideration of proximity to load center and as both these cities are adjoining so there may not be any objection for creation of 400/220 kV S/S at Sikar by LILO of 400 kV Jaipur(PG) – Suratgarh D/C line instead of Reengus.

Members of the Committee deliberated on this issue.

**7 Hissar TPS (1200 MW)**

Hissar TPS would be located near Barwala town near Hissar. The project would be excuted by HVUNL and the power from the project would be stepped up at 400kV. For evacuation of power following systems were considered: -

- (i) Provision for 400/220 kV, 3 nos. of 315 ICT at Hissar generating switchyard
- (ii) Creation of 220 kV level at Hissar generating switchyard

- (iii) LILO of both circuits of the existing Jind to Hissar industrial area D/C line at Hissar generation switchyard.
- (iv) 400kV D/C line from Hissar generation switchyard to 400 kV Mohana Substation of Haryana
- (v) Hissar TPS – Fethabad 400 kV D/C line

Result of the studies carried out with the above system is given in exhibit-VI enclosed. The result of the load flow study indicates that 400kV D/C line from Hissar generation switchyard to 400 kV Mohana Substation feed power to Hissar TPS switchyard instead of evacuating power from the generating station. As such the utility of the line is not much in the timeframe of the study. Based on the result of the study, the following system is recommended from Hissar TPS (1200 MW)

Alternative –I (preferred option) (study result at exhibit-VII)

- (i) Provision for 400/220 kV, 3 nos. of 315 ICT at Hissar generating switchyard
- (ii) Creation of 220 kV level at Hissar generating switchyard
- (iii) LILO of both circuits of the existing Jind to Hissar industrial area D/C line at Hissar generation switchyard.
- (iv) Upgradation of conductor between Hissar TPS – Hissar (IA) 220 kV D/C line
- (v) Hissar TPS – Fatehabad 400 kV D/C line

In event of non-availability of adequate space for construction of 220 kV Switchyard at Hissar TPS, up-gradation of the existing 220 kV Hissar Industrial Area (I.A) substation to 400kV to be considered with the following Alternative-II transmission system for evacuation of power from Hissar TPS

- (i) Provision for 400/220 kV, 3 nos. of 315 ICT at Hissar (I.A) substation
- (ii) 400kV D/C line from Hissar generation switchyard to 400 kV Hissar (I.A) Substation of Haryana with 85°C conductor design
- (iii) Hissar TPS – Fethabad 400 kV D/C line

Result of the studies carried out with the above system is given in exhibit-VIII

In case of problem encountered in obtaining additional space/land also at 220 kV Hissar Industrial Area existing substation, possibility for creation of a new 400/220kV substation at Hissar might be explored with the following Alternative-III transmission system for evacuation of power from Hissar TPS

- (i) Provision for 400/220 kV, 3 nos. of 315 ICT at Hissar (new) substation
- (ii) 400kV D/C line from Hissar generation switchyard to 400 kV Hissar (new) Substation of Haryana with triple 85°C conductor
- (iii) Connectivity of Hissar 400 kV new S/S of HVPN with Hissar IA 220 kV S/S through LILO of new 220 kV lines. The connecting 220 kV lines to be with higher rating conductors.
- (iv) Hissar TPS – Fethabad 400 kV D/C line

Optimum and preferred and most cost effective would be Alternative-I, however, in case of non-availability of space at Hissar TPS, Alternative II above may be persuaded. Further, if space at 200 kV Hissar (I.A) S/S is not available at 220 kV Hissar IA S/S also, then Alternative-III be considered for evacuation of power from Hissar TPS.

For feeding the Punjab share of power from this project the 400 kV D/C line line from Hissar to Fethabad need to be constructed. Concurrence of the standing committee for the same is required as it covers termination of 400 kV lines at center sector Fethabad S/S.

Members of the Committee deliberated on this issue.

**8. Deletion of 220 kV D/C line from Reengus (POWERGRID) to 220 kV Reengus S/S of RVPNL from the scope of Sasan and Mundra,**

Under the scope of for absorption of power from Sasan and Mundra Ultra Mega Projects, a 220 kV D/C line from Reengus (POWERGRID) to 220 kV Reengus S/S was agreed in the 21<sup>st</sup> SCM of NR. As, 220 D/C interconnecting line is generally not considered in the scope of regional transmission system, and the development of the 220 kV system is the responsibility of the concerned state and the same is generally covered by the state transmission agency under their plan transmission schemes, so the proposals for 220 kV D/C line from Reengus (POWERGRID) to 220 kV Reengus S/S of RVPNL may be deleted from the scope of the works agreed under the System strengthening requirement in



Northern region for absorption of power from Sasan and Mundra Ultra Mega Projects.

## **9 Transmission system for power evacuation from hydro projects in Uttranchal**

Government of Uttanchal is steering development of a number of hydro projects in their state power from which would be consumed in Uttranchal and also exported outside the state. Power Transmission Corporation of Uttranchal Ltd. has proposed to develop through ADB funding a comprehensive transmission system based on a master plan evolved in consultation with CEA. The proposed transmission system would be used for intra-state as well as inter-state transmission and there are issues relating to transmission charge etc.

The issue of PTCUL proposing to take up transmission system for development of comprehensive/integrated power evacuation system in Uttaranchal was discussed in the meeting taken by Secretary (Power) on 15<sup>th</sup> September 2006. As the issue of inter-state transmission was also involved, it was decided that before taking further action, the matter needs discussion in the regional power committee of the Northern Region.

The matter was discussed in the 2<sup>nd</sup> TCC meeting held at Moussoorie on 9<sup>th</sup> November 2006, wherein Chairman/members of TCC observed that PTCUL could take up the intra-state transmission system up to the pooling point on their own, for which there was no requirement of any commitment for payment of transmission charges by other constituents and arrangement of recovery of transmission charges will be only between PTCUL and the generators and it was agreed in TCC that PTCUL/generators would apply for open access for inter-state transmission system to CTU so that POWERGRID in consultation with CEA could firm up inter-state transmission system and necessary modification in the system up to pooling point would also be firmed up in the process. The above views of TCC were endorsed in the 3<sup>rd</sup> NRPC meeting held at Mossoorie on 10<sup>th</sup> November 2006.

Based on the decision taken in the TCC and NRPC meeting, the proposal of PTCUL and the scope of transmission have been examined, it is found that PTCUL has proposed the transmission system from the generation projects within Uttaranchal and up to the pooling point within Uttaranchal i.e 400 kV Tehri/ Koteshwar pooling station, 400 kV Roorkee, Kashipur and Pithoragarh (Annex-II).

In view of the above and as the transmission system proposed by PTCUL would not have any direct commitment for payment of transmission charges by the other constituents and recovery mechanism is only between PTCUL and the generators.

Member may discuss and give their views.