

**Central Electricity Authority, SP&PA Division**  
**Sewa Bhawan, R.K. Puram, New Delhi-110066**

**No.66/5/99-SP&PA/**

**Dated: 24-09-2009**

- |                                                                                                                 |                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Member (Transmission),<br>Bihar State Electricity Board<br>Vidyut Bhavan, Baily Road,<br>Patna-800021.       | 2. Director (System),<br>Damodar Valley Corporation<br>DVC Towers, VIP Road,<br>Kolkata-700054.                                                                           |
| 3. Member Secretary,<br>Eastern Regional Power Committee,<br>14, Golf Club Road, Tollygange,<br>Kolkata-700033. | 4. Director (Commercial),<br>Grid Corporation of Orissa Ltd,<br>Jan path, Bhubaneswar-751022.                                                                             |
| 5. Director (Transmission),<br>Orissa Power Transmission<br>Corporation Ltd,<br>Jan path, Bhubaneswar-751022.   | 6. Director (Transmission),<br>West Bengal State Electricity Transmission<br>Company Ltd, Vidyut Bhavan, 5th Floor,<br>Block-D, Bidhannagar, Sector-II<br>Kolkata-700091. |
| 7. Principal Chief Engineer cum<br>Secretary, Power Department<br>Government of Sikkim, Sikkim.                 | 8. Director (Projects),<br>Power Grid Corporation of India<br>"Saudamini" Plot No. 2, Sector-29<br>Gurgaon-122001                                                         |
| 9. Director (Technical),<br>NTPC Limited,<br>Engineering Office Complex,<br>A-8, Sector 24, Noida.              | 10. Member (Transmission),<br>Jharkhand State Electricity Board,<br>In front of Main Secretariat,<br>Doranda, Ranchi-834002.                                              |
| 11. Executive Director (T&RE),<br>NHPC Ltd, NHPC Office complex,<br>Sector 33, Faridabad-121003.                |                                                                                                                                                                           |

**Sub: Summary record of discussions of the Standing Committee Meeting on Power System Planning in Eastern Region held on 14-09-09 at Bhubaneswar.**

**Sir,**

Minutes of the meeting for the Standing Committee Meeting on Power System Planning in Eastern Region held on 14-09-09 at Bhubaneswar are available on the **CEA website: [www.cea.nic.in](http://www.cea.nic.in)**. (path to access-*Wings of CEA/Power Systems/Standing Committee on Power System Planning/EASTERN REGION*).

Yours faithfully,

(Dr. R. Saha)  
Director (SP&PA)

**Summary record of discussions of the Standing Committee Meeting on Power System Planning in Eastern Region held on 14-09-09 at Bhubaneswar, Orissa.**

List of participants is at Annex.

Shri V. Ramakrishna, Member(PS), CEA welcomed the participants to the meeting and thanked CMD, GRIDCO for excellent arrangements to host the meeting. He stated that all the issues as minuted in the last Standing Committing meeting held on 8.11.2008 at Bhubaneswar, excepting the proposal of GRIDCO for setting up of the new 400/220kV S/S at Uttara as inter-state work in lieu of 400/220kV S/S at Sundergarh, were resolved. He mentioned that establishment of the 400/220kV Uttara S/S and associated LILO works were subsequently agreed and vetted in the last ERPC meeting. The minutes of the meeting were approved.

**2.0 Proposal of DVC for establishment of New 400 kV sub-station at Jamshedpur by LILO of one ckt. of 400 kV Parulia-Jamshedpur D/C line.**

Member (PS) stated that space availability for expansion of the existing 400/220 kV Jamshedpur (PG) substation would be feasible if encroachment was removed from there. An additional 1x315MVA ICT could be provided to meet the upcoming load requirement of DVC without creating a new 400/220kV sub-station at Jamshedpur proposed by DVC. He further added that the 400kV Parulia-Jamshedpur-Mendhasal-Baripada 400 kV D/C line was being LILoed at many locations and further LILO at the new Jamshedpur S/S could cause protection coordinating problems. CE DVC stated that the procurement process for the establishment of new Jamshedpur S/S was already taken up with the aim of supplying the upcoming load of TISCO at Jamshedpur area by 2010 and also to meet more load requirement in future. Member (PS) requested PGCIL and JSEB participants to take effective measures jointly for removal of encroachment with the help of the Govt. of Jharkhand within a period of 2-3 months. PGCIL and JSEB agreed to sort out the problem. In case there was inordinate delay in resolving the encroachment issue, the proposal of DVC could be firmed up. Accordingly, he had suggested DVC to make their NIT ready to float for the proposed S/S. On the query of the members relating to sharing of transmission charges for creating the substation and

associated LILO work, Chief Engineer, DVC clarified that the proposed works would be entirely done by DVC at their own expenses.

### **3.0 Proposal of JSEB for additional two nos. 220 kV bays at 400/220 kV grid sub stations at Daltonganj (PG) and Chaibasa (PG).**

The proposal of JSEB for keeping space provision for additional 2 nos. 220 kV bays at each of the 400/220 kV Daltonganj and Chaibasa substations of PGCIL for future expansion were agreed by PGCIL. However, Member (PS) desired to know from JSEB about preparedness for the State's 220kV network development from these two sub-stations enabling to draw power by the State. He had requested JSEB to furnish the plan and programmes to CEA in this context.

### **4. Proposal of GRIDCO for establishment of a new 400/220kV,2x315 S/S at Uttara with LILO of 400kV Mendhasal- Baripada D/C line in place of 400kV/220kV Sundergarh S/S with LILO of both the circuits of 400 kV Talcher – Rourkela D/C line.**

Member (PS) stated that the proposal of GRIDCO for establishment of 400/220kV 2x315MVA S/S at Uttara by LILoing of 400 kV Baripada-Mendhasal D/C line under the regional transmission scheme was already agreed and vetted in the last ERPC meeting. CMD, GRIDCO suggested to explore the better option of connectivity to the substation either by LILO of 400 kV Baripada-Mendhasal D/C line or directly connecting the sub-station by 400 kV D/C line from Mandhasal.PGCIL agreed to examine the proposal.

## **5.0 Transmission System Associated with the Tilaiya Ultra Mega Power Project (4000 MW) in Jharkhand, and IPPs in Jharkhand, WB and Orissa**

### **5.1 ATS Specific to Generation Projects.**

#### **• Tilaiya UMPP(4000MW) in Jharkhand**

For immediate evacuation of power from Tilaiya UMPP, Member (PS) stated that 765kV Tilaiya UMPP – Sasaram S/C, Tilaiya UMPP – Gaya S/C, and Tilaiya UMPP – Balia S/C lines were earlier concurred. In view of space constraint at Sasaram, an additional 765kV Tilaiya UMPP – Balia S/C line instead of the 765kV Tilaiya – Sasaram line envisaged earlier would be constructed forming two 765kV lines from Tilaiya UMPP to Balia. Out of two 765kV circuits to Balia, one circuit would be

LILLOed at Varanasi in NR to improve reliability of power transfer to NR. Director (Trans),PGCIL stated that constructing 765kV D/C line on the same tower to Baliya instead of going by 2xS/C 765kV lines would be better option as tower outage being a rare phenomenon. M (PS) stated that the 765kV Tilaiya UMPP-Balia D/C line would save RoW and the cost of the D/C line relative to 2XS/C lines would be lesser. After deliberations, members agreed to the following revised system.

- ✓ **Tilaiya UMPP – Balia 765kV D/C line**
- ✓ **Tilaiya UMPP – Gaya 765kV S/C line**

## **5.2 CESC- Haldia TPS(600MW) and related Transmission charges.**

- **Haldia – Subhashgram(PG) 400kV D/C line**
- **2x315MVA ICTs at Subhashgram(PG)**
- **220kV D/C line from Subhashgram to CESC substation**

In order to evacuate power from Haldia TPS of CESC, the above ATS including 400kV, 220kV bays and ICTs would be developed by CESC at their own cost. Out of 600 MW plant capacity, 450MW would be the drawal of CESC at 220kV from ICTs being provided at Subhashgram(PG) by CESC. The balanced 150MW would be wheeled to NPCL (Noida Power Company Ltd,) by long term access( LTA) utilizing ISTS system. On the issue for sharing of ER transmission charges for 450MW drawal by CESC utilizing the 400 kV bus connectivity at Subhasgram(PG), Member(PS) desired to have the views of the constituents including PGCIL.

Director (Proj) PGCIL stated that CESC would not use the ISTS elements excepting the 400kV bus connectivity for their 450MW drawal and charging ER transmission charges from CESC for this quantum of power would not be correct proposition. BSEB participant was initially of the view that CESC should bear ER transmission charges for 450MW. Member(PS) clarified that CESC would have to wheel 150 MW by LTA and for that CESC would have no alternative but to inject Haldia generation at 400 kV Subashgram(PG). Other members, prima-facie, were of the view not to take ER transmission charges from CESC. However, it was pointed out that in case of outage/shunt down of Haldia PS, CESC could not be stopped from its drawal from Subhashgram (PG) S/S. Member (PS) explained that in such a case, during outage/shunt down of Haldia TPS, any drawal by CESC at Subhasgram (PG) S/S from the grid, they would be levied STOA charges for transmission system

usage subject to the availability of transmission system to wheel the power as decided by RLDC in real time. Director (Trans.) WBSETCL enquired whether there would be space available for adding third ICT under ISTS scope at Subhashgram (PG) S/S to meet future system requirement. In this context, PGCIL participant stated that though there would not be apparently any space problem in the substation, they would look into the issue. After detailed deliberations, all the ER constituents including BSEB agreed to the following:

- (i) CESC would be provided connectivity at 400 kV Subhashgram (PG) S/s.
- (ii) For wheeling of 150 MW power Haldia TPS, NPCL (beneficiary) would bear the ER and NR regional charges.
- (iii) For 450 MW power drawal by CESC from its own ICTs at Subhashgram(PG), no ER transmission charges would be charged from CESC.

### 5.3 ATS for IPPs in Jharkhand and WB

The IPP projects and LTA sought/granted were the following:

SI No	Projects	Time Frame	Ins. Cap	LTOA	Allocation			Total
					NR	WR	ER	
<b>A</b>	<b><u>Jharkhand</u></b>							
1	Adhunik	Mar-12	1005	910	400	100	350	850
2	Corporate	Mar-12	660	594	594			594
3	ESSAR	Dec-11	1200	1100	400	400	300	1100
4	Dumka	Jun-12	600	540	270	270	0	540
5	West Bengal Projects	2011-12	2000	1000	-	-	-	1000 <sup>#</sup>

[# Earlier LTOA for 2000MW granted, but WBSETCL/WBSEDCL now proposed for 1000MW and would give revised application to PGCIL.]

#### A. ATS in Jharkhand

The project specific transmission system for Dumka (600MW), Corporate (660 MW), Essar(1200MW), and Adhunik (1005 MW) projects in Jharkhand, were agreed as following:

- **ATS for CESC – Dumka (600MW)**

✓ LILO of Kahalgaon-Maithon 400kV D/c lines at Dumka

Earlier, Dumka PS was envisaged with installed capacity of 2x600MW. PGCIL informed that one unit would materialize in the first phase for which LILO of Kahalgaon-Maithon 400kV D/C lines at Dumka would meet power evacuation requirement. It was also proposed that matching with the commissioning of the second unit at a later date, Dumka-Gaya 400 kV D/C line would be constructed. On query about short circuit level at Kahalgaon station after LILoing the 400kV line at Dumka, PGCIL stated that they would examine the issue and take remedial measures to contain the short circuit level at Kahalgaon.

For supply of Jharkhand's share of 25% from Dumka project, CESC would provide 2x315MVA,400/220kV ICTs at the Dumka switchyard enabling JSEB to consume their requisite share from the switchyard by constructing 220kV outlets. Related commercial issue would be mutually settled by CESC and JSEB.

- **ATS for Corporate(660 MW) and Essar(1200MW) projects**

- ✓ Corporate – Jharkhand Pooling Station 400kV D/C line
- ✓ Essar – Jharkhand Pooling station 400kV D/C (quad moose) line

PGCIL informed that ATS for Electrosteel (1200MW) project in Jharkhand was not considered due to its uncertainty.

In order to draw power directly from Corporate and Essar generation switchyards, JSEB proposed that the facility for 400/220kV ICTs at the generation switchyard should be considered by the concerned IPPs in line with facility being provided by CESC at the Dumka project. M(PS) suggested that JSEB would need to discuss and sort out the issues including commercial issues with the concerned IPPs.

- **ATS for Adhunik (1005 MW)**

Adhunik- Jamshedpur 400 kV D/C or, LILO of Maithon-Jamshedpur 400kV D/C at Adhunik

M(PS) highlighted that for immediate evacuation of power from Adhunik project, LILO of Maithon-Jamshedpur 400kV D/C at Adhunik would be the interim arrangement till the time 400kV Adhunik- Jamshedpur 400 kV system be established.

## **B. System Strengthening under the scope of WBSETCL in State sector**

Regarding the agreed system strengthening works of WBSETCL under State sector, Director (Trans.) WBSETCL informed to note that Jagatballabhpur location would be Chanditala and Guptamanipur location would be Kharagpur. Accordingly, the system strengthening works of WBSETCL would be the following:

- Chanditala – Subhashgram 400kV D/c line
- Kolaghat – Kharagpur 400kV D/C line
- Chanditala - Kharagpur 400kV D/c line
- Chanditala -Gokarna 400kV D/c line
- LILO of Baripada – Kolaghat 400kV S/c at Kharagpur
- Kharagpur – Jamshedpur 400kV D/c line
- Purulia PSS – Ranchi 400kV D/c line

On the construction of the Kharagpur-Jamshedpur 400 kV D/C and 400 kV Purulia PSS-Ranchi D/C lines, Director (Trans) WBSETCL proposed to establish these two 400kV lines by PGCIL on the basis of 100% transmission charges to be paid by WBSETCL to PGCIL. PGCIL representative stated that CERC was not in favour of such methodology. They suggested that the line can be implemented by them as deposit works on behalf of WBSETCL by PGCIL.

While enquired about progress for construction of various generation specific transmission system and related 2000MW LTOA, WBSETCL representative stated that earlier LTOA for 2000 MW was sought from PGCIL and it would now be 1000MW. Member(PS) highlighted that WBSETCL/ WBSEDCL should apply for LTOA with revised application.

## **C. Common System Strengthening for Transfer of power from generation projects in Jharkhand and West Bengal to NR/WR by PGCIL**

In order to transfer power to NR/WR from generation projects in Jharkhand and West Bengal, the transmission corridors within the region and across the regions and location of the pooling station (s) were decided as following:

- **In ER**
  - Establishment of 400kV Pooling Station (Jharkhand Pool) near Essar and Corporate generation projects.
  - Ranchi – Jharkhand Pooling Station - Gaya 400 kV Quad D/c

- **In NR**

- New 765/400 kV substation at Varanasi and Kanpur
- Gaya – Varanasi 765 kV S/c (instead of Gaya-Balia 765kV 2<sup>nd</sup> line)
- LILO of Tillaiya – Balia 765 kV S/c at Varanasi
- Varanasi – Kanpur 765 kV D/c
- Kanpur – Jhattikalan 765 kV S/c
- 400kV connectivity for new 765/400kV S/s at Varanasi & Kanpur

- **In WR**

- Ranchi - Dharamjayagarh 765kV S/c (instead of Ranchi-Sipat 765kV 2<sup>nd</sup> S/C line)
- Dharamjayagarh – Jabalpur 765kV D/c (2<sup>nd</sup> line) –proposed to be under Pvt. Sector.

M (PS) stated that the above system requirements were already discussed and agreed by the NR and WR constituents in its 27<sup>th</sup> SCM of NR held on 30<sup>th</sup> May'09 and 29<sup>th</sup> SCM of WR held on 10-9-09 respectively.

The charges of the common transmission system would be borne by the generation developers of Jharkhand as well as WBSEDCL till the time the long term beneficiaries are finalized. Once, the long-term beneficiaries are tied-up, transmission charges would be shared by the beneficiaries in proportion to their allocation. Regional charges of Eastern Region would be borne by Jharkhand IPPs in proportion to their installed capacity, and by WBSEDCL corresponding to its long term access quantum. The regional charges for WR and NR would also be shared by Jharkhand IPPs and WBSEDCL in proportion to the power allocated to these regions.

### 5.3 Orissa IPPs

#### Phase-1 Gen Projects in Orissa

Sl no	Projects	Installed Capacity (MW)	Date of Commissioning	LTOA Required (MW)				
				NR	WR	ER	SR	Total
1	Sterlite	2400	June-09	200	200	-	-	400
2	GMR	1050	Sept -11	600	-	-	200	800
3	Navbharat	1050	July - 11	465	255	-	-	720
4	Monnet	1050	June-12	300	375	225	-	900
5	Jindal	1200	March-11	834	210	-	-	1044
6	Lanco Babandh	2640	Dec-13	650	950	-	-	1600
7	Ind Barath	700	Sept-11	266	350	-	-	616
<b>10090</b>				<b>3315</b>	<b>2340</b>	<b>225</b>	<b>200</b>	<b>6080</b>

#### A. ATS upto Pooling Station at Jharsuguda (under the scope of Generation Developer)

**Sterlite (2400 MW):** Sterlite – Jharsuguda Pool 400kV D/C line with associated line bays



**Ind-Barath (700 MW)** : Ind-Barath – Jharsuguda Pool 400KV D/C line with associated line bays

M (PS) stated that in view of the possibility of the IPP generations being stranded on account of delay in implementation of ATS, LILO of one circuit of 400kV Rourkella- Raigarh D/C line at Sterlite and LILO of the other circuit at Ind-Barath would be made as temporary arrangement to avoid such situation. These LILO would be removed when the project specific transmission system as decided would be in place.

In respect of Sterlite project, M(PS) stated that out of the total installed capacity of 2400MW , the generation developer sought LTA for only 400MW, 600 MW share for Orissa, about 1000MW would be utilized for meeting its own typical captive load and there was no strategy indicated for utilization of balanced 400MW. In view of the plant to be connected to the grid, grid security and stability could be a concern. M (PS) stated that the generation developer would be required to carry out detailed exercise about typical characteristics of their load and derive the plan for entire utilization of Plant capacity. In this context, M(PS) stated that the generation developer should submit its switchyard drawings, load characteristics etc. to CEA/PGCIL for study and analysis.

**B. ATS upto Pooling Station at Angul (under the scope of Generation Developer)**

**Jindal Thermal (1200 MW)**

Jindal – Angul Pool 400KV D/c line with associated line bays

**Monnet (1050 MW)**

Monnet – Angul Pool 400KV D/c line with associated line bays

**GMR (1050 MW)**

GMR – Angul Pool 400KV D/c line with associated line bays

**Lanco Babandh(2640 MW)**

Lanco Babandh – Angul Pool 400KV 2xD/C line along with 3x1500MVA 765/400kV ICTs at Angul

**Navbharat Ph-I (1050 MW)**

Navbharat – Angul Pool 400KV D/c line with associated line bays.

**C. Common System Strengthening Schemes by PGCIL**

M(PS) stated that the system strengthening requirements to facilitate transfer of power from Phase-I generation projects of IPPs in Orissa to NR and WR were earlier firmed-up and the same was further tuned after reviewing the generation scenarios of IPPs.

Accordingly, the transmission requirements within and across the Eastern, Northern, and Western Regions, which were already discussed and agreed in the 27<sup>th</sup> SCM of NR held on May and 29<sup>th</sup> SCM held on 10-09-09 of WR, were the following.

**(a) ER:**

- Establishment of 2x1500 MVA, 765/400kV Pooling Station at Jharsuguda
- Establishment of 4x1500MVA, 765/400kV Pooling Station at Angul
- Angul Pooling Station – Jharsuguda Pooling Station 765kV 2xS/c
- LILO of Rourkela – Raigarh 400kV D/c at Jharsuguda Pooling station
- \*LILO of Meramundali – Jeypore 400kV S/c line at Angul pooling station
- \*LILO of one ckt of Talcher - Meramundali 400kV D/c line at Angul pooling station

[ \* These LILO would be later disconnected when Angul pooling station is developed as 765kV as otherwise it would cause short circuit level problem.]

**(b) ER-WR:**

- Establishment of 765kV substation at Dharamjaygarh
- Establishment of 2x1500 MVA, 765/400kV Jabalpur Pooling Station
- Jharsuguda Pooling Station – Dharamjaygarh (WR) 765kV D/c
- LILO of Ranchi – WR Pooling (near Sipat) 765kV S/C line at Dharamjaygarh
- Dharamjaygarh – Jabalpur Pooling Station 765kV D/c line
- Jabalpur Pooling Station – Jabalpur 400 kV D/C (high capacity)

**(c) WR-NR:**

- Establishment of 2x1500MVA, 765/400kV Bhopal Pooling Station
- Jabalpur Pool Pooling Station – Bina 765kV D/c line
- Bina – Gwalior 765kV S/C (3<sup>rd</sup> circuit)
- Jabalpur Pool Pooling Station – Bhopal – Indore 765kV S/C (proposed to be under Pvt. Sector)
- Bhopal New substation – Bhopal (M.P.) 400kV D/C (high capacity)
- Gwalior - Jaipur 765kV S/c line
- Jaipur - Bhiwani 765kV S/c line

The charges of the above system strengthening scheme for evacuation and transfer of power from the above IPPs in Orissa to beneficiaries in various regions would be borne initially by the generation developers. Once the generation developers identified the long term beneficiaries for their generation projects, the same shall be borne by the beneficiary state transmission utilities.

Director (Comm.) GRIDCO stated that there would be an additional load growth in the State with the implementation of RGGVY scheme and 30% share of Orissa from the Phase-I projects would be utilized to meet the load growth. Director, CEA stated that considering this 30% share, Orissa would have considerable surplus power by the end of 11<sup>th</sup> plan as per 17<sup>th</sup> EPS load projection. M (PS) stated that for absorption 30% share, Orissa grid system would require to be strengthened for absorption of 30% share from Phase-I.

CMD, GRIDCO desired to know the timeline for setting up of 765/400kV Dhenkanal pooling station. M(PS) stated that the 765kV Dhenkanal pooling station and associated 765kV connectivity to 765 Angul and Jharsuguda sub-stations would be linked to Phase-II generation projects of IPPs in Orissa. On the issue of absorption of 30% State's share from Phase-I projects, CMD, GRIDCO stated that he would take up the matter with OPTCL.

PGCIL informed that BPTA for Phase-I projects was already initialed by IPPs. Unless the Bank Guarantee(BG) was given by the IPPs, implementation/construction of ATS could not take-off. IPPs should expeditiously furnish BG to PGCIL. In this context, the detailed deliberation held with the IPPs in Orissa on 15-9-09 following the Standing committee meeting would be issued by PGCIL.

## 6.0 Evacuation of power from generation projects coming up in Sikkim, NER and Bhutan

### 6.1 Phase-1 Gen Projects in Sikkim

Sl. No	Name of the Generation Plant	Capacity/ Power to be transferred	Tentative Beneficiaries	Expected Commissioning Schedule
1	Teesta-III	200x6 =1200 MW	PSEB-340MW, HPGCL-200MW, UPPCL-200MW, Rajasthan Discom-100MW	Aug., 2011
2	Teesta-VI	125x4=500 MW	MSEDCL (Maharashtra)	Nov, 2012
3	Jorethang	48x2 = 96 MW	NR/WR	Dec., 2011
4	Rangit-IV	40x3=120 MW	NR/WR	June, 2013
5	Tashiding	48.5x2 =97 MW	NR/WR	June, 2012
6	Tingting	49.5x2=99 MW	NR/WR	March, 2012
7	Rongnichu	48x2=96 MW	Chhattishgarh	March, 2012
8	Chuzachen	49.5x2=99 MW	PSEB, DVB, HSEB, BSEB	March, 2010
9	Bhasme	25.5x2 = 51 MW	NR/WR	March, 2012
<b>Total</b>		<b>2358 MW</b>		

**6.2** M (PS) stated that the dedicated transmission lines from hydro projects in Rangit and Teesta basins viz. Tingting, Tashiding HEPs etc. would pool the power at a 220kV pooling station to be developed near Tingting/Tashiding. The Govt. of Sikkim was to identify the site for the pooling station. On query from M (PS), CE (Power) Sikkim confirmed the site location and land availability for developing 220kV pooling station near Tingting/Tashiding.

**6.3** In view of delay in the commissioning programme of Subansiri HEP (2000MW), Kameng HEP (600MW) etc. in NER from 11<sup>th</sup> plan to early 12<sup>th</sup> plan (2012-13) and to conserve right of way in the chicken-neck area in the northern part of WB, the transmission requirements for evacuation of power from various hydro projects coming up in NER, Sikkim and Bhutan were reviewed with the aim of developing optimal and comprehensive transmission system meeting the long term requirements for transfer of power to NR and WR. The 3000MW HVDC terminal station intended earlier to be set-up at Kishanganj, would be set-up in the northern part of WB at Alipurduar (close to Bhutan border) to conserve RoW in the chicken-neck area and to facilitate transfer of power from generation projects in Bhutan. Power from various basin based hydro-projects coming up in Sikkim was already identified to be pooled at Rangpo, Tingting or Tashiding, New Melli, Mangan pooling stations within Sikkim would be finally pooled at Kishanganj. Accordingly, establishment of a 400/220kV Kishanganj pooling station with an additional 400kV D/C Quad line from Kishanganj to Patna was planned. For evacuation of Teesta-III, power from the project would be transmitted to 400/220kV Kishanganj S/S by the 400kV Teesta-III – Kishanganj D/C Quad line to be developed by TPTL under JV route. It would be LILoed at New Melli pooling station to facilitate power transfer from Phase-I projects in Sikkim. This line would be further LILoed at proposed Mangan pooling station at a later date for future generation projects in Northern part of Sikkim. After commissioning of Mangan pooling station, the Mangan – New Melli portion of this line would be also utilized by other generation projects.

**6.4** The generation project specific dedicated transmission system were the following:

**A. Upto Pooling Station at New Melli/ Kishanganj / Mangan<sup>#</sup> (proposed at a later date)**

1. **Teesta-III** :Teesta-III – Kishanganj 400kV D/C line with Quad Moose conductor(to be implemented by TPTL under JV route)

2. **Teesta-VI** :Teesta-VI – New Melli 220kV D/c line with Twin Moose conductor
3. **Jorethang & Rangit-IV**:\_Jorethang – New Melli 220kV D/c line with single moose conductor, one ckt via Rangit-IV.
4. **Tingting & Tashiding**:\_Tingting– New Melli 220kV D/c line with twin moose conductor, one ckt via Tashiding.

[The line would be routed through the proposed pooling point substation near Tingting]

#### **B. Upto Pooling Station at Rangpo**

1. **Chuzachen** :\_ Chuzachen – Rangpo 132kV D/C line with Zebra conductor.
2. **Rongnichu**: Rongnichu – Rangpo 220kV D/C line with Zebra conductor.
3. **Bhasme** : LILO of one ckt of Rongnichu-Rangpo 220kV D/c line at Bhasme with Zebra conductor.

**6.5** In order to transfer power from HEPs in Sikkim and Bhutan to NR and WR, the revised transmission system requirements and its development in phase-A,B & C were the following.

#### **Part – A: Transmission System for development of pooling station at Kishanganj and associated transmission works (under the Scope of PGCIL)**

**(By 2011-12, for evacuation of 1300 MW from Sikkim)**

- Establishment of New 2x315 MVA, 400kV sub-station at Kishanganj
- LILO of Siliguri (Existing) – Purnea 400kV D/c line(quad) at new pooling station Kishanganj
- LILO of Siliguri (Existing) – Purnea 400kV D/c line (on which reconductoring is being carried out) at Kishanganj with the higher capacity(HTLS) conductor
- LILO of Siliguri – Dalkhola 220kV D/c line at new pooling station Kishanganj
- LILO of Gangtok-Melli 132kV S/c line upto Rangpo, where Chuzachen-Rangpo 132kV D/c would be connected so as to form Chuzachen-Gangtok and Chuzachen-Melli 132kV S/c lines. [This would be a temporary arrangement till establishment of Rangpo pooling substation under Part-B of the scheme and termination of Gangtok-Rangpo, Melli-Rangpo and Chuzachen-Rangpo 132kV lines at Rangpo ]

#### **Part – B: Transmission System for development of pooling substations within Sikkim and transfer of power to a new pooling station Kishanganj in northern Part of West Bengal/Bihar (under the Scope of PGCIL)**

**(By 2012-13, when additional 1100MW materializes in Sikkim)**

- Establishment of 220/132kV, 3x100MVA Gas Insulated Substation at Rangpo

- Establishment of 10x167MVA, 1 ph, 400/220kV Gas Insulated substation at New Melli
- LILO of Teesta III – Kishanganj 400kV Quad D/c line (to be constructed through JV route) at New Melli
- Rangpo – New Melli 220kV D/C line (with twin Moose conductor)
- LILO of Gangtok-Rangit 132kV S/c line at Rangpo and termination of Gangtok-Rangpo/Chujachen and Melli–Rangpo/Chujachen 132kV lines (constructed under part-A through LILO of Gangtok-Melli 132kV S/c line upto Rangpo) at Rangpo sub-station
- LILO of Teesta V – Siliguri 400kV D/C line at New Melli
- Kishanganj – Patna 400kV D/C (quad) line

**Part-C: Transmission System for development for power transfer from Bhutan to NR/WR (under the Scope of PGCIL)**

**(By 2014-15, when Punatsangchu-I(1200MW) comes up in Bhutan)**

- New 2x315MVA, 400/220kV AC & HVDC sub-station with  $\pm 800$ kV, 3000MW converter module at new pooling station at Alipurduar.
- Extension of  $\pm 800$  kV HVDC station with 3000 MW inverter module at Agra
- LILO of Bishwanath Chariyali – Agra HVDC line at new pooling station in Alipurduar for parallel operation of the HVDC station
- LILO of Bongaigaon – Siliguri 400kV D/c line(quad) (Bongaigaon – Siliguri 400kV D/c line under Pvt. Sector) at new pooling station in Alipurduar
- LILO of Tala-Siliguri 400kV D/c line at new pooling station in Alipurduar.
- LILO of Birpara-Salakati 220kV D/c line at new pooling station in Alipurduar
- Punatsangchu-1 – Alipurduar 400kV D/c with HTLS conductor (Indian Portion)
- Earth Electrode line at new pooling station at Alipurduar
- Earth Electrode line at Agra HVDC Terminal

The above system requirements under Part-A,B & C were discussed and agreed in in the 27<sup>th</sup> SCM of NR held on 30th May'09 and 10th SCM of WR held on 16th Sept'09. Generation developers would initially bear the transmission charges for Part 'A' & 'B' of the above works .The modality for cost and transmission resource sharing among the IPPs should be sorted out between IPPs and PGCIL. The transmission charges for the Part-C would be borne by beneficiaries of Bhutan

power. Northern Region and Western Region agreed to share the transmission charges subject to allocation of power from Bhutan projects.

M(PS) thanked all the participants summarizing the following decisions in the deliberation.

- (i) All out efforts would be put by PGCIL and JSEB to remove encroachment at the existing Jamshedpur (PG) S/S for expansion of the S/S with additional ICT enabling DVC to supply the upcoming load demand of TISCO in the area. After reviewing the progress in this regard after 2/3 months, the proposal of DVC for creation of new 400/220kV, 2x315MVA S/S at Jamshedpur could be firmed-up.
- (ii) PGCIL would keep provision of space for additional two nos. 220kV line bays in its 400/220kV sub-stations at Chaibasa and Daltonganj. JSEB would furnish its plan and programme for developing 220kV underlying network of the State grid from these sub-stations of PGCIL.
- (iii) For providing connectivity to the agreed 400/220kV Uttara S/S, PGCIL would examine the proposals of GRIDCO for LILO of both the circuits of 400kV Baripada-Mendhasal D/C line or, alternatively by a 400kV D/C lines from Mendhasal S/S in Orissa.
- (iv) For immediate evacuation of power from Tilaiya UMPP, the revised transmission system as agreed would be 765kV Tilaiya-Gaya S/C and Tilaiya-Balia 765kV D/C line.
- (v) For wheeling of 150 MW power from CESC-Haldia TPS(600MW) by LTA, NPCL (beneficiary) would bear the ER and NR regional charges. For drawal of balanced 450 MW by CESC through 220kV lines to be developed by CESC from their 400/220kV ICTs at Subhasgram (PG), no ER transmission charges would be charged from CESC. However, in the event of outage of Haldia TPS, any drawal by CESC from Subhasgram (PG) they would be levied STOA charges and would be subject to the availability of transmission system to wheel the power as decided by RLDC in real time.
- (vi) For immediate evacuation of power from Adhunik project in Jharkhand, LILO of Maithon-Jamshedpur 400kV D/C line at Adhunik would be the interim arrangement till the time 400kV Adhunik- Jamshedpur D/C line be established as a dedicated system.
- (vii) Proposal of JSEB for drawal of its share directly from the Corporate and Essar generation switchyards by providing facility of 400/220kV ICTs by the concerned IPP could be firmed-up in co-ordination with the generation developers.
- (viii) Proposal of WBSETCL for construction of its Kharagpur-Jamshedpur 400 kV D/C and 400 kV Purulia PSS-Ranchi D/C lines by PGCIL on the basis of deposit work was agreed to by PGCIL.

- (ix) WBSEDCL would apply with revised application for seeking long term open access for 1000MW from PGCIL instead of 2000MW sought earlier by PGCIL relating to transfer of State's power to NR/WR.
- (x) For power evacuation from Sterlite and Ind-Barath projects in Orissa, LILO of one circuit of 400kV Rourkella- Raigarh D/C line at Sterlite and LILO of the other circuit at Ind-Barath would be made as temporary arrangement to avoid any generation being stranded. These LILO would be removed when the project specific transmission system would be in place.



## Annex

List of participants for the Standing Committee Meeting on Power System Planning in ER held on 14.09.2009 at Bhubaneswar, Orissa.

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