

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

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

Dated: 17-08-2010

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|---|---|
| 1. Member (Transmission),
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| 3. Member Secretary,
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Grid Corporation of Orissa Ltd,
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| 5. Director (Transmission),
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| 11. Executive Director (T&RE),
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Sector 33, Faridabad-121003. | 12. General Manager,
Eastern Regional Load Dispatch Center,
14, Golf Club Road, Tollygange,
Kolkata-700033. |

Sub: Agenda for meeting of the Standing Committee on Power System Planning in Eastern Region.

Sir,

The Agenda for the next Standing Committee on Power System Planning in Eastern Region has been uploaded on **CEA website: www.cea.nic.in**. (Path to access-*Power System/Standing Committee on Power System Planning/EASTERN REGION*).

The date and venue of the proposed meeting will be intimated shortly. Any additional issue to be discussed as an agenda for the meeting may please be communicated in advance.

Yours faithfully,

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

Agenda note for Standing Committee meeting of Eastern Region

1.0 Confirmation of the minutes of the meeting held at Bhubaneswar, Orissa on 14.09.2009.

Minutes of the Standing Committee Meeting (SCM) held on 14.09.2009 at Bhubaneswar, Orissa were circulated vide CEA letter No. 66/5/99/SP&PA/985-996 dated 24.09.2009. No comments have been received on the minutes.

The minutes may be confirmed.

2.0 Establishment of New 400 kV sub-station at Jamshedpur of DVC and LILO of one ckt of 400kV Jamshedpur-Baripada D/C line at Jamshedpur S/S (DVC) in lieu of LILO of one ckt. of 400 kV Parulia-Jamshedpur D/C line.

2.1 The proposal for establishment of New 400 kV sub-station at Jamshedpur by DVC through LILO of one ckt. of 400 kV Parulia-Jamshedpur D/C line was agreed in the last SCM held on 14.09.2009 at Bhubaneswar for meeting the upcoming load requirement of TISCO to be supplied by DVC. Prior to take-up this work, space availability removing encroachment at the existing 400kV Jamshedpur (PG) S/S for its expansion with an additional 1x315MVA transformer was required to be first explored without going for the new 400/220kV sub-station at Jamshedpur. As a follow up action, PGCIL and JSEB in co-ordination with the Govt. of Jharkhand had pursued with all out efforts to remove encroachment, but were not able to make it. In view of urgent requirement of DVC, CEA vide its letter No. 66/5/2009-SP&PA/425-431 dated 29-04-2010 has advised DVC to go ahead for setting up of the new 400/220 kV, 2x315 MVA sub-station at Jamshedpur by LILO of one ckt. of 400 kV Parulia-Jamshedpur D/C line at their own expenses.

2.2 Further, DVC vide its letter dated 30th June, 2010 has informed that getting the route for LILO of the Parulia-Jamshedpur line at Jamshedpur (DVC) S/S is very difficult due to dense population enroute. Instead, they have proposed for LILO of one ckt of the 400kV Jamshedpur- Baripada D/C line at its new Jamshedpur S/S involving 10km stretch for the LILO work relative to 25km stretch for LILO of the 400 kV Parulia-Jamshedpur line.

The present proposal of DVC for LILO of 400kV Jamshedpur- Baripada line at Jamshedpur (DVC) S/S would be workable from system consideration and may be agreed.

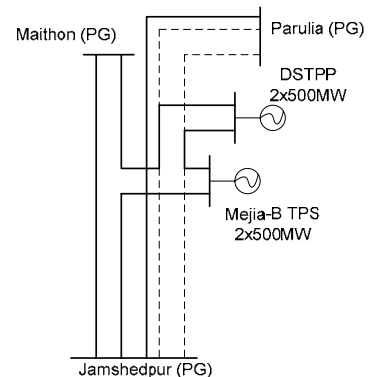
Members may concur.

3.0 Contingency arrangement for start-up power for 2x500MW Durgapur STPP(Andal) of DVC.

LILO of one ckt. of the ongoing 400kV Durgapur(Parulia) - Jamshedpur D/C line of PGCIL (Part of approved ERSS-I scheme) at DSTPP was planned under the scope of DVC to cater to the requirement of start-up-power for Durgapur STPP and to facilitate power evacuation. From the 14th ERPC MoM held on 11-6-10, it is noted that the boiler for 1st unit of DSTPP would be lit up by July,10 and proposed LILO (6 Km) work for start-up-power has been completed by DVC. It is also noted that the construction of the 400kV Durgapur - Jamshedpur D/C line being implemented by PGCIL is getting delayed due to objection raised by M/s Bengal Aerotropolis Pvt. Ltd (BAPL) and by M/s ECL.

In view of urgency for start-up power for DSTPP by DVC, PGCIL has proposed for temporary start-up power arrangement (shown in Fig.) by using a portion (approx. 19 km) of the 400 kV Durgapur-Jamshedpur D/C line (under construction by PGCIL) and 4km portion of DVC's line (constructed for LILOing the 400 kV Durgapur-Jamshedpur line) and 400 kV Maithon-Mejia S/C existing line. The transmission charges for this arrangement would be borne by DVC upto CoD of 1st unit and DVC was agreeable to this proposal in the 14th ERPC meeting.

The proposed start-up arrangement could be adopted as an interim arrangement till the time 400kV Durgapur- Jamshedpur line is implemented by PGCIL. However, PGCIL has to expeditiously obtain the clearances against the objections raised by the organizations and complete the construction of the 400kV Parulia- Jamshedpur line for the proper start-up power arrangement and to facilitate power evacuation from DSTP Plant of DVC.



Members may concur.

4.0 Extension of 400kV Jamshedpur S/S (DVC) to facilitate power evacuation from 2x270MW Adhunik TPS (IPP) in Jharkhand.

PGCIL has informed that due to encroachment problem at its existing 400kV Jamshedpur S/S, providing connectivity to Adhunik IPP (2x270MW) at their sub-station for the 400kV Adhunik-Jamshedpur (PG) D/C dedicated line is not possible. In turn, they have proposed that Adhunik TPS may be interconnected with the new Jamshedpur 400kV S/s being

developed by DVC.

The arrangement for terminating the dedicated line at DVC would be considered as a special case for the sake of optimization of transmission system provided that

- (i) Adhunik power from DVC Jamshedpur bus is evacuated from ISTS system, and to achieve that the LILO of 400kV Jamshedpur-Baripada line at Jamshedpur (DVC) may have to be done by PGCIL.
- (ii) DVC should agree not to levy their transmission charges and losses on Adhunik power.

Members may discuss and concur

5.0 ATS for Nabinagar-II TPS (3x660 MW).

5.1 Nabinagar-II TPS in Bihar is proposed to be setup through JV between NTPC and BSEB during 2014-15. The step-up voltage is envisaged at 400 kV.

While the permanent allocation from the project is yet to be firmed-up, NTPC has given the tentative allocation as following:

State	Allocation in MW
Bihar (75%)	1485
West Bengal	153
Orissa	133
Jharkhand	52
Sikkim	9
Unallocated (7.9%)	148
Total	1980

5.2 For evacuation of power, the following two 400kV alternatives are proposed by PGCIL.

Alternative-I

- Nabinagar-II – Nabinagar-I 400kV D/C line
- Nabinagar-II – Patna 400kV D/C line with quad moose conductor

Alternative-II

- Nabinagar-II – Gaya 400kV D/C line with quad moose conductor
- Nabinagar-II – Patna 400kV D/C line with quad moose conductor
- 1x1500MW 765/400kV ICT at Gaya.

Out of the two Alternatives, system study reveals that the Alternative-II is a better option to meet system requirements and may be adopted. However, as most of the generation

from Nabinagar-II will be absorbed within ER, the provision of 1x1500MVA 765/400kV ICT is an overprovision and should be excluded from the scope of the Alternative-II. Accordingly, ATS for Nabinagar-II would be as following.

- **Nabinagar-II – Gaya 400kV D/C line with Quad moose conductor**
- **Nabinagar-II – Patna 400kV D/C line with Quad moose conductor**

Members may discuss and concur.

6.0 Transmission System for IPP Generation Projects in Jharkhand, West Bengal and Orissa.

The progress of various IPP generation projects and related status of LTA/BPTA were reviewed in the meeting held on 1-02-2010 in CEA with the generation developers. Accordingly, the latest status of the Phase-I IPPs in Jharkhand, West Bengal and Orissa are as following.

6.1 IPPs in Jharkhand & West Bengal and ATS:

SI No	Projects	Developer/Applicant	Time Frame	Ins. Cap (MW)	LTOA (MW)	Allocation(Mw)			
						NR	WR	ER	Total
A Jharkhand Projects									
1	Adhunik	Adhunik Power & Natural Resources Ltd.	Jan-12	540	450	200	50	200	450
2	Corporate	Corporate Power Ltd	Sept-13	540	480	240	240		480
3	ESSAR	Essar Power (Jharkhand) Ltd.	Mar-13	1200	1100	400	400	300	1100
			Subtotal	2280	2030	840	690	500	2030
B West Bengal Projects									
		WBSEDCL (West Bengal State Electricity Distribution Company Ltd.)	2013-14	1000	1000	600	400	-	1000
			Total	3280	3030	1440	1090	500	3030

6.1.1 Immediate evacuation system for Adhunik, Corporate, Essar and Corporate Phase-I generation projects

(under the Scope of Generation Developer)

- **Adhunik(2x270 MW)** – CoDs in January 2012 and March 2012.

In the last SCM held on 14-09-2009, the ATS for Adhunik (1005MW) was decided as following:

- 400kV Adhunik- Jamshedpur(PG) 400 kV D/C as a dedicated line and LILO of Maithon-Jamshedpur 400kV D/C at Adhunik would be the interim arrangement till the time the dedicated line be established.

The generation developer has revised its plant capacity to 2x270MW (first phase) and signed BPTA for LTA of 450 MW (NR-200 MW, WR-50MW, ER-200MW).

Subsequently, PGCIL has proposed for interconnecting Adhunik project to the Jamshedpur (DVC) S/S due to acute encroachment problem at its Jamshedpur (PG) S/S. The Jamshedpur(DVC) substation would be connected with CTU system through LILO of Jamshedpur-Baripada line (LILO may have to be done by PGCIL instead of DVC). Thus, power from Adhunik generation would be transferred to its beneficiaries through CTU system utilizing only the busbar of Jamshedpur(DVC) substation. As no transmission system of DVC would be utilized, Adhunik would not share the charges of DVC system for injection of power to the CTU system. However, apart from sharing the transmission charges for transmission system planned for Jharkhand and West Bengal generation projects, Adhunik would share the charges of ER corresponding to their installed capacity (540 MW) and charges of NR and WR corresponding to the allocation for respective region (200MW for NR and 50MW for WR). The application of transmission charges of the STUs for delivery of power to different beneficiaries would also be borne by Adhunik.

- **Corporate(540 MW) – CoD in Sept.,2013**
 - Corporate – Jharkhand Pooling Station 400kV D/C line
- **Essar(2x600MW) –CoDs in March, 2013 and Sept.,2013**
 - Essar – Jharkhand Pooling station 400kV D/C (Quad moose) line
- **Corporate Power Ltd Phase-I (2x270 MW) – CoDs in March 2012 & June 2012 (earlier known as Chitrapur Coal and Power Ltd.)**
 - Corporate Ph-I – Ranchi 400kV D/c twin moose line

This system was agreed in the SCM held on 5-11-07 at Ranchi when M/s Chitrapur Coal and Power Ltd was the developer of the project. PGCIL has informed that Corporate phase-I developer has applied for connectivity as well as LTA.

Members may note and concur.

6.1.2 Common system strengthening for transfer of power from Phase-I generation projects in Jharkhand and West Bengal to NR/WR

(Under the scope of PGCIL)

In the 14th Sept.'09 SCM, the requirement of the common system strengthening works were finalized categorizing the system into three region specific groups viz. ER, NR and WR. In order to facilitate part-wise implementation of the work matching with the commissioning of generation projects, PGCIL has proposed to regroup the entire work into two parts i.e. Part-A & Part-B. The Part-A is associated with ER and WR & Part-B is associated with NR.

Due to delay in commissioning of Tilaiya UMPP project, PGCIL has also proposed to modify the LILO of Tilaiya – Balia line at Varanasi as LILO Gaya – Balia line at Varanasi. Accordingly, the scope of work under Part-A & Part-B for the common system strengthening work would comprise of the following:

I. Common system strengthening for transfer of power from Phase-I generation projects in Jharkhand and West Bengal - Part-A :

- Ranchi – Gaya 400 kV D/C Quad line via proposed Jharkhand Pooling Station near Essar/ Corporate generation projects
- Ranchi New (765/400kV S/s) - Dharamjayagarh 765kV S/C (instead of Ranchi-Sipat 765kV 2nd S/C line)
- Establishment of 400kV Jharkhand Pooling Station near Essar and Corporate generation projects (depending upon progress of Essar and Corporate IPPs). This will be a switching station without ICTs.

II. Common system strengthening for transfer of power from Phase-I generation projects in Jharkhand and West Bengal - Part-B :

- New 2x1500 MVA, 765/400 kV substation at Varanasi and Kanpur
- Gaya – Varanasi 765 kV S/C (instead of Gaya-Balia 765kV second line)
- LILO of one circuit of Gaya - Balia 765 kV line at Varanasi
- Varanasi – Kanpur 765 kV D/C
- Kanpur – Jhatikra 765 kV S/C
- 400kV connectivity for new 765/400kV S/s at Varanasi & Kanpur
 - Varanasi - Sarnath (UPPCL) 400kV D/C Quad line
 - LILO of Sasaram - Allahabad 400kV line at Varanasi
 - Kanpur (765/400kV) - Kanpur (Existing) 400kV D/C Quad line

III. Private Sector line: *In addition to the above work to be undertaken by PGCIL, Dharamjayagarh – Jabalpur 765kV D/C line (2nd line) would be under the scope of private sector. Associated 765kV line bays at Dharamjayagarh and Jabalpur sub-station would be under the scope of POWERGRID.*

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. Further, the regional charges of Eastern Region would be borne by the developers of Jharkhand projects in proportion to their installed capacity and by WBSEDCL corresponding to open access quantum i.e. 1000MW. The regional charges for WR and NR would also be shared by the developers of Jharkhand projects and WBSEDCL in proportion to the power allocated to these regions. Once, the long-term beneficiaries are tied-up, transmission charges would be shared by the beneficiaries in proportion to their allocation.

Members may note and concur.

6.2 Phase-I IPPs in Orissa & ATS:

Sl no	Projects	Generation Developer/ Open Access Applicant	Date of Commissioning	Installed Capacity (MW)	LTOA Required (MW)				
					NR	WR	ER	SR	Total
1	Sterlite	Sterlite Energy Ltd	Jun-09	2400	200	200	-	-	400
2	GMR	GMR Kamalanga Energy	Nov -11	1050	600	-	-	200	800
3	Navbharat	Navabharat Power Pvt. Ltd	Mar-12	1050	465	255	-	-	720
4	Monnet	Monet Power Company Ltd	June-12	1050	300	225	225	150	900
5	Jindal	Jindal India Thermal Power	March-11	1200	834	210	-	-	1044
6	Lanco Babandh	Lanco Babandh Power Pvt Ltd	Dec-13	2640	650	950	-	-	1600
7	Ind Barath	Ind Barath Energy(Utkal) Ltd	Dec-11	700	266	350	-	-	616
Subtotal(Orissa)				10090	3315	2190	225	350	6080

6.2.1 Transmission System : *(Under the Scope of Generation Developer)*

The project specific dedicated transmission system for Phase-I IPPs in Orissa as firmed up in the earlier SCMs are as following:

A. **ATS planned Upto Pooling Station at Jharsuguda**

- 1 Sterlite (2400 MW)
Sterlite – Jharsuguda Pool 400kV D/c line with associated line bays
- 2 Ind-Barath (700 MW)
Ind-Barath – Jharsuguda Pool 400KV D/c line with associated line bays

B. **ATS planned Upto Pooling Station at Angul**

- 1 Jindal Thermal (1200 MW)
Jindal – Angul Pool 400KV D/c line with associated line bays
- 2 Monnet (1050 MW)
Monet – Angul Pool 400KV D/c line with associated line bays
- 3 GMR (1050 MW)
GMR – Angul Pool 400KV D/c line with associated line bays
- 4 Lanco Babandh(2640 MW)
Lanco Babandh – Angul Pool 400KV 2xD/c line
3x1500MVA, 765/400kV ICT at Angul with associated line bays
- 5 Navbharat Ph-I (1050 MW)
Navbharat – Angul Pool 400KV D/c line with associated line bays

- C.** Till the dedicated line to be developed by the generation developer and the associated transmission system/pooling station to be developed by PGCIL, the interim arrangement (under the scope of respective generation developer) for power evacuation from IPPs

viz. Sterlite, Ind Bharat, GMR and Jindal IPPs in Orissa would be as following:

Sterlite	• LILO of one ckt of Rourkela-Raigarh 400kV D/c line
Ind Bharat	• LILO of other ckt of Rourkela-Raigarh 400kV D/c line
GMR	• LILO of one ckt of Talcher-Meramundali 400kV D/c line
Jindal	• LILO of Meramundali-Jeypore 400kV S/c line

6.2.2 Transmission System for Phase-1 generation projects in Orissa: (Under the Scope of PGCIL)

In the SCM held on 14-9-2009 at Bhubaneswar, the transmission work under the scope of PGCIL for Phase-1 projects in Orissa were formulated and categorized under the sub-titles of 'ER', 'ER-WR' and 'WR-NR'. Subsequently, the entire work was divided into four parts for implementation. Part-A pertains to construction of pooling stations at Jharsuguda and Angul in Orissa and associated interconnections, Part-B corresponds to system strengthening in WR, Part-C having four elements in which first two elements corresponds to system strengthening common for WR and NR and 3rd & 4th elements for system strengthening in NR, and Part-D which is under the scope of private developers pertains to system strengthening in WR. The details of the scope of work under Part-A,B,C & D are as following:

I. Transmission System for Phase-1 generation projects in Orissa - Part-A

- 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
- Establishment of 2x1500 MVA, 765/400kV Pooling Station at Jharsuguda
- Establishment of 4x1500MVA, 765/400kV Pooling Station at Angul

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

II. Transmission System for Phase-1 generation projects in Orissa - Part-B

- Establishment of 765kV switching station at Dharamjaygarh / near Korba
- Establishment of 765/400kV Pooling Station at Jabalpur
- Jharsuguda Pooling Station – Dharamjaygarh / near Korba (WR) 765kV D/c
- LILO of Ranchi – WR Pooling near Sipat 765kV S/c line at Dharamjaygarh / near Korba
- Dharamjaygarh / near Korba – Jabalpur Pooling Station 765kV D/c line
- Jabalpur Pooling Station – Jabalpur 400 kV D/c (high capacity) line

Note: In the 14th ERPC meeting, a view has emerged that the interim arrangements (i.e. 400kV LILO of CTU lines shown above by **) for evacuation of power from IPPs in

ER should be avoided and instead, project specific ATS should be developed for its evacuation.

It is to note that planning of common 765/400kV pooling stations at Angul and Jharsuguda in Orissa and associated high capacity transmission lines for transfer of power from pooling stations to NR/WR have been done to enable optimal utilization of transmission assets and with a view that each of the common pooling stations would meet the evacuation needs of a couple of near by IPPs. The time lines or programmes for implementation of IPP projects are widely varying from its committed schedule due to delay in tying-up the necessary inputs/links and obtaining necessary clearances/approvals, and seeking LTA and signing BPTA. In the process, generation developers used to revise its plant capacity, change CoDs, and sometimes shelve the project. Due to IPPs not adhering to its schedule, as is the case presently, the huge investment for development of common pooling station(s) may be infructuous as utilization of pooling station will be sub-optimal. Keeping this in view, it would be prudent to go by the interim arrangement for power evacuation from IPPs by LILO of 400kV CTU line at IPP on temporary basis. PGCIL has to give a reasonable time frame for setting up of the planned pooling stations for power evacuation from IPPs through dedicated lines and for withdrawal of LILO of ISTS lines.

III. Transmission System for Phase-1 generation projects in Orissa - Part-C

- Jabalpur Pooling Station – Bina 765kV D/c line
- Bina – Gwalior 765kV S/c (3rd circuit)
- Gwalior - Jaipur 765kV S/c line (2nd circuit)
- Jaipur - Bhiwani 765kV S/c line

IV. Transmission System for Phase-1 generation projects in Orissa - Part-D (under Private Sector)

- Establishment of 2x1500MVA, 765/400kV Bhopal Pooling Station
- Jabalpur Pool – Bhopal – Indore 765kV S/c
- Bhopal New substation – Bhopal (M.P.) 400kV D/c (high capacity)

Members may note.

7.0 ATS for power evacuation from Phase-I generation projects in Sikkim/Bhutan:

In the last SCM held on 14-09-2009 at Bhubaneswar, the dedicated system requirement for HEPs in Sikkim/Bhutan under the scope of generation developers and the scope of PGCIL work for transfer of power to NR and WR were firmed-up. Subsequently, the progress of various IPPs was reviewed in the meeting held with generation developers on 1-02-2010 in CEA, and as a follow up action, most of the project developers in Sikkim signed BPTA

submitting BG to PGCIL on 19-2-10. The latest scenario of Phase-1 Gen Projects in Sikkim is given below:

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	April., 2012
4	Rangit-IV	40x3=120 MW	NR/WR	Nov., 2013
#5	Tashiding	48.5x2 =97 MW	NR/WR	Oct.,2012
#6	Tingting	49.5x2=99 MW	NR/WR	Oct.,2012
7	Rongnichu	48x2=96 MW	Chhattishgarh	NA
8	Chuzachen	49.5x2=99 MW	PSEB, DVB, HSEB, BSEB	Sept., 2010
9	Bhasmey	25.5x2 = 51 MW	NR/WR	June, 2012
Total		2358 MW		

Note: Tingting(99 MW) and Tashiding(97 MW) HEPs considered to be materialized in Stage-II

Keeping this in view and considering CERC regulation relating to ATS for HEPs of 50MW and below 250MW capacity, the overall system requirements are revised as following:

7.1 Project specific revised dedicated transmission system:

(under the scope of Generation Project Developers)

A. Upto Pooling Station at New Melli/ Kishanganj / Mangan[#] (proposed at a later date)

- Teesta-III:** Teesta-III – Kishanganj 400kV D/c line with Quad Moose conductor (being implemented by TPTL under JV route between TUL and PGCIL)
- Teesta-VI:** Teesta-VI – Rangpo 220kV D/c line with Twin Moose conductor
- Jorethang & Rangit-IV:** Jorethang – New Melli Switching station 220kV D/C line with single moose conductor, one ckt via Rangit-IV.
- ATS for Tingting (99MW) and Tashiding (97MW) HEPs:** ATS for the HEPs would be required to be reformulated as per the latest CERC guidelines going to be notified shortly, which mandates that for HEPs having installed capacity of 50MW and below 250MW, the project developer is to construct its project specific dedicated transmission line upto pooling or sub-pooling point. The responsibility for developing the pooling and/or sub-pooling station for power evacuation from HEP or a cluster of HEPs in a basin and onward transmission system for de-pooling of power lies on PGCIL/CTU. Accordingly, PGCIL needs to develop a pooling station near Tashiding/Tingting, and

also to develop the associated transmission system (viz. 220kV D/C line from Tashiding/Tingting pooling station to New Melli pooling station) for further dispersal of power, which were earlier under the scope of the project developers. Alternatively, PGCIL would require to evolve a composite and optimal evacuation system plan for HEPs in Rangit basin in Sikkim and ATS requirements along with phase-wise development plan matching with the commissioning of HEPs.

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. **Bhasmey :** Bhasmey HEP - Rangpo S/S 132 D/C line (**Revised**)

Note: Earlier, evacuation of Bhasmey HEP was planned together with Rongichu HEP by LILO of one ckt. of 220kV Rongnichu HEP-Rangpo D/C line (planned under Rongichu). In view of Bhasmey and Chuzachen (99MW) HEPs being in the same basin and developed by the same developer (M/s Gati-Infrastructure), and Rongichu HEP being uncertain, PGCIL has proposed to evacuate Bhasmey by LILO of one ckt. of the 132kV Chuzachen-Rangpo D/C line being developed under Chuzachen HEP. The issue is examined in CEA and it is viewed that the new ATS proposal for Bhasmey HEP is inadequate to meet (n-1) contingency and during 132 kV S/C outage, Chuzachen and Bhasmey HEPs will be bottled-up. CEA has suggested to establish a dedicated and independent 132 D/C line from Bhasmey HEP to Rangpo.

Members may please note.

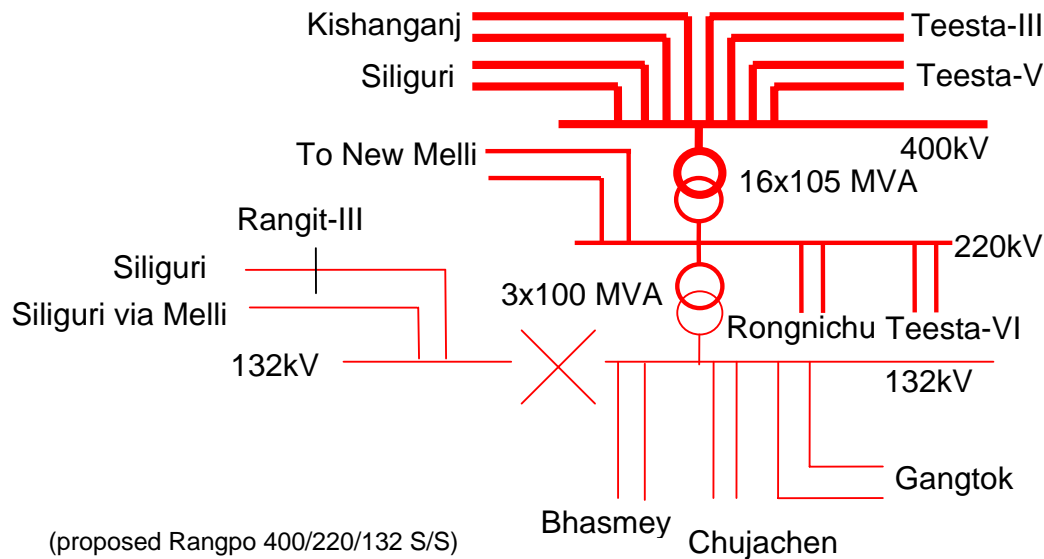
7.2 Revised ATS for HEPs in Sikkim/ Bhutan: (under the scope of PGCIL)

The scope of work under PGCIL for transfer of power from HEPs in Sikkim/ Bhutan to NR and WR were decided and categorized under **Part-A, B & C** in the last SCM held on 14-07-2009 at Bhubaneswar. PGCIL has recently informed the transportation constraints for transporting equipments at New Melli site in Sikkim, and has proposed for shifting of 400/220kV New Melli pooling station to Rangpo considering 220kV switching/pooling station only at New Melli, and accordingly revised the scope of work under Part-A,B & C as following.

7.2.1 Under the scope of Part-A work, LILO of the existing Siliguri – Purnea 400 kV D/c twin moose line (being re-conducted with HTLS conductor by PGCIL) at Kishanganj S/S was planned to be constructed with HTLS conductor. Instead of using HTLS conductor in the LILO portion, PGCIL has proposed for use of quad moose conductor with a view to saving in cost of about 9 crores. This saving in cost is marginal compared to the total re-conducting cost of the line using HTLS conductor and it would be prudent to adopt same HTLS conductor for the LILO section to maintain uniformity. Apart from this, there is no other change in the scope of Part-A work.

7.2.2 Under the scope of Part-B work, the construction of 400/220kV, 10x167MVA GIS at New Melli and a 220/132kV, 3x100MVA GIS pooling stations at Rangpo were planned and are in the process of implementation by PGCIL.

PGCIL has informed that due to acute transportation problem, transportation of the planned transformers to the site of the proposed New Melli sub-station/pooling station is not possible. Keeping this in view, PGCIL has proposed to construct a 220 kV switching station only at New Melli creating 400/220kV facility at Rangpo where a 220/132kV 3x100MVA GIS is under implementation stage. It is also informed that adequate space at Rangpo will be available for setting up of 16x105MVA, 400/220kV and 3x100MVA 220/132kV GIS and being it near to the highway, no transportation problem will be encountered. Accordingly, the 400 kV Teesta-III - Kishanganj D/C line being implemented by TPTL under JV route for Teesta III HEP and the existing 400kV Teesta-V to Siliguri D/C line, which were earlier envisaged to be LILoed at New Melli, are proposed to be LILoed at 400kV Rangpo GIS. For flexibility in operation, a bus-sectionaliser (shown below) is proposed to be put at 132kV bus, so that if the power flows in the 132kV ckt downstream of Rangpo (to Siliguri via Melli and Rangit-III) exceed limit in actual operation, the Circuit Breaker connection in the two bus could be opened to divert power from 132kV side to 220kV side.



Note: Teesta-III – Kishanganj 400kV D/c line to be LILoed at Rangpo will be utilized for evacuation of Phase-I generation projects in Sikkim to Kishanganj. This line would be LILoed at proposed Mangan pooling station at a later date on identification of future generation projects in Northern part of Sikkim. Accordingly, at present the Teesta-III – Rangpo portion of this line is for evacuation of Teesta-III generation only. However after commissioning of Mangan pooling station, the Mangan – Rangpo portion of this line would be utilized by other generation projects also.

7.2.3 Under the scope of Part-C work, the 400kV evacuation system for Punatsangchhu-I (1200MW) in Bhutan and associated transmission system for power transfer (upto Alipurduar) to NR/WR were planned with high capacity lines using HTLS conductor (both Indian portion and Bhutan portion) to optimize RoW. Subsequently, evacuation system for Punatsangchhu is reviewed to meet the needs of Bhutan and twin moose conductor based multiple transmission lines in place of HTLS conductor are decided. Accordingly, Part-C work is revised.

7.2.4 In accordance with the above proposals, the revised scope of work under Part-A, Part-B & Part-C would be as 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 at Kishanganj (on which re-conductoring with high capacity HTLS conductor is undertaken by PGCIL)
- 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 16x105MVA, 1 ph, 400/220kV and 3x100MVA 220/132kV, Gas Insulated Substation at Rangpo
- Establishment of 220kV Switching station at New Melli (**Revised**)
- LILO of Teesta III – Kishanganj 400kV Quad D/c line (to be constructed through JV route) at Rangpo (**Revised**)
- New Melli - Rangpo 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 Existing Teesta V – Siliguri 400kV D/c line at Rangpo (**Revised**).
- 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 ± 800 kV, 3000MW converter module at new pooling station at Alipurduar.
- Extension of ± 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

- Punatsangchhu-I & II – Alipurduar 400kV 2xD/C with Quad moose conductor line
(Indian portion only) (Revised)
- Earth Electrode line at new pooling station at Alipurduar
- Earth Electrode line at Agra HVDC Terminal

Note : The transmission charges for Part 'A' & 'B' of the above transmission works shall be initially borne by the generation developers. However, the modality for cost and transmission resource sharing among the IPPs should be sorted out between IPPs and PGCIL. The transmission charges for Part 'C' shall be borne by beneficiaries of Bhutan power.

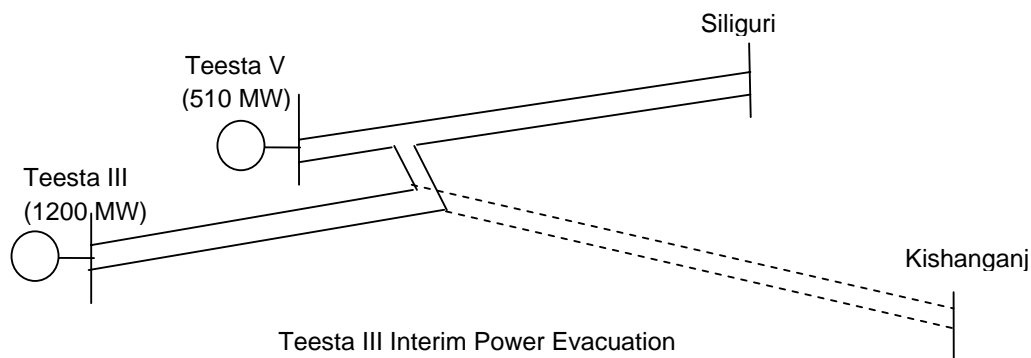
Thus, the proposed modifications in Part_A,B & C are on account of the physical difficulties experienced by PGCIL in Sikkim while implementing the work. The present scope of work is in line with the system agreed earlier and agreed to.

Members may note and concur.

8.0 Interim Arrangement for evacuation of power from Teesta-III HEP (1200MW) being developed by Teesta Urja Ltd.

The 400kV Teesta-III - Kishanganj D/C Quad moose line is being constructed by Teestavalley Power Transmission Ltd. (TPTL), a JVC of Teesta Urja Ltd and POWERGRID for power evacuation from Teesta-III HEP. PGCIL/TPTL has informed that the aforesaid line corridor passes through very difficult terrain and already facing serious right-of-way issues in Sikkim and West Bengal, and is apprehending that the readiness of the 400kV line matching with the commissioning of the 1st unit of Teesta-III is doubtful.

In order to meet immediate evacuation requirement of Teesta-III, PGCIL/TPTL has proposed to temporarily inject Teesta-III into one circuit of the existing Teesta-V – Siliguri D/C line by an interconnection with the ongoing 400kV Teesta-III – Kishanganj line running in close proximity (at Jorethang) to the 400kV Teesta-V – Siliguri circuits (shown below).



Note: It may be observed from the system study results furnished by PGCIL (Exhibit-I) that with full dispatch at Teesta-III & V power flows in the two ckt's of Teesta V – Siliguri line (one via Teesta-III) are 845MW and 856 MW. During outage of one 400kV ckt (either Teesta-V Siliguri or Teesta-III-Siliguri), about 800-850MW (out of total 1710MW from Teesta-III and Teesta-V HEPs) could be only evacuated. In this case, if Teesta-V (510MW) delivers its full power, only 300 MW or less from Teesta-III HEP could be evacuated.

The above interim arrangement would be considered as a special case till the time 400kV Teesta III – Kishanganj quad D/C line and associated 400kV Kishanganj S/S are completed. TPTL and PGCIL has to expeditiously complete their work at the earliest and to give a time frame for withdrawal of the proposed interconnection with Teesta-V _Siliguri line. The above interim arrangement should be made by TPTL and the necessary expenditure for the arrangement should be borne by the TPTL. Evacuation of Teesta-V shall have higher priority. Special protection scheme (SPS) shall be provided to back down Teesta-III generation in case of transmission constraints.

Members may discuss and concur.

9.0 Cross Border Transmission link between India and Bangladesh

9.1 As decided at the highest level, for exchange of power between the two countries, cross border link between the electrical grids of India and Bangladesh as given in para 9. 3 has been planned through bilateral dialogues between the two Governments to facilitate transfer of 500MW power in either direction. The entire transmission charges for Baharampur Switching station and 400kV line upto the Border shall be borne by Bangladesh and BPTA to this effect has already been signed. In addition, Bangladesh would also pay applicable transmission service charges depending on from where power is supplied.

9.2 As regards the mode of interconnection, it has been decided to go for asynchronous interconnection with HVDC back to back link along with 400kV D/C line between the two countries. In the Indian side the proposed interconnection is selected at Baharampur in West Bengal, where a 400kV switching station would be established by loop-in and loop-out of Farakka-Jeerat 400kV S/C line. In the Bangladesh side, 500MW HVDC back to back converter station would be established at Bheramara in Bangladesh wherein 230kV substation needs to be established by LILO of existing Ishurdi-Khulna South 230kV D/C line. A 400kV D/C line from Baharampur(WB) to Bheramara(Bangladesh) would be the cross border link.

9.3 The detail scope of the cross border transmission link is given below.

India portion

- i. Establishment of 400kV Switching Station at Baharampur
- ii. LILO of Farakka - Jeerat 400kV S/C line at Baharampur : 3 km
- iii. Baharampur(India)-Bheramara(Bangladesh) 400kV D/C line (Indian Portion) : 85 km

Bangladesh portion

- iv. Baharampur (India)-Bheramara (Bangladesh) 400kV D/C line (Bangladesh portion) : 40 km
- v. LILO of Ishurdi - Khulna South 230kV D/C line at Bheramara: 5 km
- vi. Establishment of 500MW HVDC back-to-back Station and 230kV Switching Station at Bheramara

The Indian portion would be executed by POWERGRID, while the Bangladesh portion would be executed by PGCB (Power Grid Company of Bangladesh Ltd.), Bangladesh.

Members may note & concur.

10.0 Proposal for LILO of one circuit of 765kV Tilaiya UMPP-Balia D/C line at Gaya S/S as part of ATS for Tilaiya UMPP (4000 MW) in Jharkhand.

For evacuation of power from Tilaiya UMPP, ATS was originally envisaged to be Tilaiya UMPP – Sasaram, 765kV S/C, Tilaiya UMPP – Gaya 765kV S/C and Tilaiya UMPP – Balia 765kV S/C lines. Due to space constraints at Sasaram and difficulty for implementing the Tilaiya UMPP – Sasaram 765kV line, the system requirement was later reviewed. In the SCM held on 14-9-09 at Bhubaneswar it was decided that ATS for Tilaiya would comprise of Tilaiya UMPP – Balia 765kV D/C and Tilaiya UMPP – Gaya 765kV S/C lines. Members of the ERPC in its 14th meeting held on 11-6-10 at Manali suggested to additionally consider LILO of one circuit of Tilaiya UMPP – Balia 765kV D/C line at Gaya.

Out of 4000MW Tilaiya UMPP capacity, share of ER is 1500 MW (Jharkhand-1000MW, Bihar-500MW), and this share which would be delivered from Gaya through 765kV Tilaiya- Gaya S/C line. In case of outage of the 765kV Tilaiya- Gaya S/C line, there will be no direct feed from Tilaiya UMPP to ER for dispersal of shares of BSEB and JSEB. For better reliability of supply to BSEB and JSEB, provision of second in-feed to Gaya through LILO of one circuit of Tilaiya UMPP – Balia 765kV D/C line may be considered as part of the ATS.

Members may discuss and concur.

11.0 System Reinforcements in ER as a Eastern Regional System Strengthening Scheme:

(i) Additional Bus Reactor of 1x125 MVAR each at 400/220kV Patna & Ranchi Sub-stations of PGCIL.

Presently, 80MVAR bus reactor each at 400kV Patna and Ranchi sub-stations of PGCIL is in operation. Due to persistent operational problem of high system voltage being experienced at these sub-stations, some of the 400kV lines connected to the sub-stations are switched off to control system voltage. In order to avoid high voltage, PGCIL has proposed to provide an additional bus reactor of 125MVAR capacity each at the 400kV Patna and Ranchi S/Ss for which ER constituents were agreeable in the 14th ERPC meeting. The proposed Reactors would enable to meet the operational requirements in the ER grid and could be adopted.

(ii) Proposal of PGCIL for spare Transformers/Reactor to meet the needs of Member States.

The proposal of PGCIL for provision and procurement of the following spare ICTs/Reactor that will be available to meet the reliability of supply and also to take care of any grid eventuality in each State of ER was agreed by ERPC members in its 14th ERPC meeting.

- one 80 MVAR reactor instead of 50 MVAR approved earlier by 13th ERPC
- 2x 315 MVA 400/220 kV ICTs
- 1x 160 MVA 220/132 kV ICT.
- 1x50 MVA 220/132 kV ICT.
- 1x 50 MVA 132/66 kV ICT.

ERPC members approved the above elements to be procured by PGCIL with the objectives that the transformers will be kept in charged condition and location will be decided during “lead time” and shall be exclusively used by ER beneficiaries. It would form a part of CTS of ER until any one is requisitioned by any beneficiary, thereafter that

element will form a part of STS of that beneficiary.

Further to the provision of above spares, 1X50 MVA, 220/132kV Transformer at Birpara S/S (agreed to be replaced by 1X160MVA unit in the 14th ERPC meeting) and 2X50 MVA, 220/132kV Transformers at Malda S/S of PGCIL (agreed to be replaced by 2X160MVA units in the 14th ERPC meeting) should also be in the list of spares for its utilization.

The provision of aforesaid spares would enable to reduce the downtime in case of any eventuality in the ER grid and improve the reliability of supply, and thus agreeable.

(iii) Proposal for a new 400kV Farakka - Subhasgram D/C line with one circuit to be LILLOed at Jeerat S/S

The existing 400kV Farakka-Jeerat and Farakka-Subhasgram S/C lines are inter-alia catering to the load demand of Jeerat (WB)/Subhasgram(PG) sub-stations. The lines are fairly loaded and critical to meet (n-1) contingency. Accordingly, these corridors need strengthening to meet present and future load growth. From the system studies carried out in CEA, it has emerged that provision of a new 400kV Farakka - Subhasgram D/C line with one circuit to be LILLOed at Jeerat S/S would be required to meet system requirement including contingency, and may be considered as regional system strengthening work.

The aforesaid three transmission proposals would form a composite ER system strengthening scheme to be implemented by PGCIL.

Members may discuss and concur.

12.0 Proposal of ERPC for establishment of 400kV Gokarna-Binaguri or Gokarna - Malda –Purnea 400 kV D/C.

ERPC vide its letter to CEA dated May 4, 2010 has highlighted that During winter (December to mid February) when hydro availability in NER, Bhutan, Teesta, etc. get depleted, quantum of thermal power flow towards Malda from Farakka STPS through the existing 400kV Farakka-Malda-Purnea D/C line becomes critical to meet contingency. ERPC proposed for system strengthening in ER by an additional 400kV D/C line in the Gokarna-Binaguri or Gokarna - Malda –Purnea corridor.

It is to mention that Bongaigaon TPS (750MW) of NTPC in Assam and Pallatana GBPP (760MW) of OTPCL in Tripura are expected to be commissioned by the end of 2011. The entire generation from these projects would be consumed within NER to meet load demand of the region. With the commissioning of the generation projects, drawal of NER during low

hydro season from Malda grid station in ER would considerably reduce and off-load the 400kV Farraka-Malda D/C line to a greater extent. As such, requirement of additional 400kV Gokarna-Binaguri or Gokarna-Malda –Purnea 400 kV D/C line would be an overprovision and may be dispensed with.

Members may discuss and concur.

13.0 Augmentation of 220/132 kV ICTs at Birpara, Siliguri and Malda S/Ss of PGCIL.

The following augmentation work would be under the scope of PGCIL as a regional project of ER for which ERPC members were agreeable in its 14th ERPC meeting.

- Additional 1X160 MVA, 220/132kV Transformer with associated bays at 220/132kV Siliguri Substation.
- Replacement of 1X50 MVA, 220/132kV Transformer by 1X160MVA, 220/132kV Transformer at 220/132kV Birpara Substation.
- Installation of additional Bay/Breaker against 400kV Malda-Farakka-I feeder at Malda Substation.
- Replacement of 2X50 MVA, 220/132kV Transformer by 2X160MVA, 220/132kV Transformer at 220/132kV Malda Substation.

It has been decided In the 14th ERPC meeting that PGCIL shall take up the above mentioned works as a regional scheme for which the transmission charges shall be borne by WBSETCL. It may be agreeable.

Members may note.

14.0 Proposal of WBSETCL for Provision of two additional 220kV line bays at 400/220kV Alipurduar S/S of PGCIL for interconnection with the Alipurduar 132kV S/S (WBSETCL) being upgraded to 220kV.

WBSETCL vide its letter no. CE/CTD/CEA dt. 21-7-10 has informed that they have contemplated upgradation of its existing Alipurduar 132kV S/S to 220kV level for meeting load growth/demand of 160-170MW in and around Alipurduar and Coochbehar areas. WBSETCL has proposed for 220kV D/C connectivity (10km) with the upcoming 400/220kV Alipurduar S/S of PGCIL and cost for the 220kV line would be borne by WBSETCL. PGCIL has to confirm the availability for 2nos. 220kV bays at its 400kV Alipurduar S/S.

Member may discuss and concur.

15.0 Proposal for establishment of 220kV D/C line from 400/220kV Jeypore(PG) S/S in ER to Jagdalpur in South Chattisgarh of WR for alternative supply to Jagdalpur area.

In the 30th SCM of power system planning in Western Region(WR) held on 8-7-10, Chattisgarh State Power Transmission Company Ltd. (CSPTCL), a constituent of WR informed that the whole of south Chattisgarh load comprising of five Districts viz. Jagdalpur, Kanker, Dantewada, Bijapur & Narayanpur, is supplied through a 220 kV D/C line, which is a radial line emanating from Bhilai 220 kV substation to Barasur (Bodghat). This 220kV line passes through dense forest with lot of naxal activities and in case of its outage there is no alternative supply even for feeding essential loads like waterworks, hospitals etc. For an alternative radial supply to south Chhattisgarh, CSPTCL has proposed in the SCM of WR for establishment of a 220 kV line from Jeypore (Orissa) in ER to Jagdalpur at their own cost for which PGCIL has confirmed them the availability of space for 2 nos. 220 kV bays at Jeypore (PG) 400/220 kV S/S.

The above proposal for providing alternative supply to Chhattisgarh in WR from Jeypore S/S in ER is a technical requirement and may be agreeable subject to the followings:

- (i) CSPTCL is to give the quantum of power drawal from Jeypore S/S of PGCIL.
- (ii) CSPTCL is to tie-up the source of power in ER and necessary commercial arrangement.

Member may discuss and decide.

16.0 Review of Progress on Earlier Agreed Transmission Schemes

POWERGRID may give the progress of earlier agreed transmission schemes under implementation giving:

- i) Date of firming-up in Standing Committee
- ii) Target as in the Standing Committee meeting
- iii) Date of FR for the scheme
- iv) Date of approval by PGCIL board or PIB as the case may be
- v) Date of award of the major part
- vi) Target date as of now
- vii) Reason for delay if any

EXHIBIT-I

