Central Electricity Authority
System Planning & Project Appraisal Division
Sewa Bhawan, R.K. Puram, New Delhi – 110066.

No. 51/4/SP&PA-2006/ 46-56 Date: 12-01-2007

To

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Sub: 23rd meeting of the Standing Committee on Power System Planning of Southern Region

Sir,

23rd meeting of the Standing Committee on Power System Planning of Southern Region would be held at 10:00 Hrs on January 22, 2007(Monday) at Maple Hall, Hotel Savera, 146, Dr. Radhakrishnan Road, Chennai.
Kindly make it convenient to attend the meeting.
Agenda for the meeting is enclosed.

Yours faithfully,

(Pardeep Jindal)
Director (I/C) (SP&PA-III)
(Telephone No. 011 26107144)

Standing Committee on Power System Planning in Southern Region

Agenda for 23rd Meeting

1. Confirmation of the minutes of 22nd standing committee meeting.

The summary record of the 22nd meeting held on August 17, 2006 at SRPC, Bangalore was circulated vide our letter No.CEA/51/4/SP&PA/2006 dated 10-08-2006. No observations have been received from participants. However, from two reference from PGCIL regarding provision of switchyard equipment at North Chennai TPS and Tuticorin TPS, addressed to NTPC and NLC respectively, with copy to CEA, it is seen that they have requested corrigendum regarding clarifying that generation switchyard provisions of the agreed transmission schemes are to be provided by the respective generation companies in their generation projects as per the practice already being followed.

It is observed that the recording of 22nd meeting is as per the discussion. As such, the minutes as already circulated may be confirmed.

Clarification as suggested by PGCIL would be included in the minutes of this (23rd) meeting.

2. Transmission Systems for Evacuation of power from Krishnapattnam UMPP (4000 MW) and corresponding requirements for additional transmission capacity between SR-WR and SR-ER.

2.0 Government of India, in a major imitative, is facilitating development of very large size ultra mega generation projects at coal pit-head and coastal location in order to bridge the gap between demand and supply. The capacity of each of these projects is about 4000 MW, with 5x800 MW units. Efforts are on to have one unit during the 11th plan period by 2011-12 and full capacity is expected to be commissioned by 2013-14.

2.1 Coastal ultra mega projects in Southern Region are being proposed in Andhra Pradesh, Tamil Nadu and Karnataka. Of these, Krishnapattnam in Andhra Pradesh has advanced, first unit of which could now be expected in the last year of 11th Plan or early 12th Plan. Other UMPPs are also expected by end of 12th Plan. Tentative power allocation from Krishnapattnam UMPP is as following:

Beneficiary State	Tentative allocation (MW)
A. P.	1600
Karnataka	800
Tamil Nadu	800
Maharashtra (WR)	800
Total	4000

2.2 Transmission system planning studies have been carried out considering Krishnapattnam UMPP and other projects that are being envisaged by 2013-14, so

as evolve the evacuation system as well as the inter-regional system needed to export the surplus power in SR that could be available by that time-frame. The Tamil Nadu UMPP which is being planned to be built at a coastal site near Chennai / Nagpattnam in Tamil Nadu and is expected in early 12th Plan, has also been considered in the system studies. Projected availability and demand scenarios for Summer, Monsoon and Winter seasons for 2013-14 for Peak and Off-peak operating conditions are given in Table-I and Table-II, respectively.

Table-I : Availability and Demand Scenario for 2013-14 Peak Condition

	Winter Peak			Monsoon Peak			Summer Peak		
Regions	Availability	Demand	Surplus(+) / Deficit (-)	Availability	Demand	Surplus(+) / Deficit (-)	Availability	Demand	Surplus(+) / Deficit (-)
Northern	41338	53110	-11772	51574	47799	3775	47575	53110	-5535
Western	55344	62010	-6666	52228	55809	-3581	53453	62010	-8557
Southern	45013	39141	5872	44170	39141	5029	44559	43490	1069
Eastern	36586	20370	16216	36053	18333	17720	35896	20370	15526
North-Eastern	5419	3220	2199	8907	2898	6009	7580	3220	4360
Total	183699	177851	5848	192932	163980	28952	189063	182200	6863

Table-II : Availability and Demand Scenario for 2013-14 Off-Peak Condition

	Winter off Peak			Monsoon off Peak			Summer off Peak		
Regions	Availability	Demand	Surplus(+) / Deficit (-)	Availability	Demand	Surplus(+) / Deficit (-)	Availability	Demand	Surplus(+) / Deficit (-)
Northern	30288	37177	-6890	48811	37177	11634	43431	47799	-4368
Western	51493	43407	8086	50517	43407	7110	50886	43407	7479
Southern	39467	30443	9024	41705	30443	11262	40862	30443	10419
Eastern	32820	14259	18561	34170	14259	19911	33072	14259	18813
North-Eastern	2537	2254	283	8187	2254	5933	6139	2254	3885
Total	156604	127540	29064	183390	127540	55850	174389	138162	36227

2.3 Based on the above projections, for carrying out studies, two dispatch scenarios, one for Summer peak in which SR exports 1000 MW and one for Winter Peak in which SR exports 6000 MW, have been taken as per following:

	Summer Peak			Winter Peak		
Regions	Availability	Demand	Surplus(+) / Deficit (-)	Availability	Demand	Surplus(+) / Deficit (-)
Northern	44600	53000	-8400	39000	53000	-14000
Western	50400	62000	-11600	53000	62000	-9000
Southern	44500	43500	1000	45000	39000	6000
Eastern	35000	20300	14700	35500	20300	15200
North-Eastern	7500	3200	4300	5000	3200	1800
Total	182000	182000	0	177500	177500	0

2.4 Transmission Alternatives

System studies have been carried out for various alternatives for – (i) evacuation of power from Krishnapattnam UMPP (4000 MW) and also from Krishnapattnam TPS of AP (1000 MW) that is expected in the same time-frame and is also located nearby and (ii) for export of 1000 MW from SR during Summer period and 6000 MW of power during Winter period. A tentative transmission system for the Tamil Nadu UMPP is also considered for studying these scenarios.

Following are the transmission systems that have emerged from the studies.

Alternative-I.

1. Krishnapattnam UMPP – Nellore 400 kV, Quad D/C line
2. Krishnapattnam UMPP – Kurnool 400 kV, Quad D/C line
3. Krishnapattnam UMPP – Gooty, 400 kV, Quad D/C line
4. Kurnool – Raichur 400 kV Quad D/C line
5. Raichur (SR) – Sholapur (WR) 765 kV 2xS/C lines
6. Sholapur (WR) – Pune (WR) 765 kV S/C line.
7. Narendra (SR) – Kohlapur (WR) 400 kV D/C line
8. 765/400 kV S/S at Raichur, 3000 MVA
9. 765/400 kV S/S at Sholapur 3000 MVA
10. 765/400 kV S/S at Pune, 3000 MVA

Alternative-II.

1. Krishnapattnam UMPP – Nellore 400 kV, Quad D/C line
2. Krishnapattnam UMPP – Kurnool 400 kV, Quad D/C line
3. Krishnapattnam UMPP – Gooty, 400 kV, Quad D/C line
4. Kurnool – Raichur 400 kV Quad D/C line
5. Raichur (SR) – Sholapur (WR) 765 kV 2xS/C lines
6. Sholapur (WR) – Pune (WR) 765 kV S/C line.
7. Narendra (SR) – Kohlapur (WR) 400 kV D/C line
8. 1000 MW HVDC back to back at Narendra
9. 765/400 kV S/S at Raichur, 3000 MVA
10. 765/400 kV S/S at Sholapur 3000 MVA
11. 765/400 kV S/S at Pune, 3000 MVA

In both the above alternatives, tentative transmission system for evacuation of power from Krishnapattnam AP State (1000 MW) has been taken as 400kV D/C lines from Krishnapattnam to Nellore and Chitoor; and tentative transmission system for evacuation of power from Tamil Nadu UMPP has been taken as 400kV quad D/C lines from TNUMPP to Melakottaiyur, Hosur and Neyveli. However, these would need to be firmed-up in subsequent focused studies.

2.5 Study cases: The following cases are enclosed:

S.No.	Scenario	Alt.	Case	Exhibit
1	Winter peak	I	Base Case	1
2	Winter peak	I	Outage of Raichur-Sholapur 765kV S/C	2
3	Winter peak	I	Outage of Raichur-Sholapur 765kV 2xS/C	3
4	Winter peak	II	Base case	4
5	Winter peak	II	Outage of Raichur-Kurnool 400kV D/C and one ckt of Raichur-Gooty 400kV	5
6	Winter peak	II	Outage of Sholapur-Pune765kV S/C	6
7	Winter peak	II	Outage of Raichur-Sholapur 765kV S/C	7
8	Summer peak	I	Base case	8
9	Summer peak	II	Base case	9
10	Summer peak	II	Outage of Talcher-Kolar HVDC bi-pole	10

2.6 Discussion of Studies Results

Most critical condition for the transmission system under focus system would be corresponding to Winter peak scenario. In this scenario the flow on Talcher-Kolar HVDC Bipole and Gazuwaka back-to-back is kept off and the Ramagundam - Chandrapur back carrying 500 MW towards WR. Talcher II generation is taken as 1600 MW, which get exported directly from Talcher bus to ER grid. The balance 3900MW export would take place through the proposed additional system. The additional system that is 2 nos of 765kV lines and one 400kV D/C line would have 5600 MW capacity and would thus meet the requirements. Case 1, which is the base case for alternative-I, meets the requirements. It also meets outage of one ckt of 765kV inter-regional line at Raichur-Sholapur (Case-2). However, outage of both 765kV inter-regional circuits does not converge with 6000MW export. It converges at 5000MW export level but with heavy overloading on the remaining AC inter-connection that is Narendra-Kohlapur. Under this scenario, the exportable power from SR was reduced to 4000 MW from of 6000 MW under base case for achieving convergence of the load flow solution and with permissible line loading (Case-3). It may thus be concluded that alternative-I would provide net export capacity of the level of 4000MW.

In alternative-II, with HVDC back-to back of 1000MW at Narendra, the bas case for winter (Case-4) is similar to base case of alternative-I (Case-1). Also, in this alternative-II, outage of one 765kV circuit between SR-WR (Case-7) is also similar to that of alternative-I (Case-2), the difference being that in Alt-II, total power of the circuit in outage gets transferred to the other healthy 765kV circuit where as in alt-I is get partly transferred to Narendra-Kohlapur line. However, in Alt-II, in the pre-contingency of one 765kV circuit between SR-WR out, the total inter-regional transmission capacity can be maintained at about 5500MW that is 1600MW of Talcher, 1000MW of Chandrapura, 1000MW of Narendra and 2000MW at the AC line, contingency of which would cause isolation of SR system and the +/- of 2000MW on either side could be absorbed.

In view of the above, and the advantage of better ability in Alt-II to check disturbance from spreading from one side to other, alternative-II is recommended.

Summer peak cases show that both the alternative meet the requirements. In this scenario the flow on Talcher - Kolar HVDC Bipole is regulated at 1200 MW, the Chandrapur and Gazuwaka HVDC back-to-back at minimum power, and Narendra HVDC back-to-back at 500 MW (126MW in alt-I). Flow on Raichur-Sholapur 765 kV 2xS/C lines is 90 MW in alt-II and 478MW in alt-I. Talcher II generation is taken as 1600 MW, thus 400 MW is going into ER grid.

2.7 Recommendation

From the above discussions and pattern of flow of power as depicted in various load flow plots for base cases as well as for outage cases it emerges that the transmission system as per alternative-II would provide an optimum solution.

Estimated cost of the above transmission system would be of the order of Rs. 5500 crore. The SR-WR inter-connection system covered in the proposal would also have additional transmission capacity to cater to the requirement corresponding to Tamil Nadu UMPP.

With respect to sharing of transmission charges, it is proposed that:

- SR-WR inter-regional system could be shared 50:50 between SR and WR.. This would include the following:
- Transmission charges for the transmission system in SR for Krishnapatnam UMPP and Tamil Nadu UMPP pooled and allocated between SR and WR in

ratio of allocation to the respective regions from Krishnapatnam UMPP plus Tamil Nadu UMPP.

The above approach is similar to that adopted for Sasan and Mundra UMPPs in WR where WR and NR have shares.

Member may discuss and concur.

3. Requirement of Reactors to contain over voltages in the Southern Region.

It was agreed in the 22nd meeting that Installation of 25 nos of reactors (20 bus reactors + 5 line reactors) would be taken-up by PGCIL as a regional system strengthening scheme but before firming up, PGCIL was to confirm the feasibility of installation of the reactors at the proposed locations and if there was constraint, this was to be revised. PGCIL was also to ensure through further studies that the reactor procured under the scheme did not become redundant in the study of long-term conditions. The proposed reactors are as under:

Bus Reactors

S.NO	Bus Name
POWERGRID	
1.	Hosur
2.	Kolar
3.	Hiriyur
4.	Salem
5.	Munirabad
6.	Hyderabad (PG)
7.	Sriperumbudur
NTPC	
8.	Ramagundam
NPCIL	
9.	Kaiga
NLC	
10.	Neyveli-Expn
11.	Neyveli TS-II

S.No	Bus Name
KPTCL	
12.	Raichur TPS
13.	Talaguppa
14.	Davanagere
15.	Neelamangala
16.	Hoody
APTRANSCO	
17.	Simhadri
18.	Srisailam LBPH
19.	Kurnool
20.	Vizag

No. of Existing Reactors- 64 nos
(56 line, 8 bus) =3500 MVAR

Line Reactors

S.No	Bus Name	Name of the Line
	POWERGRID	
1.	Trichy	Neyveli - Trichy- I
2.	Madurai	Madurai - Trichy-I
3.	Udumalpet	Salem – Udumalpet-II
4.	Trivandrum	Madurai – Trivandrum -I
	APTRANSCO	
5.	Hyderabad (AP)	Khammam-Hyderabad-I

PGCIL may give the feed back.
Member may discuss.

4. Any other issue with permission of chair

Central Electricity Authority
System Planning & Project Appraisal Division
Sewa Bhawan, R.K. Puram, New Delhi – 110066.

Sub: **23rd meeting** of the Standing Committee on Power System Planning of Southern Region - invitation regarding

23rd meeting of the Standing Committee on Power System Planning of Southern Region would be held at 10:00 Hrs on January 22, 2007(Monday) at Maple Hall, Hotel Savera, 146, Dr. Radhakrishnan Road, Chennai. Agenda for the meeting is enclosed.

As may be seen from the agenda, especially related to transmission system for Krishnapattnam UMPP (4000 MW), the issues proposed to be discussed in this meeting would have significant ramifications on the operation of the SR and National Grids. As such, your participation in this meeting would be highly beneficial. You are, therefore, cordially invited to participate in the meeting.
Kindly make it convenient to attend the meeting.

(Pardeep Jindal)
Director (I/C) (SP&PA-III)
(Telephone No. 011 26107144)

Chief Engineer (GM), CEA

No. 51/4/SP&PA-2006/ Date: 18-01-2007