

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

No. 51/4/SP&PA-2001/

Date : 12-9-2005.

To

1.The Member Secretary, Southern Regional Electricity Board, 29, Race Course Cross Road, Bangalore 560 009. FAX : 080-22259343	2.The Director (Projects), Power Grid Corp. of India Ltd. “Saudamini”, Plot No.2, Sector-29, Gurgaon 122 001,Haryana.. FAX : 95124-2571760
3.The Director (Transmission), Transmission Corp. of Andhra Pradesh Ltd., Vidyut Soudha,Hyderabad – 500 082. FAX : 040-55665137	4.The Director (Transmission), Karnataka State Power Transmission Corp. Ltd.,Cauvery Bhawan, Bangalore 560 009. FAX : 080 -22228367
5.The Member (Transmission), Kerala State Electricity Board, Vidyuthi Bhawanam, Pattom, P.B. No. 1028, Thiruvananthapuram - 695 004. FAX : 0471-2446452, 2448213	6. Member (Distribution), Tamil Nadu electricity Board (TNEB), 6 th Floor, Eastern Wing, 800 Anna Salai, Chennai - 600002. FAX : 044-28525587, 28525639
7.The Director (Power), Corporate Office, Block – I, Neyveli Lignite Corp. Ltd., Neyveli, Tamil Nadu – 607 801. FAX : 04142-252646	8.The Superintending Engineer –I, First Floor, Electricity Department, Gingy Salai, Pondicherry – 605 001. FAX : 0413-2334277
9. Director (Projects), National Thermal Power Corp. Ltd. (NTPC), NTPC Bhawan, Core-7,Scope Complex-7, Institutional Area, Lodhi Road, New Delhi-110003. FAX-011-24360912	10. Shri N. S. M. Rao Chief Engineer (Transmission), Nuclear Power Corp. of India Ltd., 12 th Floor,Vikram Sarabhai Bhawan, Anushakti Nagar, Mumbai – 400 094. FAX : 022-25556513/25563350
11. The Director (Operation), Power Trading Corpn. of India Limited, 2 nd Floor, NBCC Tower, 15 Bhikaji Cama Place, NewDelhi 110066. FAX-011-51659504	

Sub: 21st meeting of the Standing Committee on Power System Planning of Southern Region

Sir,

Agenda note for the 21st meeting of the Standing Committee on Power System Planning of Southern Region to be held on 22nd September, 2005 at 11-00Hrs at the Conference Hall of SREB, Bangalore, is enclosed.

Kindly make it convenient to attend.

Encl. as above

Yours faithfully,

(A.K.Asthana)
Chief Engineer(Incharge),
SP & PA, CEA
Ph: 011-26102045

Agenda for 21st Meeting of the Standing Committee on Transmission System Planning in Southern Region

1. Discussion on “Draft National Electricity Plan – Transmission”

Towards fulfillment of the requirement as mandated in Section 3 (4) of Electricity Act 2003, CEA has prepared the “Draft National Electricity Plan - Transmission” covering planning issues and Transmission Programme during the 10th and 11th Plan period. The programme has been evolved based on projected demand of 150 GW (with regional diversity) and generation capacity of 204 GW, corresponding to the 34834 MW addition programme during 10th plan and 64157 MW addition during 11th plan period. The transmission plan has been evolved with an integrated all-India system in which the National Grid would facilitate free flow of power across the regional boundaries.

The document is available on our website (<http://www.cea.nic.in/>). We have invited views and comments from all the stakeholders. The response from stakeholders has already started pouring in. To have a face-to-face interaction with constituents of this region, it has been included as part of the agenda for forthcoming meeting of this Standing Committee.

Summary of the document is given at Annex.

The members may deliberate.

2. Confirmation of the minutes of 20th standing committee meeting held on 7th October, 2004 at Kalpakkam.

The summary record of the 20th meeting held on 7-10-04 at Kalpakkam was circulated vide our letter No.CEA/51/4/SP&PA –2001/ dated 20-10-2004.

No other observations have been received from participants. The minutes may, therefore, be confirmed.

3. Evacuation System for 500 MWe Prototype Fast Breeder Reactor based Atomic Power Project at Kalpakkam (KPFBR)

The evacuation system for KPFBR atomic power project was determined to be KPFBR-Kancheepuram 230 kV D/C, KPFBR-Arni 230 kV D/C, KPFBR-MAPS 230 kV S/C line (with cable link) and one more 230kV D/C line to TNEB sub-station which was required to be firmed-up after obtaining the further input from TNEB. Based on the input furnished by TNEB and further system studies were conducted in CEA corresponding to peak and off-peak conditions, requirements of 230kV KPFBR-Tiruporur D/C line was additionally recommended vide our letter No.CEA/51/4/SP&PA –2001/8-18&24 dated 04-1-2005. Later, TNEB vide their letter No.SE/SS/EE1/AEE1/F Stg. Comm/D 21/2005 dated 29.1.2005 had proposed to consider a 230kV D/C line from KPFBR to a 230kV S/S at Sirucheru which is 15km away from Tiruporur in lieu of KPFBR-Tiruporur D/C line. Accordingly, the following transmission system for KPFBR was finally recommended for KPFBR project vide our letter no CEA/51/4/SP&PA –2001/ 143-155 dated 01-3-2005 :

KPFBR(500MWe) Evacuation System

(I) Step-up voltage of 230kV.

(II) Transmission Lines:-

- i) KPFBR - Kancheepuram 230 kV D/C line
- ii) KPFBR-Arni 230 kV D/C line
- iii) KPFBR-Sirucheri 230kV D/C line
- iv) KPFBR-MAPS 230 kV S/C (with one spare phase) –cable link*

(III) Requirements of 6nos. 230kV line bays at KPFBR for construction of three nos. 230kV D/C lines to Kancheepuram, Arni and Tiruprur sub-stations of TNEB. Bay(s) for KPFBR-MAPS link would be additional.

* The interconnection is envisaged to facilitate operation of KPFBR station as per the requirement of the Project Authority, BHAVINI and would not be an evacuation line. The cost of the link and associated bay/equipments etc. would be borne by BHAVINI.

Members may concur the above KPFBR transmission requirement.

4. Evacuation System proposals of TNEB for Tuticorin JV TPS (2x500MW) and North Chennai JV TPS(2x500MW)

- 4.1 TNEB vide their letter No. SE/SS/EEI/AEEII/F/JVP North Chennai/D53/05 dated 19.2.2005 had proposed the evacuation system for 2x500 MW coal based Thermal Power Project at Tuticorin under joint venture of TNEB-NLC being envisaged during 2009-10 and also proposed the transmission system for 2x500 MW coal based Thermal Power Project at North Chennai under joint Venture of TNEB-NTPC being envisaged during 2010-11.
- 4.2 NLC vide their letter No. GM/P&BD/Tuticorin/PBD-35/2005 dated 16.3.05 (copy enclosed) addressed to POWERGRID with a copy to CEA had indicated the tentative share allocation from Tuticorin 2x500 MW JV-TPS for the SR beneficiaries.

Sl. No.	State	Tentative share allocation from Tuticorin JV TPS (%)	Tentative Share (MW)
1	Andhra Pradesh	Nil	Nil
2	Tamil Nadu	43.2	432
3	Karnataka	26.2	262
4	Kerala	13.1	131
5	Unallocated	15	150
TOTAL		97.5%	975

- 4.3 As such, associated transmission system for Tuticorin JV-TPS (2x500MW) would be a regional transmission project and as the total generation from North Chennai JV-TPS would be for the State of TN, associated transmission system for North Chennai JV-TPS would be of TNEB.
- 4.4 **STUDIES:** Based on the generation capacity addition program in SR by 2011-12 and corresponding input data of Tamil Nadu grid furnished by TNEB in July 2005, system studies have been carried out in CEA to determine transmission requirements for both the Tuticorin JV-TPS and North Madras JV-TPS projects, which are located at different geographical locations in TN. The major generation projects likely to take-off by the 2011-12 time frame in SR are Kayamkulam CCP (1800MW), Kudankulam APP(2x1000MW), Kalpakkam PFBR (500MW), Ennore JV CCP (2x500MW), Tuticorin JV TPS (2x500MW), North Madras JV TPS (2x500MW) Ramagundam BPL(500MW), Vijayawada TPS Stg.-IV (660MW), Bidadi TPS (1400 MW) etc. and these have been considered in the studies with a focus to evolve transmission requirements for Tuticorin JV-TPS (2x500MW) and North

Madras JV-TPS (2x500MW). In addition to the transmission proposals of TNEB, further alternatives for each of the projects have been considered in the studies to determine optimal system requirements. In the network considered in the studies, alongwith Ennore CCP(1000MW), its ATS consisting of Ennore - Pugalur 400kV D/C, Ennore-North Madras JV TPS 400kV D/C lines and 220kV inter-connection with the existing Ennore PS, has been considered..

4.5 Tuticorin JV TPS (2x500 MW) Transmission System(S)

The generation from Tuticorin (2x500 MW) JV-TPS has been envisaged to be stepped-up at 400 kV for evacuation. The following transmission arrangements are considered in CEA studies for evacuation:

S.No.	Evacuation System	Remarks
Option-I	<ul style="list-style-type: none"> • Tuticorin JV TPS-Karaikudi 400 kV D/C • Tuticorin JV TPS - Madurai 400 kV Quad S/C • Karaikudi 400 kV SS-Pugalur 400 kV S/C • Pugalur 400 kV SS - Arasur 400 KV D/C • Establishment of a 400/230 kV S/S with 2 nos. 315 MVA auto transformers at Tuticorin JV-TPS with 6 nos. 230 kV outlets. 	System proposed by TNEB vide their Ir.No.SE/SS/EEI/AEEII/F/JVP North Chennai/ D53/05 dated 19.2.2005
Option-II	<ul style="list-style-type: none"> • Tuticorin-Karaikudi 400 kV D/C • Karaikudi -Pugalur 400 kV S/C • Pugalur - Arasur 400 kV D/C • Tuticorin-Tirunelveli 400 kV D/C • 220kV inter-connection with existing Tuticorin TPS 	Second alternative considered in the CEA studies
Option-III	<ul style="list-style-type: none"> • Tuticorin JV-TPS - Madurai 400 kV D/C • Karaikudi -Pugalur 400 kV S/C • Pugalur - Arasur 400 kV D/C • 2 x 315 MVA, 400/230 kV auto transformers at Tuticorin JV-TPS • 220 kV inter-connection with the existing Tuticorin TPS 	Third alternative considered in the CEA studies
Option-IV	<ul style="list-style-type: none"> • Tuticorin JV-TPS - Madurai 400 kV D/C • 2 x 315 MVA, 400/230 kV auto transformers at Tuticorin JV-TPS • 220 kV inter-connection with existing Tuticorin TPS 	Fourth alternative considered in the CEA studies

In Option-I, as proposed by TNEB, generation from the project is evacuated through 400kV Tuticorin JV TPS-Karaikudi 400 kV D/C, Tuticorin JV TPS - Madurai 400 kV Quad S/C, Karaikudi - Pugalur 400 kV S/C, Pugalur - Arasur 400 KV D/C lines with a provision of 400/230 kV,2x315MVA transformers at Tuticorin JV TPS . Power flows on the various transmission lines are shown at Exhibit-I-A. The result of the studies shows that all the above 400kV lines are not being adequately loaded. It is seen that the power flows through 400kV Tuticorin-Karaikudi D/C line and Tuticorin JV TPS - Madurai Quad conductor S/C and Karaikudi-Pugalur 400kV S/C lines are to the tune of 2x150MW, 290MW and 120MW respectively under normal condition. It emerges that this 400kV alternative is having over provision. It is also observed that utilization of 400kV RoWs in Tuticorin-Madurai and Karaikudi-Pugalur section are sub-optimal as lines being proposed as single circuit line.

As an alternative, Option-II has been formulated in which generated power is evacuated through 400kV Tuticorin-Karaikudi D/C, Tuticorin-Tirunelveli D/C, Karaikudi -Puglur

S/C, Pugalur - Arasur D/C lines with 220kV inter-connection between Tuticorin JV station and the existing Tuticorin TPS. The result of the studies is shown in Exhibit-I-B. It is seen that all the 400kV lines emanating from the station are very lightly loaded and as such, utilization of 4 nos. 400kV outlets from the power house with a provision of 220kV step-down arrangement are sub-optimal.

In the third case (Option-III), generated power is evacuated through 400kV D/C lines connecting to Madurai S/S and existing Tuticorin PS through 2x315MVA 400/230 kV auto transformers at the station. The 400kV Pugalur - Arasur D/C line is also considered in this option. The result of the studies is shown in Exhibit-I-C. It is seen that Tuticorin-Madurai 400kV D/C line would be able to cater to the evacuation requirement under normal and contingency condition. However, Karikudi-Pugalur 400kV S/C and Pugalur-Arasur 400kV D/C lines still seem to be redundant as the loads of Arsur could be met from Udumalpettai.

In the fourth case(Option-IV), (Exhibit I-D) Karikudi-Pugalur 400kV S/C and Pugalur-Arasur 400kV D/C lines have been omitted. It is seen that the system is meeting all the requirements optimally in this option. Accordingly, the same is recommended.

4.6 North Chennai JV-TPS (2x500 MW) transmission System(S)

The generation from North Chennai JV project has been envisaged to be stepped-up at 400 kV. For evacuation. The following transmission arrangements are considered in CEA studies for evacuation:

S.No.	Evacuation System	Remarks
Option-I	<ul style="list-style-type: none"> North Chennai JV TPS -Alamathy 400 kV D/C North Chennai JV TPS -Arni 400 kV Quad S/C Arni-Pugalur 400 kV S/C Establishment of a 400/230 kV S/S, 2x315 MVA at Arni with 4 nos. 230 kV outlets 	System proposed by TNEB vide their lr. No.SE/SS/EEI/AEEII/F/JVP North Chennai/ D53/05 dated 19.2.2005
Option-II	<ul style="list-style-type: none"> North Chennai JV TPS -Alamathy 400 kV Quad conductor D/C line 2x315 MVA, 400/230 kV auto transformers at North Chennai JV TPS 220 KV inter-connection with the existing North Madras TPS 	Second alternative considered in the CEA studies
Option-III	<ul style="list-style-type: none"> North Chennai JV TPS-Arni 400 kV Quad conductor D/C line LILO of one ckt. of North Chennai JV TPS -Arni 400kV D/C line at Alamathy Arni-Pugalur 400kV D/C line 2x 315 MVA, 400/230 kV S/S at Arni 220 kV inter-connection with the existing North Madras TPS 	Third alternative considered in the CEA studies

In Option-I, as suggested by TNEB, generation from the project is evacuated through 400kV lines connected to Alamathy (D/C line) and Arni (Quad conductor S/C line) and further from Arni to 400kV Pugalur (with twin moose conductor S/C line) for power absorptions to the load centers of TN. Power flows on the various transmission lines are shown at Exhibit-II-A. The result of the studies shows that the 400kV S/C line from power station to Arni and further to Pugalur S/s is very lightly loaded and the system emerges as over provision. As such, utilization of 400kV RoWs in North Madras-Arni-Pugalur section is sub-optimal as lines being proposed as single circuit.

As an alternative, option-II has been formulated in which generated power is evacuated through 400kV D/C line connected to Alamathy 400kV S/S by higher parameter conductor (quad AAAC) and 220kV interconnection with the existing North Madras TPS. Power from Alamathy onwards will be dispersed by displacement. The result of the studies shown in Exhibit-II-B reveals that the higher parameter(Quad) lines would meet the evacuation requirement under normal and contingency conditions.

In the third case (Option-III), generated power is evacuated through 400kV Quad conductor D/C line connected to Arni S/S with LILO of one ckt at Alamathy 400kV S/S and 400kV Arni-Pugalur D/C line and 220kV inter-connection with the existing North Madras TPS. From the result of the studies shown in Exhibit-II-C, it is seen that loading level in Alamathy-Arni 400kV section, Arni-Puglur D/C line and transformer flow at Arni 400/230kV S/S are not adequate.

In view of the above, Option-II is recommended.

Members may discuss and finalize the evacuation arrangement.

5. Progress of Works:

5.1 Upgradation of Kaiga-Davanagere D/C line for 400kV Operation

One circuit of the 400kV Kaiga-Sirsi-Guttur (Davanagere) D/C line has been upgraded to 400kV and commissioned in June/July'05 and the other line is operating at 220kV. NPCIL and KPTCL may intimate the status of the 220kV second ckt.

5.2 Construction of 400kV Nellore Substation by APTRANSCO

APTRANSCO may intimate the present status of construction of Nellore Substation.

6. TNEB's requirement of 3 nos. 230kV bays at Tirunelveli 400/230kV S/S of POWERGRID.

At present, out of 4 nos. 230kV bays at Tirunelveli, 2 have been allocated for KSEB for the Edamon lines and 2 nos. to TNEB. TNEB have requested 3 nos 230kV bays at Tirunelveli s/s. However, instead of additional provision, they have suggested that the 2 lines of Edamon be bunched and the released bay could be provided to TNEB, as the 230kV bays for Edamon would in any case be released when the line to Edamon would be upgraded to 400kV operation. The programme of upgrading of lines to Edamon for 400kV operation is yet to be firmed-up.

Members may discuss and decide.

7. Any other issue with the permission of Chair.