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

No. 51/4/SP&PA-2010/ 1124 -1134 **Date: 08 November 2010**

To

1.The Member Secretary, Southern Regional Power Committee, 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 : 95124-2571932**
3.The Director (Transmission), Transmission Corp. of Andhra Pradesh Ltd., Vidyut Soudha, **Hyderabad – 500 082.** **FAX : 040-66665137**	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 : 0471-2444738**	6. Member (Distribution), Tamil Nadu electricity Board (TNEB), 6th Floor, Eastern Wing, 800 Anna Salai, **Chennai - 600002.** **FAX : 044-28516362**
7.The Director (Power), Corporate Office, Block – I, Neyveli Lignite Corp. Ltd., **Neyveli , Tamil Nadu – 607 801.** **FAX : 04142-252650**	8.The Superintending Engineer –I, First Floor, Electricity Department, Gingy Salai, **Puducherry – 605 001**. **FAX : 0413-2334277/2331556**
9. Director (Projects), National Thermal Power Corp. Ltd. (NTPC), NTPC Bhawan, Core-7, Scope Complex, Lodhi Road, **New Delhi-110003.** **FAX-011-24360912**	10. Director (Operations), NPCIL, 12th Floor,Vikram Sarabhai Bhawan, Anushakti Nagar, **Mumbai – 400 094.** **FAX : 022- 25991258**

Sub: 31st meeting of the Standing Committee on Power System Planning of Southern Region - **Agenda for the meeting.**

Sir,

The **31st meeting** of the Standing Committee on Power System Planning of Southern Region is scheduled to be held on **16-11-2010(Tuesday) at Conference Hall of Northern Region Power Committee, Katwaria Sarai, New Delhi.** The meeting would commence **at 13:30 Hrs.**
Agenda for the meeting is enclosed. It is also available at CEA's website(www.cea.nic.in) .
Notice for the meeting has already been issued vide our letter dated 29-Oct-2010.
Please make it convenient to attend the meeting.

Yours faithfully,

(Pardeep Jindal)
Director (SP&PA)
(Telephone: 011 26198092, Fax No. 011 26102045)

Copy to : Sh. SK Soonee, CEO, POSOCO,
B-9, Qutub Institutiional Area,
Katwaria Sarai, New Delhi-110016

AGENDA NOTE

Agenda Note for 31st Meeting of
Standing Committee on Power System Planning in Southern Region (SCPSPSR)

Time: **13:30 Hrs Date: November 16, 2010 (Tuesday)**
Venue: Conference Hall of Northern Region Power Committee (NRPC),
18, Shaheed Jeet Singh Sansanwal Marg,
Katwaria Sarai, New Delhi - 110016

1.0 Confirmation of the minutes of 30th meeting of the Standing Committee:

1.1 Minutes of 30th meeting of the Standing Committee on Power System Planning of Southern Region, held on 13th April 2010 at Gurgaon, were issued vide CEA's letter number 51/4/SP&PA-2010/ 442 – 451 dated May 05, 2010.

1.2 There has been no observations/comments on the circulated minutes. The Minutes as circulated may be confirmed.

2.0 Review of Inter-regional Scheme - Narendra – Kolhapur 400kV D/c line with 1000 MW HVDC back-to-back at Kolhapur:

2.1 Presently the following interconnections are existing/under implementation/planning under various schemes between Southern and Western Regions

a) Chandrapur 1000 MW HVDC back-to-back link	Existing
b) Raichur – Sholapur first 765 kV S/c line	under transmission system associated with Krishnapatnam UMPP
c) Raichur – Sholapur second 765 kV S/c line	under IPTC route
d) Kolhapur 1000 MW HVDC back-to-back link	scheme for augmentation of SR-WR inter-regional capacity
e) Basawan Bagewadi – Sholapur 765 kV D/c	planned under transmission system associated with IPPs in Cuddalore area

2.2 The developer of Krishnapatnam UMPP has indicated that the commissioning of his generation units shall be progressively from June, 2013. Accordingly, Raichur – Sholapur 765kV lines, which will also provide synchronous interconnection between South and West, are scheduled to be commissioned by 2013-14.

2.3 The Kolhapur 1000 MW HVDC back-to-back modules alongwith Narendra – Kolhapur 400kV D/C line was targeted to be commissioned during 2010-11 anticipating the operational surplus in Southern Region due to large capacity additions expected by the IPPs. This HVDC link was envisaged to transfer the power

from South to West/North. The 1000 MW HVDC back-to-back modules at Kolhapur were to be accomplished through a new 500 MW HVDC module and by shifting of 500 MW HVDC module from Sasaram. PGCIL have now indicated that the cost of shifting the existing module form Sasaram and its re-installation at Kolhapur could be close to the cost of erecting new module, thus eroding the economic advantage expected from shifting the HVDC module from Sasaram.

2.4 In addition to above two SR-WR links, the Madhugiri - Basawan Bagewadi – Sholapur 765 kV D/c lines are also being planned under transmission system associated with IPPs in Cuddalore area. In view of the inputs conveyed by PGCIL regarding the cost implications and timing of the Narendra-Kolhapur asynchronous link and to optimize total transmission capacity requirements between SR-WR, following are proposal has been prepared in consultation with PGCIL:

1. The proposal of HVDC back-to-back modules of 2x500 MW on Narendra-Kolahpur link may be dropped.
2. Madhugiri – Narendra – Kolhapur 765kV D/C line may be planned in place of the proposal for Madhugiri - Basawan Bagewadi – Sholapur 765 kV D/C lines.
3. The Madhugiri – Narendra – Kolhapur 765kV D/C line may be initially charged at 400kV.
4. The Narendra – Kolhapur 765kV D/C line and the Madhugiri – Narendra 765kV D/C lines may be timed depending upon commitment of the generation projects in Southern Region.

2.5 The studies for the above proposals are given in the Agenda for LTA. PGCIL may present the complete facts and studies to the Committee.

2.6 Members may discuss.

3.0 Transmission System for Evacuation of Power from Yermarus TPS (2x800 MW) and Edlapur TPS (1x800 MW) of KPCL :

3.1 Following transmission system was agreed in the 28th meeting of the Standing Committee on power system planning in Southern Region held on 15th June, 2009.

(1) Edlapur TPS being located adjacent to the Raichur TPS(RTPS) project, would be connected to RTPS switchyard through extended bus arrangement.
(2) Yermarus TPS – Raichur (New) 765/400 kV (PGCIL) S/S, 400 kV Quad D/C line.
(3) Yermarus TPS – Basavana Bagewadi 400 kV Quad D/C line.
(4) Basavana Bagewadi – Narendra (PGCIL) 400kV D/C line*,
(*- in case there is no additional bay space at the Narendra S/S, the possibility of connecting Basavana Bagewadi – Narendra with LILO of one circuit of the Narendra – Guttur 400 kV D/C line would be explored.).

3.2 Subsequently short circuit studies carried out for Yermarus and Edlapur TPS of KPCL indicated that the fault level at Yermarus TPS 400kv bus would be 40 kA and that at Raichur TPS would cross 40 kA. Accordingly, CEA suggested KPTCL to review transmission system for these two projects. It was suggested that instead of

connecting Edlapur TPS to the existing Raichur TPS switchyard, it might be connected to Yeramaras TPS switchyard at 400 kV through a 400 kV D/C line. The power from Yermarus and the Edlapur TPS could be transmitted through Yermarus – Basavana Bagewadi 400kV quad D/C line, and Yermarus - Raichur New 765 kV S/C line. This would also reduce the fault levels at 400 kV Sub-stations at Raichur TPS, Yermarus TPS and Raichur New. This alternative required a 765kV S/S at Yermarus. To avoid a 765kV S/S at Yermarus and to optimize transmission requirement for Yermarus and Edlapur TPS's revised studies were carried out in CEA in June 2010 jointly with engineers from KPTCL and PGCIL.

3.3 Five alternatives were selected for studies, results of the studies are given in the Study Report given at Annex-YR Report.
Following Alternatives were considered for study:

Alternative - I :

(1) Edlapur TPS being located adjacent to the RTPS project will be connected to RTPS switchyard through extended bus arrangement.
(2) Yermarus TPS – Raichur New (PGCIL) 400 kV Quad D/C line.
(3) Basavana Bagewadi 400/220 kV 2x500 MVA Substation.
(4) Yermarus TPS – Basavana Bagewadi 400 kV Quad D/C line.
(5) Basavana Bagewadi – Narendra (PGCIL) 400kV D/C line.

Alternative - II :

(1) Edlapur TPS - Yermarus TPS 400 kV D/C line.
(2) Yermarus TPS – Raichur New (PGCIL) 400 kV Quad D/C line.
(3) Basavana Bagewadi 400/220 kV 2x500 MVA Substation.
(4) Yermarus – Basavana Bagewadi 400 kV Quad D/C line.
(5) Basavana Bagewadi – Narendra (PGCIL) 400kV D/C line.

Alternative - III :

(2) Edlapur TPS - Yermarus TPS 400 kV D/C line.
(3) 400kV D/C Quad line from Yermarus TPS to LILO point of RTPS-Gooty line, so as to make Yermarus-Gooty 400kV D/C link (RTPS-Gooty 400kV Quad D/C line is planned to be LILOed at Raichur New)
(4) RTPS would remain connected with Raichur New and the Gooty would be disconnected from Raichur New.
(5) Basavana Bagewadi 400/220 kV 2x500 MVA Substation.
(6) Yermarus – Basavana Bagewadi 400 kV Quad D/C line.
(7) Basavana Bagewadi – Narendra (PGCIL) 400kV D/C line.

Alternative - IV :

(1) Edlapur TPS - Yermarus TPS S/S 400 kV D/C line.
(2) Yermarus 765/400kV 2x1500 MVA Substation.
(3) Yermarus TPS – Raichur (New)(PGCIL) 765 kV 2xS/C lines
(4) Basavana Bagewadi 400/220 kV 2x500 MVA Substation.
(5) Yermarus – Basavana Bagewadi 400 kV Quad D/C line.
Basavana Bagewadi – Narendra (PGCIL) 400kV D/C line.

Alternative - V :

(1) Edlapur TPS - Yermarus TPS S/S 400 kV D/C line.
(2) Yermarus TPS – Raichur New (PGCIL) 400 kV Quad D/C line.
(3) The planned LILO of RTPS-Gooty at Raichur New would be bypassed through a bypass arrangement so as to retain RTPS-Gooty direct connection.
(4) Basavana Bagewadi 400/220 kV 2x500 MVA Substation.
(5) Yermarus – Basavana Bagewadi 400 kV Quad D/C line.
(6) Basavana Bagewadi – Narendra (PGCIL) 400kV D/C line.

3.4 Out of these five alternative configurations, the Alternative-5 was found to be the most suitable considering the fault level and the flows in the grid. In case there is no additional bay space at the Narendra S/S, the possibility of connecting Basavana Bagewadi – Narendra with LILO of one circuit of the Narendra – Guttur 400 kV D/C line would be explored.

3.5 In all the above alternatives, the KPCL generation from Yermarus/ Edlapur is being injected into the Raichur New / Gooty, which are ISTS sub-stations. As per Sec 39 of the Electricity Act, transmission system for an intra-state generating station should be developed by the STU. In this case, KPCL is leaning on the ISTS for about 50 % capacity of Yermarus and Edlapur TPSs in a normal scenario. In normal case, it is not desirable to plan ISTS for intra-state purpose since as per the Act the responsibilities of CTU and STU have been clearly defined under Section 38 and 39 respectively. However, in the interest of overall optimization of investment in transmission, we are agreeable to Alternative-V. The 400kV intra-state D/C lines from Yermarus - Baswana Bagewadi – Narendra to be built by KPTCL for Yermarus and Edlapur should be completed by KPTCL matching with commissioning of the generating units, failing which KPCL might be allowed scheduling of power on first priority to the tune of 50% capacity. For the remaining capacity, they may have to seek STOA.

3.6 Therefore, transmission charges for use of ISTS by KPCL would need to be shared by KPCL and beneficiaries of KPCL in accordance with relevant regulations and for the quantum of power estimated to be injected into the ISTS grid points. As per the new CERC regulations on sharing of inter state transmission charges, NLDC has been designated as the Nodal Agency for its implementation. Accordingly, if Alternative-5 is taken as transmission scheme for Yermarus and Edlapur generating stations, NLDC may be informed to treat Raichur New as ISTS injection point by KPCL into ISTS grid for a suitable quantum of power.

3.7 Members may discuss and approve Alternative-V.

4.0 Transmission schemes proposed by APTRANSCO:

4.1 APTRANSCO have proposed following two transmission proposals (reference from APTRANSCO is given at Annex-IV)

4.2 **Transmission Proposal no. – 1 :**

For the APGENCO's RTPP-St IV (600 MW) power plant APTRANSCO have proposed to evacuate the power by interconnecting to 400kV Gooty substation of

PGCIL through a 400kV Twin Moose line. This line is proposed to be erected by APTRANSCO. APGENCO would normally inject into ISTS grid at Gooty. It is pointed out that from RTPP St-I, II and III, APTRANSCO, as STU, has built matching State transmission system. Accordingly, RTPP Stage-IV also being an intra-state generation project, APTRANSCO should develop the associated intra-state transmission system for the same. Accordingly, the proposal of APTRANSCO to connect at Gooty(PGCIL) may be considered provided they plan their own matching intra-state transmission system also.

4.3 **Transmission Proposal no. – 2 :**
They have proposed to erect a 400/220kV S/S at Nirmal (Adilabad district) in Andhra Pradesh by LILO of the existing 400kV Ramagundam–Chandrapur D/C line.

4.4 APTRANSCO may present the relevant studies and members may discuss.

5.0 Transmission schemes proposed by KSEB:

5.1 KSEB have proposed to make LILO of existing Kayamkulam – Pallom 220kV D/C line of PGCIL, which is part of the evacuation system for Kayamkulam CCPP (RGCCPP), at Punnapra 220kV S/S being built by KSEB. KSEB is upgrading their 110kV Substation to Punnapra to 220kV. They have proposed to take off the LILO between location no.43 and 44 (from Kayamkulam end) at Veeyapuram of the Kayamkulam – Pallom D/C line. (reference from KSEB with details is given at Annex-III)

5.2 KSEB may present the relevant studies and indicate capacity of the Punnapra S/S. Members may discuss.

6.0 Review of Transmission system for the NLC-TNEB JV project at Tuticorin (NTPL) (2x500 MW): (Ref: Annex-I & II)

6.1 For evacuation of power from ISGS NLC-TNEB JV project at Tuticorin namely NTPL of 2x500 MW capacity, following transmission system was agreed in the 22nd meeting of Standing Committee on Power System Planning in Southern Region held on 17-8-2006 at Bangalore:

- Tuticorin JV TPS-Chekkanurani(Madurai) 400kV D/C quad line.
- 2x315MVA,400/230kV ICT at Tuticorin TPS JV.
- LILO of two Nos. 230kV circuits at Tuticorin TPS JV.

6.2 The 2x315 MVA transformers were planned to serve the purpose of absorbing power by TNEB at 230kV level and also for supplying start-up power for the JV project. TNEB have conveyed that they were facing difficulty for obtaining right of way problem for the LILO of 230kV lines at the JV project. They have also informed that due to upcoming generation projects in Tuticorin area, they can meet their local loads without the 2x315 MVA transformers. Therefore they have proposed to revise the ATS for the JV project by removing the 2x315 MVA transformers from its scope.

6.3 NLC have observed that as they have already placed orders for supply and erection of switchyard equipments and power transformers, which are under various stages of manufacturing, the original scope of the transmission system should be maintained.

6.4 TNEB may present the relevant studies. Members may discuss.

7.0 Transmission schemes proposed by TNEB:

7.1 TNEB have proposed to make LILO of their planned Arasur – Mettur TPS-III 400kV D/C line at their new 400/230kv substation at Karamdai. TNEB has proposed to LILO one circuit of their 400kV D/C line and erect 2x315 MVA transformer. TNEB is proposing this new 400kV S/S to meet growing load demand in that area where they are also planning five new 230kV S/Ss. In view of future requirements, TNEB has been asked to consider LILO of both the circuits and plan for 3x315 MVA or 2x500 MVA ICTs instead of 2x315 MVA ICTs.

7.2 TNEB may present the relevant studies. Members may discuss.

8.0 Status of Under Construction / Approved Schemes:

8.1 Powergrid may inform the progress of the transmission works that are being implemented by them as part of regional schemes.

8.2 State Utilities may inform the progress on their transmission works that are necessary to match with the regional schemes by Power grid for effective utilization of the system:

8.2.1 APTRANSCO may inform status of the transmission system for Kothagudam TPS Stage-VI, Bhoopalapally Stage-I and Stage –II projects.

8.2.2 KPTCL may inform status the Nagarjuna TPS(UPCL)-Hassan 400kV D/C line and transmission system for in the Yeramas and Edlapur generating station.

8.2.3 TNEB may inform about status of transmission system for NCTPS Stage-II, Mettur TPS-III, Udangudi TPS and the transmission system for evacuation of wind power in Tirunelveli/Kayathar area i.e. Kanarpathy - Kayathar- Karaikudi -Pugalur-Singarapet - Sholinganallur 400kV system.

9.0. The committee may take up the Agenda point regarding Connectivity and LTA applications circulated by PGCIL.

10.0 Any other issue with the permission of Chairman.

ANNEX- YE Report

Government of India
Central Electricity Authority
System Planning & Project Appraisal Division
Sewa Bhawan, R.K.Puram,New Delhi-110066

No. 54/1/2010-SP&PA/ **Date: July 05, 2010**

To

Director (Transmission),
Karnataka Power Transmission Corporation Ltd,
1st Floor, Kaveri Bhavan,
Kempe Gowda Road,
Banglore-560009

Sub: Transmission System for Evacuation of Power from Yermarus TPS (2x800 MW) and Edlapur TPS (1x800 MW) and calculation of fault levels for Yermarus and Edlapur S/S

Ref: (1) KPTCL letter no. CEE(P&C)/KCO-97/26447/10-11 dated April 26, 2010
(2) CEA letter no. 54/1/2020-SP&PA/7-8 dated January 22, 2010

Sir,

System studies have been carried out in CEA during June 09-11, 2010 jointly with engineers from KPTCL (Shri K. Pramesha) and PGCIL (Shri R.V.M.M. Rao) to review the transmission system for evacuation of power from the Yermarus TPS and Edlapur TPS of M/s KPCL.

A copy of study report is enclosed.

(Pardeep Jindal)
Director(SP&PA)

Copy to:

1.) Executive Director (SEF, CE & IT),
Power Grid Corp. of India Ltd.
Saudamini, Plot No. 2, Sector-29,
Gurgaon - 12201

2.) The Technical Director,
Karnataka Power Corporation Ltd,
Shakti Bhawan,
No.82, Race Course Road,
Banglore-560001

Report on Study for Planning Transmission System for Evacuation of Power from Yermarus TPS (2x800 MW) and Edlapur TPS (1x800 MW) and calculation of fault levels for Yermarus and Edlapur S/S

1.0 Background:

1.1 Following transmission system was agreed in the 28th meeting of the Standing Committee on power system planning in Southern Region held on 15th June, 2009.

(1) Edlapur TPS being located adjacent to the Raichur TPS(RTPS) project, would be connected to RTPS switchyard through extended bus arrangement.

(2) Yermarus TPS – Raichur (New) 765/400 kV (PGCIL) S/S, 400 kV Quad D/C line.

(3) Yermarus TPS – Basavana Bagewadi 400 kV Quad D/C line.

(4) Basavana Bagewadi – Narendra (PGCIL) 400kV D/C line*,

(*- in case there is no additional bay space at the Narendra S/S, the possibility of connecting Basavana Bagewadi – Narendra with LILO of one circuit of the Narendra – Guttur 400 kV D/C line would be explored.)

1.2 Karnataka Power Corporation Limited vide their letter dated 14th June 2010 asked CEA to calculate fault levels and r/x at their Yermarus 400 kV Sub-station. The studies were carried in CEA and results were communicated vide CEA's letter No.54/1-2010/SP&PA/7 dated Jan.22, 2010. Studies indicated that the fault level at Yermarus TPS 400kv bus would be 40 kA and that at Raichur TPS would cross 40 kA. Accordingly, CEA suggested that transmission system for these two projects may be revised. It was suggested that instead of connecting Edlapur TPS to the existing Raichur TPS switchyard, it might be connected to Yeramaras TPS switchyard at 400 kV through a 400 kV D/C line. The power from Yermarus and the Edlapur TPS could be transmitted through Yermarus – Basavana Bagewadi 400kV quad D/C line, and Yermarus - Raichur New 765 kV S/C line. This would also reduce the fault levels at 400 kV Sub-stations at Raichur TPS, Yermarus TPS and Raichur New.

1.3 KPTCL vide their letter No.CEE(P&C)KCO-9/26447/10-11 dated 23rd April 2010 suggested few more alternatives. Accordingly, it was decided that a joint study be carried out in CEA involving KPTCL and PGCIL to revise the transmission system for evacuation of power from Yermarus TPS and Edlapur TPS.

1.4 Systems study were carried out in CEA during June 9-11, 2010 involving engineers from KPTCL (Shri K. Paramesha), and from PGCIL (Shri R.V.M.M. Rao).

2.0 Alternatives Considered in the Study:

Following transmission alternatives were considered for evolving transmission system for evacuation of power from Yermarus TPS (2x800 MW) and Edlapur TPS (1x800 MW) of KPCL.

2.1 Alternative - I :

(1) Edlapur TPS being located adjacent to the RTPS project will be connected to RTPS switchyard through extended bus arrangement.

(2) Yermarus TPS – Raichur New (PGCIL) 400 kV Quad D/C line.

(3) Basavana Bagewadi 400/220 kV 2x500 MVA Substation.

(4) Yermarus TPS – Basavana Bagewadi 400 kV Quad D/C line.

(5) Basavana Bagewadi – Narendra (PGCIL) 400kV D/C line.

2.2 Alternative - II :

(1) Edlapur TPS - Yermarus TPS 400 kV D/C line.

(2) Yermarus TPS – Raichur New (PGCIL) 400 kV Quad D/C line.

(3) Basavana Bagewadi 400/220 kV 2x500 MVA Substation.

(4) Yermarus – Basavana Bagewadi 400 kV Quad D/C line.

(5) Basavana Bagewadi – Narendra (PGCIL) 400kV D/C line.

2.3 Alternative - III :

(1) Edlapur TPS - Yermarus TPS 400 kV D/C line.

(2) 400kV D/C Quad line from Yermarus TPS to LILO point of RTPS-Gooty line, so as to make Yermarus-Gooty 400kV D/C link (RTPS-Gooty 400kV Quad D/C line is planned to be LILOed at Raichur New)

(3) RTPS would remain connected with Raichur New and the Gooty would be disconnected from Raichur New.

(4) Basavana Bagewadi 400/220 kV 2x500 MVA Substation.

(5) Yermarus – Basavana Bagewadi 400 kV Quad D/C line.

(6) Basavana Bagewadi – Narendra (PGCIL) 400kV D/C line.

2.4 Alternative - IV :

(1) Edlapur TPS - Yermarus TPS S/S 400 kV D/C line.

(2) Yermarus 765/400kV 2x1500 MVA Substation.

(3) Yermarus TPS – Raichur (New)(PGCIL) 765 kV 2xS/C lines

(4) Basavana Bagewadi 400/220 kV 2x500 MVA Substation.

(5) Yermarus – Basavana Bagewadi 400 kV Quad D/C line.

(6) Basavana Bagewadi – Narendra (PGCIL) 400kV D/C line.

2.5 Alternative - V :

(1) Edlapur TPS - Yermarus TPS S/S 400 kV D/C line.

(2) Yermarus TPS – Raichur New (PGCIL) 400 kV Quad D/C line.

(3) The planned LILO of RTPS-Gooty at Raichur New would be bypassed through a bypass arrangement so as to retain RTPS-Gooty direct connection.

(4) Basavana Bagewadi 400/220 kV 2x500 MVA Substation.

(5) Yermarus – Basavana Bagewadi 400 kV Quad D/C line.

(6) Basavana Bagewadi – Narendra (PGCIL) 400kV D/C line.

3.0 Discussion of the Alternatives:

3.1 The studies were carried out for 2016-17 time-frame.

3.2 Alternative – 1: (Load flow at Exhibit: Case-1)

The transmission system is the one that was originally agreed in 28th meeting of the Standing Committee. It is observed that the fault level at RTPS crosses 40 kA and that for Raichur New is nearing to 48 kA. The fault level at Edlapur also crosses 40 kA and that at Yermarus is about 35kA. From Yermarus, 680 MW flows towards Basavana Bagewadi and about 760 MW towards Raichur New. At Basavana Bagewadi 469 MW is absorbed into the 220 kV system and rest flows towards Narendra. The power injected from Yermarus into Raichur New gets transmitted through ISTS grid.

3.3 Alternative – 2:(Load flow at Exhibit: Case-2)

The Yermarus - Basavana Bagewadi 400 kV D/C line carries about 750 MW and about 1410 MW is injected into the Raichur New S/S. The fault level at Raichur TPS 400kV bus is 38 kA, Yermarus - 37 kA, Edlapur – 33kA and Raichur New – 48 kA.

3.4 Alternative – 3: (Load flow at Exhibit: Case-3)

In this case, about 940 MW flows from Yermarus towards Basavana Bagewadi and 1220 MW is injected into ISTS grid point at Gooty. The power injected into Gooty sub-station and gets transmitted through ISTS grid. The fault levels at all the sub-stations come down. The fault level at RTPS becomes 32 kA, Raichur New –33 kA, Yermarus – 23 kA and Edlapur – 22 kA.

3.5 Alternative – 4: (Load flow at Exhibit: Case-4)

In this case, about 880 MW flows towards Basavana Bagewadi and 1280 MW towards Raichur 765 kV S/S. The fault level at RTPS is 35 kA, Raichur New – 40 kA, Yermarus (400kV) – 35 kA and Edlapur – 31 kA.

3.6 Alternative – 5: (Load flow at Exhibit: Case-5)

In this case, the Yermarus - Basavana Bagewadi 400kV D/C line carries about 1150 MW and 1010 MW is injected into ISTS grid at Raichur New. The fault levels come down at all the nearby substations. The fault level at RTPS is 24 kA, Raichur New – 33 kA, Yermarus – 31 kA and Edlapur – 28 kA.

3.7 A comparative table of fault levels at 400kV and 765kV buses and **x/r** at Yermarus TPS and Edlapur TPS 400 kV buss for all the five cases is given below:

Sl. No.	Name of the Bus	Fault level (in kA) under various Transmission Alternatives				
		Alt. - 1	Alt. - 2	Alt. - 3	Alt. - 4	Alt. - 5
1.	RTPS	41	38	32	35	24
2.	Raichur New 400kV	48	48	33	40	33
3.	Raichur New 765kV	27	27	24	30	24
4.	Yermarus TPS 400kV	35	37	23	35	31
5.	Yermarus 765kV	-	-	-	28	-
6.	Edlapur TPS 400 kV	41	33	22	31	28
7.	Basvana Bagewadi	15	15	14	15	15
8.	Gooty 400kV	39	39	38	38	37
9.	Kurnool New 400 kV	41	41	40	42	41
10.	Kurnool New 765kV	28	28	26	29	26
11.	Bellary TPS 400kV	31	30	31	30	29

Sl. No.	Name of the Bus	X/R under various Transmission Alternatives				
		Alt. - 1	Alt. - 2	Alt. - 3	Alt. - 4	Alt. - 5
1.	X/R at Yermarus TPS 400kV Bus	13.3	14.0	17.5	20.9	20.6
2.	X/R at Edlapur TPS 400kV Bus	10.2	14.0	17.4	19.9	19.9

4.0 Conclusion and Recommendation:

1. Out of all the five alternatives described above, the Alternative-5 seems to be most suitable considering the fault level and the flows in the grid. The transmission system for evacuation of power from Edlapur TPS and Yermarus TPS would be firmed up after discussion by the Standing Committee on Power System Planning of Southern Region.

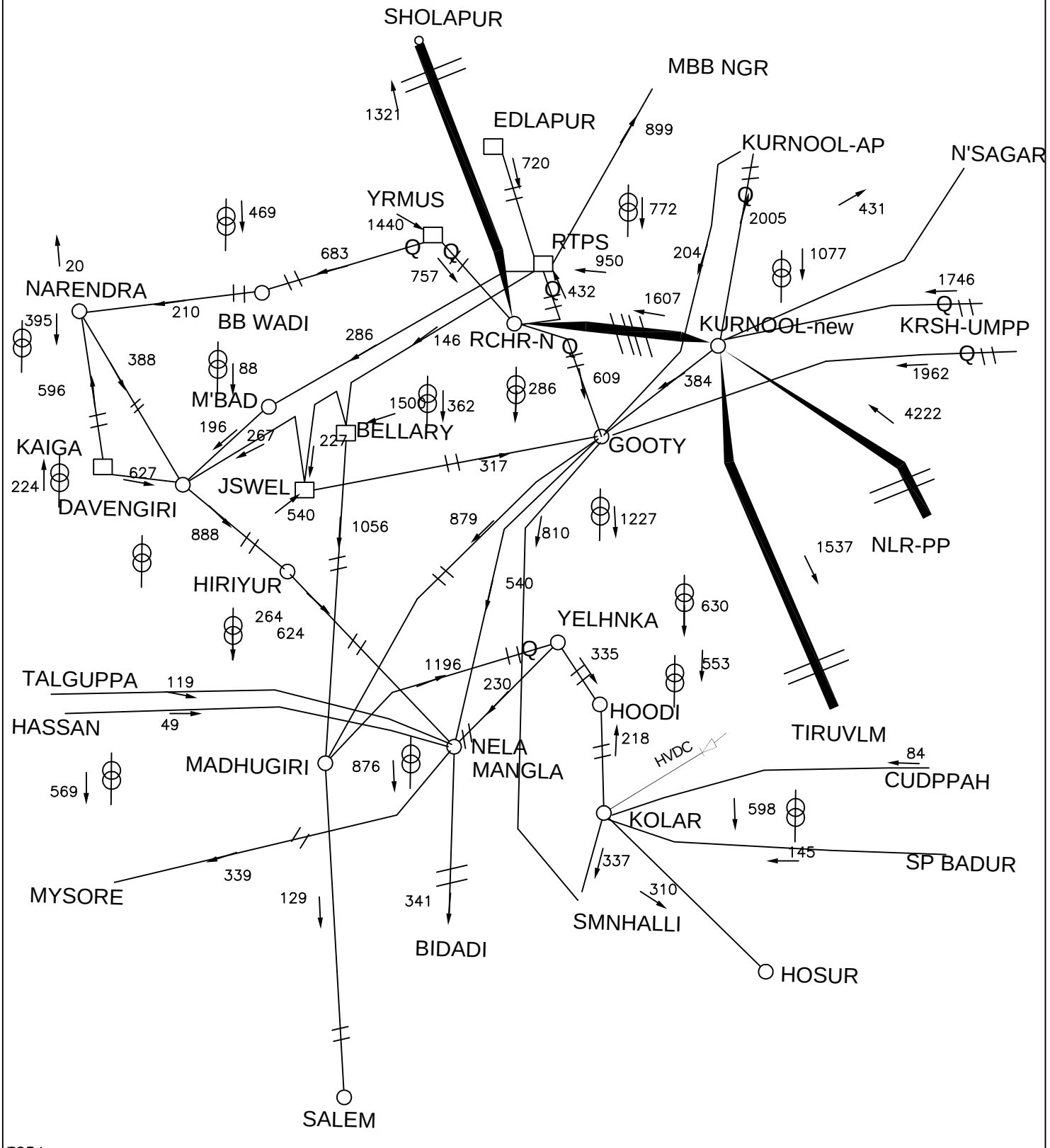
2. Regarding the fault level and x/r at Yermarus and Edlapur, M/s. KPTCL may be informed accordingly.

3. In all the above alternatives, the KPCL generation at Yermarus/ Edlapur is being injected into the Raichur New / Gooty, which are ISTS sub-stations. Therefore, transmission charges for use of ISTS would need to be shared by KPCL or beneficiaries of KPCL in accordance with relevant regulations and for the quantum of power estimated to be injected into the ISTS grid points.

4. As per the new CERC regulations on sharing of inter state transmission charges, NLDC has been designated as the Nodal Agency for its implementation. As per Sec 39 of the Electricity Act, transmission system for an intra-state generating station should be developed by the STU. In this case, STU/KPCL is leaning on the ISTS for about 50 %(1000 MW) in a normal scenario. Accordingly, if Alternative-5 is taken as transmission scheme for Yermarus and Edlapur generating stations, NLDC may be recommended to treat Raichur New as ISTS injection point for 1000 MW injection by KPCL into ISTS grid.

5. In case there is no additional bay space at the Narendra S/S, the possibility of connecting Basavana Bagewadi – Narendra with LILO of one circuit of the Narendra – Guttur 400 kV D/C line would be explored.

CASE - 1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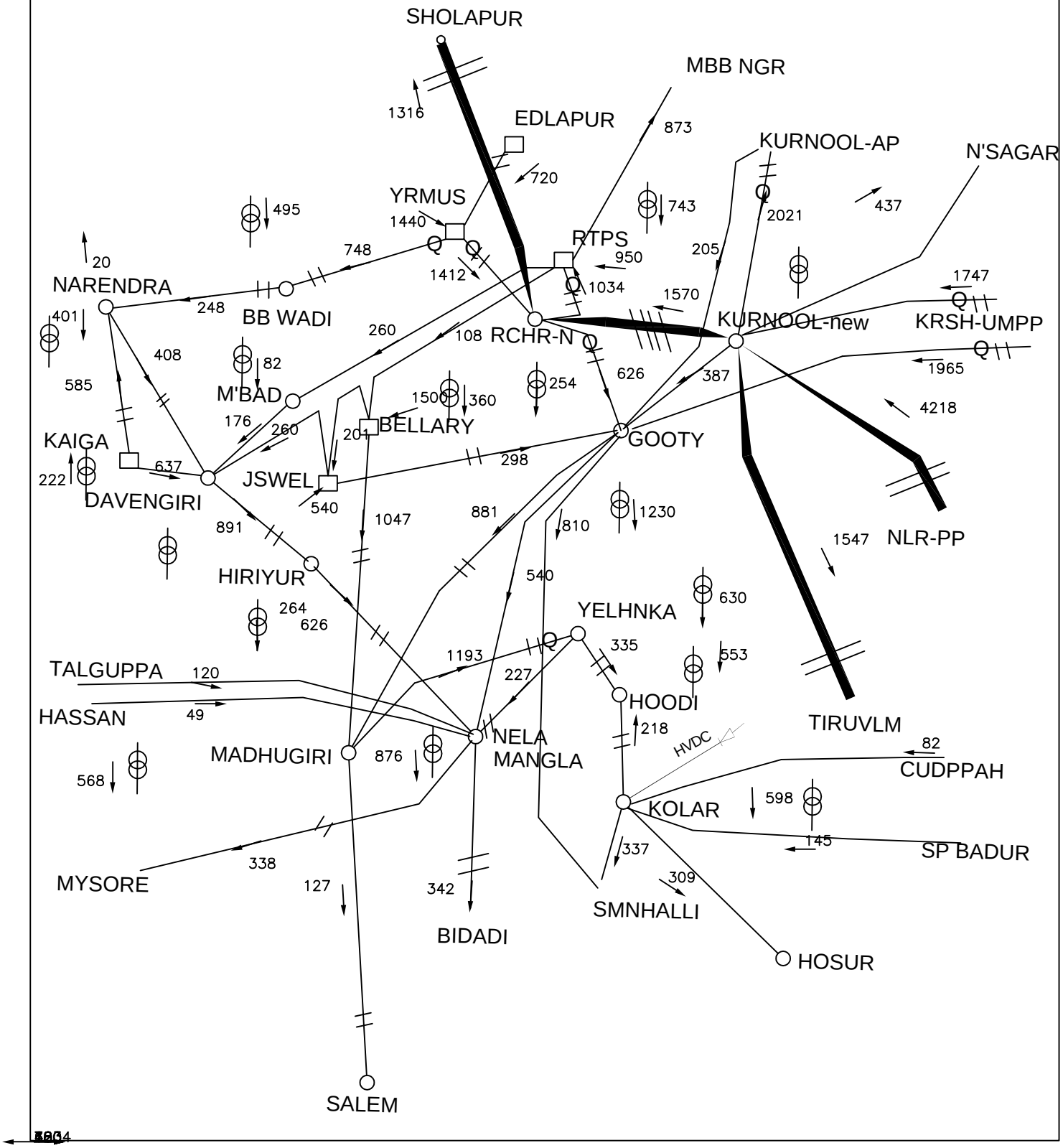
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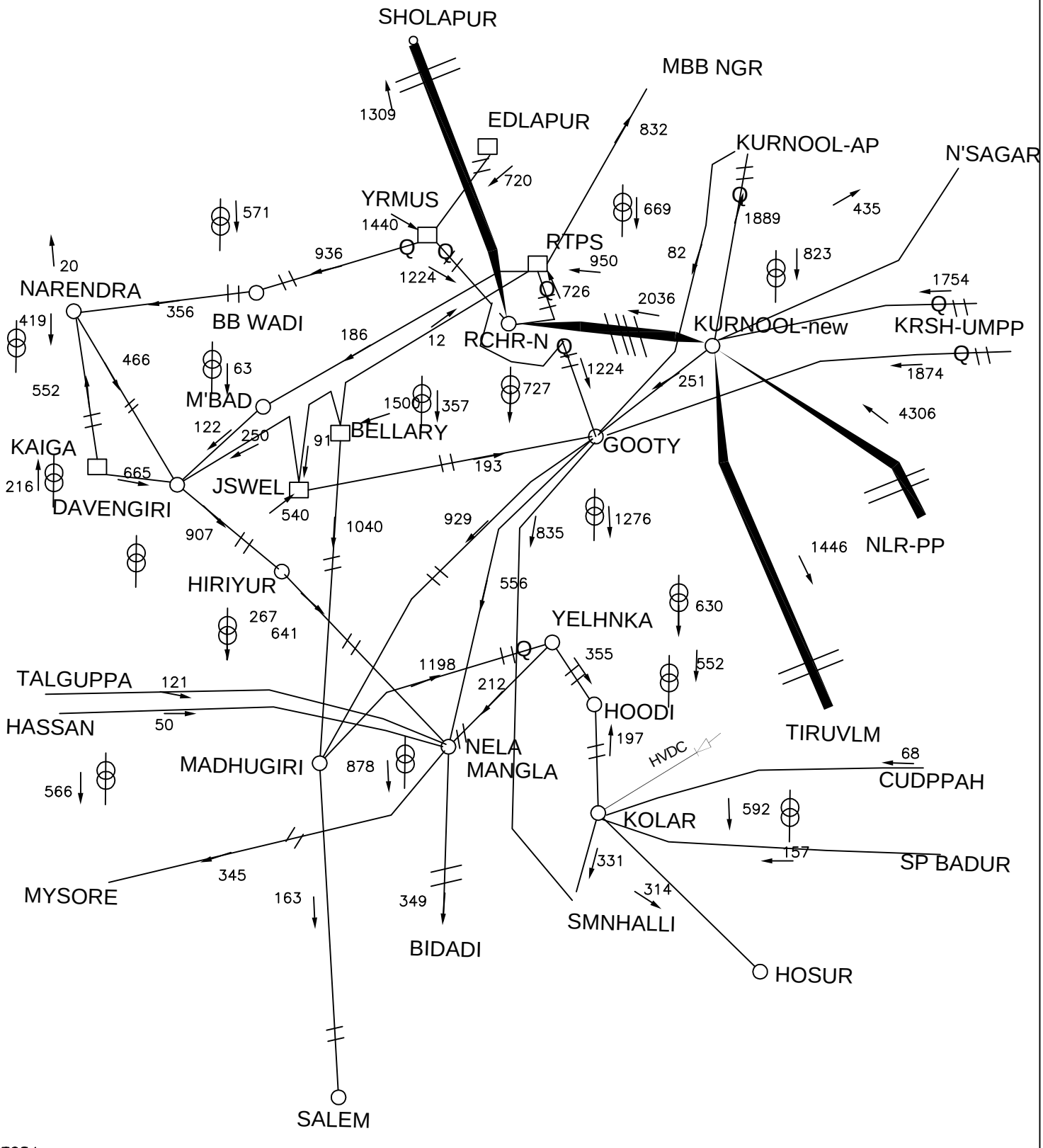
CASE - 3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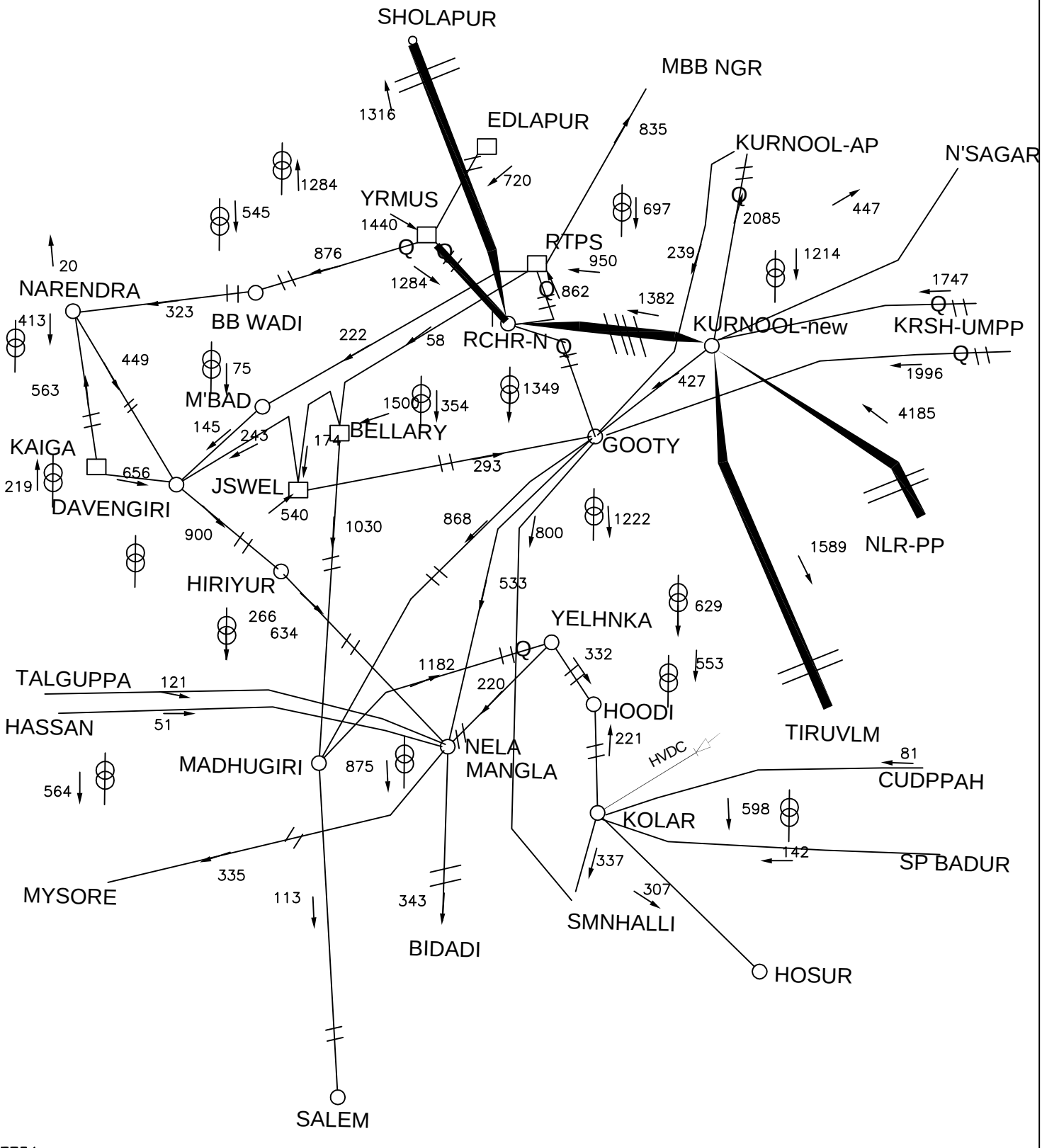
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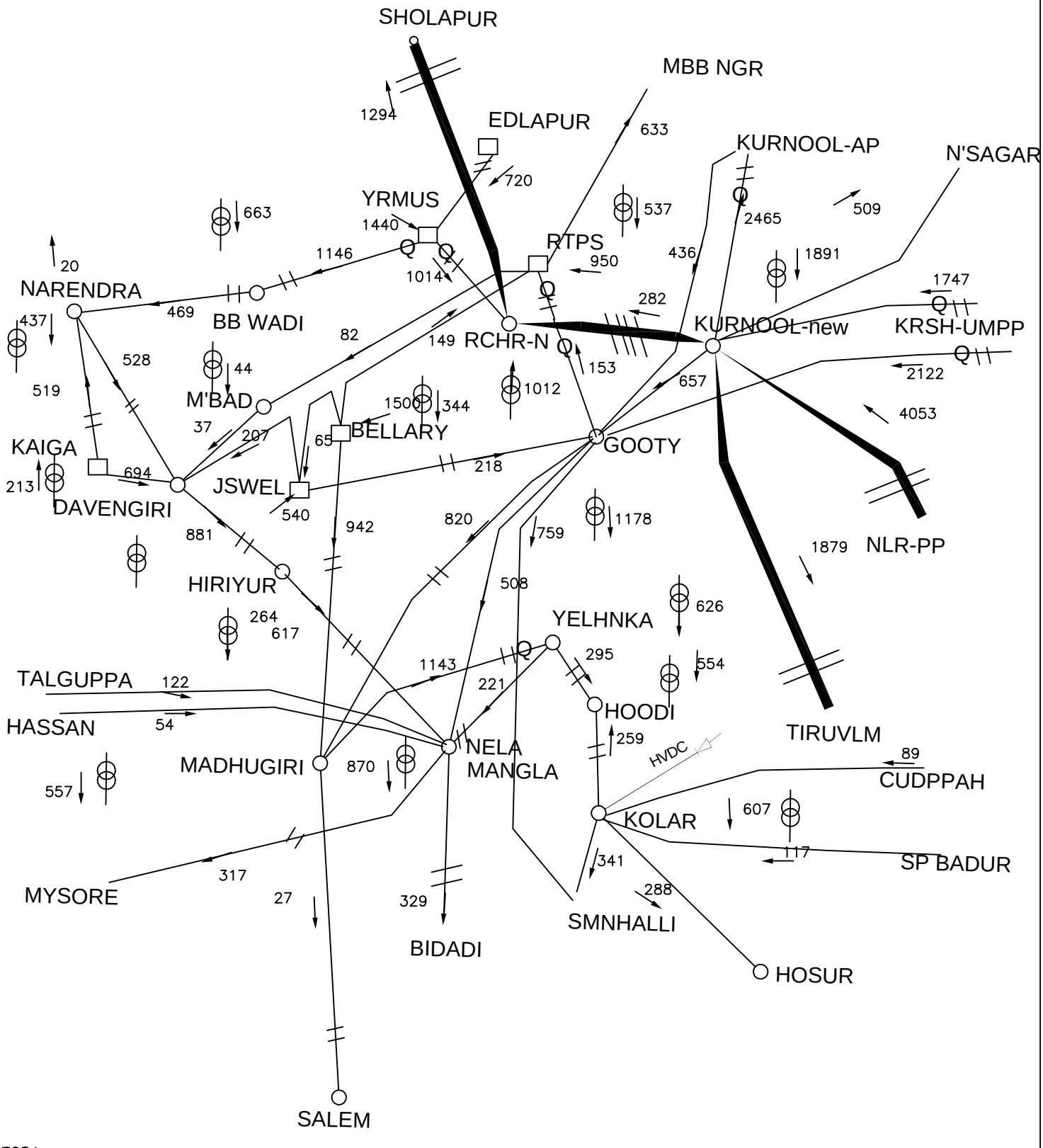
CASE - 5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Er. R.Murugan, B.E.,
Director (Distribution) i/c.
Tamil Nadu Electricity Board.
X Floor, Eastern Wing,
N.P.K.R.R.Maaligai,
800 Anna Salai, Chennai – 600 002.

ANNEX I

To
The Member (Power System)
Central Electricity Authority,
Sewa Bhavan, R.K. Puram,
New Delhi 110 066.

Lr.No.CE/Plg &RC/SE/SS/EE1/AEE1/F.JV Projects/D 309/2010 dt 06.10.10

Dear Sir,

Sub: Establishment of NTPL Project (2x500 MW) at Tuticorin– Power evacuation schemes – 230 KV connectivity – regarding.

*****

1.0 The Standing Committee on Power System Planning for Southern Region in the 22nd meeting held on 17.8.06 at Bangalore had approved the following transmission schemes for evacuation of power from the proposed NLC Joint Venture Project (2x500MW) at Tuticorin.

iv) Tuticorin JV TPS – Chekkanurani 400 kV DC Quad line

v) 2x315 MVA, 400/230 kV ICT at Tuticorin JV TPS

vi) LILO of two Nos. 230 kV circuits at Tuticorin JV TPS

It was also agreed that the execution of 230 kV lines comes under the purview of TNEB. The ICTs and 230 kV outlets are required for start up power and dispersal of JV power locally.

2.0 Now,TNEB has conducted load flow studies for deciding the 230KV connectivity for the proposed NLC Joint Venture Project (2x500MW) at Tuticorin and the following are observed.

1. NLC JV ICT (2X315MVA ICT) is loaded to maximum of 234MW (37%) during nil wind condition. With one number 315MVA ICT also the ICT is loaded to 152MW (48%) during nil wind condition but with the commissioning of Udangudi (2X800MW) project the ICT is loaded to 39MW (12%) only. As the, proposed Udangudi Power Project is directly connected to the proposed

Kayathar 400KV SS, part of the Udangudi power is dispersed locally during Nil wind condition. Hence the NLC JV ICT loading get reduced.

2. Further, due to way leave problem it is difficult to connect a 230KV load SS to the NLC JV switchyard. More over due to the existing TTPS generation & Ind Bharat (3X63MW) power plant generation and the proposed Ind Bharat – Karwar (3X150MW) generation, it is difficult to disperse the power locally.

3. Hence, it is suggested that the transmission evacuation scheme for the NLCJV project will be only through 400KV D/C quad line to Checkanurani 400KV SS i.e., with out 2X315MVA ICT and 230KV outlets.

4. It is suggested that the startup power for TTPS JV may be availed by one of the following 2 options.

   A. At 230KV level by making LILO of TTPS – TTNAuto 230KV SC line at NLCJV.

   B. At 400KV level, by using the NLC JV - Checkanurani 400KV line.

3.0 It is requested the above changes may be put up [illegible] in the next Standing Committee meeting. If necessary a joint study in this regard may be conducted by CEA involving TNEB, NCL and PGCIL. It is also requested to communicate convenient dates for conducting joint study so that Engineers from TNEB can be deputed.

11.6.10

(S.Kalyani) (2/6)
Chief Engineer/Planning & Resource Center
For Director/Distribution (i/c)

Copy to DGM (Engg), PGCIL, Saudamini, Plot No.2, Sector-29, Gurgeon -122001, Haryana

Copy to Director/Projects/ TNEB, Chennai -2. It is requested to inform the above details to GM/NTPL Ltd.

Copy to Director / Transmission / Chennai -2

Copy to GM, NTPL Ltd., Corporate office, B-1, Neyveli -607801.

ANNEX II

नेयवेली लिग्नाइट कोर्पोरेशन लिमिटेड NEYVELI LIGNITE CORPORATION LIMITED
(भारत सरकार का उपक्रम) (A Govt. of India Enterprise)
निदेशक (विद्युत) का कार्यालय OFFICE OF THE DIRECTOR (POWER)

दूरभाष : Phone : 04142-252570
फैक्स : Fax : 04142 252650
ई-मेल : E-mail : dir.power@nlcindia.com

निगमित कार्यालय Corporate Office
ब्लाक - 1 Block - 1
नेयवेली - 607 801 Neyveli - 607 801
तमिलनाडु (भारत) Tamilnadu (India)

NLC/Dir.(Power)/302-207/10 Dt:15.10.2010

The Director(Distribution)
Tamil Nadu Electricity Board
X Floor, Eastern Wing, NPKRR Maaligai,
800, Anna Salai,
Chennai – 600 002

Kind Attn: Er. R. Murugan, Director(Distribution)

Dear Sir,

Sub: 2x500 MW NTPL JV Project at Tuticorin – Implementation of LILO of 2 nos. of 220 KV circuits by TNEB – Reg.

Ref: CE/Plg&Rc/SE/SS/EE1/AEE1/F.JC Projects/D309/2010, Dt.06.10.10

This is with reference to the letter from Director (Distribution), TNEB addressed to The Member (Power Systems), CEA cited above and a copy marked to us regarding Power evacuation system of NTPL JV Project, Tuticorin. The letter content was studied in detail and our observations in this regard are as follows.

- In the summary record note of discussion of the 22nd meeting of the Standing Committee on Power System Planning held on 17.08.2006, the following evacuation system was agreed for Tuticorin TPS JV (2x500 MW) taking in to consideration of reliable power evacuation from the Power Station.
  - Tuticorin JV TPS – Madurai 400 KV D/C Quad.
  - 2X315 MVA, 400 /220 KV ICT at Tuticorin TPS JV
  - LILO of two Nos. 220KV circuits at Tuticorin TPS JV
- Accordingly provision of evacuating the power both through 400 KV as well as 220 KV were made.

- Based on the above approved scheme, NLC has already placed orders for supply and erection of Switchyard equipments and Power Transformers. The various equipments and components are under different stages of manufacturing. Corresponding Civil works are under progress.
- The commissioning of the 220 KV Switchyard with respective Transformers has been scheduled by September 2011. The power supply requirements for the various packages were also planned and worked out accordingly.
- Hence any change in the scope of work is not possible since this will have ramification on all the package works and jeopardize the entire project itself.
- Hence it is requested that the original approved Transmission scheme may please be maintained and TNEB may proceed with the execution of LILO of two Nos. 220KV circuits at Tuticorin JV TPS for early commissioning of the units.

Yours faithfully,
for NEYVELI LIGNITE CORPN. LTD,

15/10/10

J. MAHILSELVAN
Director/Power)

Copy to Member (Power System), Central Electricity Authorty,
Sewa Bhavan, R.K.Puram, NewDelhi – 110 066.

Director(Projects) TNEB., NPKRR Maaligai, 800, Anna Salai,
Chennai – 600 002

Director(Transmission) TNEB, NPKRR Maaligai, 800, Anna Salai,
Chennai – 600 002

DGM (Engg), PGCIL, Saudamini, Plot No. 2, Sector-29,
Gurgaon – 122001

CE(Planning & Resource centre) TNEB, NPKRR Maaligai, 800,
Anna Salai, Chennai – 600 002

M/s. Mecon, Bangalore

CEO (NTPL) TUTICORIN

ANNEX III

KERALA STATE ELECTRICITY BOARD

OFFICE OF THE MEMBER (TRANSMISSION), VYDYUTHI BHAVANAM
THIRUVANANTHAPURAM.695004

No.CE/CP/LFS/SRPC/PGCIL/2010-11/94 Dated: 27.10.2010

To

1. Sri. Pradeep Jindal,
   Director,
   System Planning & Project Appraisal committee,
   Central Electricity Authority,
   Sewa Bhawan, R.K Puram,
   New Delhi-110066.

2. The Director (Projects),
   Power Grid Corp. of India Ltd,
   "Saudamini", Plot no.2, Sector-29,
   Gurgaon 122001, Hariyana.

Sir,

Sub: Construction of 220kV line from Veeyapuram to Punnapra – Take off arrangement from Kayamkulam – Pallom line owned by PGCIL at Veeyapuram for LILO - Permission - Regarding

Ref: Nil

KSE Board has decided for the upgradation of 110kV Substation, Punnapra to 220kV, by constructing 18.666km DC line by LILO-ing Kayamkulam – Pallom line which is owned by PGCIL. 80% of the Substation works has been completed and the project is targeted for commissioning by 3/2011. Contract has been awarded for executing the line works and the tower foundation works are under progress. The take off arrangement of the line is proposed as a LILO between location no.43 and 44 (from Kayamkulam end) of Kayamkulam – Pallom DC line, owned by PGCIL, at Veeyapuram.

The line particulars are as follows:

Name of the power line	:	220kV LILO DC line to Punnapra Substation from the existing 220kV Kayamkulam – Pallom DC feeder.
Length of the line to 220kV Punnapra Substation	:	18.666 km

Length of tapping point from Pallom 220kV Substation	:	33.734 km
Length of tapping point from RGCCPP Kayamkulam 220kV Substation	:	12.476 km
Power System details	:	220kV Double Circuit line connecting Kayamkulam (RGCCPP), Punnapra and Pallom 220kV Substations.
Power line details	:	
a) Size of Conductor	:	1) Single Zebra Power Conductor 2) Steel – 7/3.18 mm 3) Aluminium – 54/3.18 4) Overall diameter – 28.62 mm 5) Unit mass – 1621 kg/km
b) Configuration	:	1) Near Vertical 2) Conductor / Phase – 1 3) UTS – 130.32 kN

Permission may please be accorded for the above take off arrangement for the proposed LILO between location no.43 and 44 (from Kayamkulam end) at Veeyapuram, of Kayamkulam – Pallom DC line, owned by PGCIL.

Yours faithfully

Member
(Transmission and Distribution)

Copy forwarded to:

The Member Secretary,
Southern Regional Power Committee,
29, Race Course Cross Road,
Bangalore-560009

ANNEX IV

For kind attention of
Director (SP & PA) / CEA

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

From
The Chief Engineer, Power Systems
APTRANSCO,
Vidyut Soudha,
Hyderabad.

To
The Chief Engineer, SP & PA
CEA
Seva Bhavan R.K.Puram
Sector -I, New Delhi
Vidyut Soudha / Hyderabad.

Lr.No. CE/PS/SESP/DESS/D.No. 122 /2010, Dt. 16-08-2010.

Sir,

Sub: - Agenda Points of AP, to be included in the 31st standing committee - Reg.

* * *

It is requested that the following schemes may be included in the 31st standing committee.

1. It was proposed that a power plant of 600 MW of RTPP will be coming up in stage IV. In this context it is proposed to have the evacuation facilities by inter connecting to the 400 kV Gooty SS of PGCIL. The 400 kV DC Twin Moose line will be erected by APTRANSCO.
2. It was proposed for erection of 400/220 kV SS at Nirmal (Adilabad District) to meet all the loads of this area, and to relieve the over loadings of the Ramgundam ICTs. In this context it is proposed that substation will be erected by APTRANSCO duly interlinking the existing 400 kV Ramagundam Chandrapur DC line by making LILO arrangements.

This is for favour of taking up further necessary action to include in the upcoming standing committee, as the matter is most urgent.

CHIEF ENGINEER/POWER SYSTEMS