पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)
पावरग्रिड
केन्द्रीय कार्यालयः "सौदामिनी" प्लॉट सं. 2, सैक्टर–29, गुडगाँव–122 001, (हरियाणा) दूरभाषः 0124-2571700-719, फैक्स : 0124-2571762
"Saudamini" Plot No. 2, Sector-29, Gurgaon-122 001, (Haryana) Tel. : 0124-2571700-719, Fax : 0124-2571762, Web.: www.powergridindia.com

CP/RTI /2014/41

Date: 31st July, 2014

Smt. Shweta Narayan,
No. 92, 3rd Cross,
Thiruvalluvar Nagar,
Besant Nagar,
Chennai-600090

Sub: **Information under Right to Information Act, 2005.**

Dear Madam,

This is in continuation to our earlier letter dated 13th June, 2014 forwarding reply against RTI request and your appeal dated 2nd July, 2014 under RTI Act, 2005.

In this regard, it may please be mentioned that the information sought is available at CEA and POWERGRID websites. However, only CEA's website was mentioned in our earlier letter dated 13.6.2014 and POWERGRID's website was left out to mention inadvertently. The information sought related to study report may please be looked at POWERGRID website (www.powergridindia.com→ Quick Links→LTOA details). A copy of the information is also attached herewith.

Thanking you,

भवदीय,

(सुधीर मित्तल) 31.7.14

महाप्रबंधक (के.आ.) एवं के.लो.सू.अधिकारी

Attach: As above

Annexure – I

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

No. 51/4/SP&PA-2009/ 529-538 **Date: June 05, 2009**

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: **28th meeting** of the Standing Committee on Power System Planning of Southern Region - Agenda Note and notice for the meeting.

Sir,

The **28th meeting** of the Standing Committee on Power System Planning of Southern Region would be held on **15th June 2009 (Monday)** at 10:00 AM at Orange County, Karadigodu Post, Siddapur, Coorg, Karnataka.

Agenda note for the meeting is available at CEA's website, **www.cea.nic.in**.

Please make it convenient to attend the meeting.

Yours faithfully,

(Ravinder)
Chief Engineer (SP&PA)
(Telephone/FAX No. 011 26102045)

Contact Person and Meeting Venue Details

28th Meeting of
Standing Committee on Power System Planning in Southern Region (SCPSPSR)

Meeting Time: 10:00 AM. Date: June 15, 2009 (Monday)

The meeting arrangements are being made by POWERGRID.

Venue:
Orange County, Karadigodu Post, Siddapur, Coorg - 571253, Karnataka

Contact Person:
Mr. A. Naga Raju, CM(Comml),
SRTS-II, POWERGRID, 32, Race Course Road, Bangalore

Telefax: 080-22206201
Mobile Phone: 9449599005

Email: anagaraju123@rediffmail.com

Please Note:

- Powergrid has informed that accommodation at the venue has been arranged for 14th A/N to 16th Noon

- The participants have to come to Mysore(Railhead) and from there proceed by road to the venue.
- Transport would be tied up from Mysore by POWERGRID

AGENDA NOTE

Agenda Note for 28th Meeting of Standing Committee on Power System Planning in Southern Region (SCPSPSR)

Time: 10:00 AM. Date: June 15, 2009 (Monday)
Venue: Orange County, Karadigodu Post, Siddapur, Coorg, Karnataka

1.0 Confirmation of the minutes of 27th meeting of the Standing Committee

1.1 Minutes of 27th meeting of the Standing Committee on Power System Planning of Southern Region, held on 03rd March 2009 at Bangalore, were issued vide CEA's letter number 51/4/SP&PA-2009/ 246-255 dated March 17, 2009.

1.2 Director(Transmission), KPTCL, vide his letter no KPTCL/CEE(P&C)/KCO-97/9055/2008-09 dated March 20, 2009, has given observation regarding the issues of the Gooty-Yelahanka 400kV line and transmission system for Yeramas/Edlapur projects.(refer para 8.1 and 8.3 of the minutes)

1.3 Based on the observation of KPTCL, a corrigendum to the minutes was issued vide CEA letter number 51/4/SP&PA-2009/ 285-294 dated April 02, 2009(enclosed at Appendix-I)

1.4 The Minutes as circulated and amended as per above corrigendum may be confirmed.

2.0 Status of Under Construction / Approved Schemes:

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

2.2 State utilities may also inform the progress on their transmission works that are necessary to match with the regional schemes by POWERGRID for effective utilization of the system.

3.0 Transmission System for Evacuation of Power from Yeramaras(2x800 MW)& Edlapur (1x800 MW) Generation projects of KPCL near Raichur in Karnataka:

3.1 Further to the discussions in the 27th meeting of the Standing Committee on Power System Planning of Southern Region, system studies were carried out in CEA during 30th March - 2nd April 2009 with participation of officers from CEA, PGCIL and KPTCL for the following transmission systems: (**A copy of the Study Report is given at Annex-II.**)

- Evacuation of Yeramaras(2x800 MW)& Edlapur (1x800 MW) of KPCL near Raichur TPS.
- Establishing connectivity to proposed 400 kV Yelahanka sub station Additional ISTS In-feed for Bangalore.
- Strengthening/Restructuring of Bangalore 400 kV ring arrangement.

These studies were carried out for the time frame of 2014-15. PGCIL informed that they have received new proposals from prospective power producers in Southern Region, mainly in Tamil Nadu and Andhra Pradesh, seeking Long Term Open Access(LTOA) for evacuation and transmission of their power within Southern Region and for export outside the Region. The transmission system for these new generation projects would depend upon the actual commitment by the developers for BPTA, actual progress of the generation project and identification of beneficiaries for the project. During the course of these joint studies and broad transmission corridors were identified for the purpose of LTOA for these projects. These corridors were taken into account while evolving above mentioned transmission systems. The new proposals of IPP generations coming in the Tamilnadu /Andhra Pradesh coastal area generations and their ensuing transmission systems, therefore, were not specifically represented in the present studies. However, outcome of these studies would be dovetailed in the studies being carried out specifically for evolving the transmission system for providing LTOA to these generation projects, which would also be taken up under LTOA Agenda items at the end of this meeting.

3.2 The Edlapur (1x800MW) and Yeramaras (2x800MW) projects of KPCL would be commissioned during 2013-15 time period. The Edlapur (1x800MW) project was being located adjacent to the existing Raichur TPS (RTPS) and the Yeramaras (2x800MW) project about 6 km from the existing RTPS project. Considering the PGCIL's observation during the 27th meeting of SCPSP, studies were revised simulating exact connectivity for RTPS, Raichur (new) 765/400kV and Gooty substation. Results of the studies are given at Exhibit-I(a) (base case) and Exhibit-I(b) through Exhibit-I(e) (outage cases) of the 'Study Report.

3.3 Based on the studies following transmission system was arrived as a transmission system for evacuation of the proposed Yeramaras and Edlapur generation.

(i) Edlapur(1x800MW), being located adjacent to the RTPS project, will be connected to RTPS switchyard through extended bus arrangement.
(ii) Yeramaras (2x800MW) – Raichur(New)765/400kV (PGCIL) Sub-station, 400kV Quad D/C line.
(iii) Basavana Bagewadi 400/220kV 2x315 MVA S/S
(iv) Yeramaras - Basavana Bagewadi 400 kV Quad D/C line
(v) Basavana Bagewadi – Narendra 400 kV Twin D/C line

3.4 The above system would be implemented by KPTCL as transmission scheme for evacuation of power from Yeramaras(2x800MW & Edlapur (1x500 MW) generation projects in the time-frame matching with the commissioning schedule of these projects.

3.5 Members may discuss and agree.

4.0 Establishing connectivity to Yelahanka 2X500 MVA, 400/220 kV S/S and Additional ISTS In-feed for Bangalore

4.1 During the 27th meeting of the SCPSP Southern Region, following connectivity for Yelahanka 400/220kV S/S of PGCIL, have been agreed.

(i) LILO of Nelamangala - Hoody 400kV S/C line at Yelahanka 400/220kV S/S
(ii) LILO of Somanahalli – Hoody 400 kV S/C line at Yelahanka 400/220kV S/S.

The Yelahanka - Hiriyur 400kV D/C is already being taken up by KPTCL as a part of Bellary TPS evacuation system. Regarding the Gooty – Yelahanka 400 kV D/C link and additional in-feed for Bangalore, studies were carried out considering two network configurations. Alternative-I is based on the system earlier planned/proposed in the 27th meeting of the SCPSP SR and Alternative-II based on optimization of configuration considering possible transmission system for providing LTOA to new projects in Tamil Nadu.

4.2 **Alternative-I** :
Based on the system earlier planned/proposed in the 27th meeting of the SCPSP SR. The load flow study results are given at Exhibit-II(a) of 'Study Report'.

(i) Gooty-Yelahanka 400kV D/C line – **to be implemented by PGCIL**
(ii) Hosur – Electronic City 400kV D/C line – **to be implemented by PGCIL**
(iii) Hiriyur - Yelahanka 400kV D/C line – **to be implemented by KPTCL**
(iv) Jindal TPS – Gooty 400kV D/C line – **to be implemented by the IPP as Dedicated Transmission line.**(Jindal TPS – Munirabad 400kV D/C option was also studied and results are given at Exhibit-II(b))

4.3 **Alternative-II** :
As, discussed above, during interaction with PGCIL for planning transmission system for evacuation of IPP generation projects coming up in Tamil Nadu and Andhra Pradesh area, it was brought out that a new 765/400kV S/S north of Bangalore and south of Hiriyur would be required during 2014-15. Considering this opportunity, the Gooty – Bangalore 400kV link could be planned via new Hiriyur, as it would be economical, provide better reliability and fits into future system development plans. The load flow study results are given at Exhibit-III(a) through Exhibit-III(e) of the 'Study Report'.

(i) Gooty-Bangalore(New) (proposed new 765/400kV S/S by PGCIL) – **to be implemented by PGCIL.**
(ii) Hosur – Electronic City 400kV D/C line – to be implemented by PGCIL
(ii) Bangalore(New) - Yelahanka 400kV D/C Quad line – **to be implemented by KPTCL**
(iii) Jindal TPS – Gooty 400kV D/C line instead of Jindal TPS-Munirabad 400kV D/C line – **to be implemented by the IPP as Dedicated Transmission line.** (Jindal TPS – Munirabad 400kV D/C option was also studied and results are given at Exhibit-III(b))

4.4 The Hosur – Electronic City 400kV D/C line could be built using Right of Way of the existing Peenya-Singarapet 220kV line(presently Yerandahally-Hosur line). This RoW could be used by building multi-circuit towers and/or dismantling part of the line depending upon practicability.

4.5 The Alternative-II is recommended and may be agreed by the Members of the Standing Committee. The decision regarding connecting Jindal TPS to either Gooty or Munirabad can be taken up during the LTOA agenda discussions later in this meeting

5.0 Strengthening/Restructuring of Bangalore 400 kV Ring Arrangement:

5.1 KPTCL has proposed rearrangement of the 400kV ring around Bangalore to achieve Nelamangala – Yelahanka DC line, Yelahanka – Hoody - Kolar D/C line, Kolar - Electronic City - Somanahalli S/C line and Somanahalli – Bidadi - Nelamangala D/C line.

5.2 Load flow results are given at Exhibit-IV of the 'Study Report'. Members may discuss and agree.

6.0 Transmission System associated with Simhadri-II TPS

6.1 For evacuation of power from the Simhadri-II TPS of NTPC, Simhadri-II – Gazuwaka 400 kV D/C line was inter-alia agreed in the 25th meeting of Standing Committee. POWERGRID has informed that due to growth of residential area in the vicinity, right of way problem and various existing 220 kV and 400 kV existing lines in position, termination of proposed Simhadri-II – Gazuwaka 400 kV D/C line at Gazuwaka was extremely difficult. Also, two numbers of adjacent bays for termination of both circuits were not available at Gazuwaka substation hence these have to be terminated at two opposite ends of the switchyard requiring single circuit line approach from two different sides.

6.2 To overcome this difficulty, any of the following existing lines can be LILOed at the Simhadri-II TPS switchyard by drawing 2x400 kV D/C lines on multi-circuit towers.

- Kalpakka(APTRANSCO) – Gazuwaka(POWERGRID) 400 kV D/C line, or
- Kalpakka – Khammam 400kV D/C line, or
- Gazuwaka – Vemagiri 400kV D/C line

This would require 2 numbers of additional 400kV bays at the Simhadri-II switchyard of NTPC, though; the total number of 400 kV bays would remain same as originally proposed.

6.3 Members may discuss and decide accordingly.

7.0 Transmission System Associated with Cheyyur UMPP in Tamil Nadu 4000 MW

7.1 Cheyyur UMPP (TNUMPP) at Cheyyur Taluk, Kanchipuram District, Tamil Nadu is being taken up by Coastal Tamil Nadu Power Ltd, an SPV company of PFC. They have applied to POWERGRID seeking Long Term Open Access for evacuation and transmission of power from the project to its beneficiaries. Following is the allocation of power from this UMPP:

Southern Region (2900 MW):		
Tamil Nadu	-	1600 MW
Karnataka	-	800 MW
Andhra Pradesh	-	400 MW
Kerala	-	300 MW
Western Region (400 MW):		
Maharashtra	-	400 MW
Northern Region (500 MW):		
Utter Pradesh	-	300 MW
Punjab	-	200 MW

7.2 The project is expected to be commissioned during 2015-17. Transmission system for this project is presently proposed to be implemented by private developer selected through tariff based competitive bidding process.

7.3 POWERGRID has carried out the studies for evolving transmission system for evacuation of power from this project and are included as part of the LTOA agenda circulated by them. The studies were reviewed by CEA and accordingly, following transmission system is proposed for the Cheyyur UMPP:

1. Stepping up of power at TNUMPP to 765kV
2. TNUMPP – Tiruvalam 765kV 2xS/C or D/C line
3. LILO of Cuddalore Pooling Point – Tiruvalam 765kV S/C line at TNUMPP
4. Tiruvalam – Kurnool 765kV S/C line
5. Kurnool – Raichur 765kV 2xS/C or D/C line
6. Cuddalore – Salem 765kV S/C line

7.4 The transmission charges for the above transmission system would be borne by the beneficiaries of the UMPP as per CERC regulations. Members may discuss and agree for the transmission finalised accordingly.

8.0 Issues pertaining to Tamil Nadu Electricity Board:

8.1.0 During the 27th meeting of this Committee, the issue of setting up a 765/400/220kV sub-station by TNEB/POWERGRID came up for discussion while discussing the transmission system for Vallur TPS and NCTPS-II projects. Refer para 5(iv)(d) of the minutes:

Para 5(iv)(d):
"Regarding new 400/220kV S/S at Tiruvalam the final decision could not be taken. TNEB stated that they had extra land at their 220kV Tiruvalam S/S for building their own 400kV S/S. CEA observed that CEA was examining the feasibility of establishment of 765kV S/S at Tiruvalam as part of ATS for TNUMPP and the proposed 400/220 kV S/S could be implemented as part of 765/400/230kV S/S in order to economise the overall cost. **TNEB would study and revert.**"

8.1.1 TNEB vide their letter dated 22-04-2009 have informed following conclusion:
"Since conception of 765kV S/S will take longer time, TNEB could initially establish the 400/230kV S/S to match with the commissioning schedule of the NCTPS-II and Vallur JV projects. Later, the 765kV side could be executed by PGCIL in the same premises in such a way that 400/230kV S/S owned by TNEB will be part of the 765kV S/S. In this connection, as discussed in the standing committee meeting, TNEB has initiated the process of identifying the land at Tiruvalam suitable for establishment of 765/400/230kV S/S"

8.1.2 TNEB may inform about current status of land procurement/identification. Members may discuss and finalise the configuration/ownership of 765/400/230kV S/S(s) at Tiruvalam.

8.2.0 During the 27th meeting of this Committee, following proposals of TNEB, to be executed by them, were taken up for discussion:

- Establishment of 400/230kV S/S at Singarapet with 2x315 MVA ICT.
- Hosur – Singarapet 400kV DC line with twin moose conductor.
- LILO of both the circuits of Pugalur – Ottiampakkam (Sholinganallur) 400kV DC Quad line at Singarapet 400kV S/S with Quad Conductor.

8.2.1 Considering the requirement of transmission system for export of power outside Tamil Nadu, the Hosur-Singarapet 400kV D/C line was not agreed upon. Refer para 7.2(iii) & (iv) of the minutes:

Para 7.2:

(iii) During the discussions in the 25th meeting, POWERGRID stated that with commissioning of new generation projects TNEB would be surplus in power and would be utilizing ISTS to transfer the surplus to other constituents within and across the Southern region, therefore, TNEB should seek long term open access for utilization of ISTS for new generation projects planned for development under State sector.

(iv) CEA advised TNEB, that before agreeing to Hosur-Singarapet 400 kV DC line, they should estimate the quantity of surplus power (in consultation with the wind generators) to be injected into the SR grid. Accordingly, they should approach POWERGRID for long-term Open access from Tamil Nadu to SR so that ISTS could be planned for the same. TNEB agreed for the same and the proposal of 400 kV Hosur-Singarapet D/C line would be considered in the next meeting.

8.2.2 TNEB vide their letter dated 22-04-2009 have informed that:

a) TNEB would execute the above mentioned schemes on its own.
b) TNEB is in the process of assessing the net quantum of power to be injected into SR grid taking into account of all the proposed power projects in Tamilnadu, allocation of power to Tamilnadu from the up coming projects in other states of SR, proposed capacity addition of wind power and anticipated load growth. TNEB will apply for LTOA with PGCIL on assessment of the above.

8.2.3 Members may discuss.

9.0 LTOA Applications Made to CTU for Projects in Southern Region:

POWERGRID may take up the agenda points related to the transmission system requirements for evacuation of power from generation projects.

Appendix-I

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

No. 51/4/SP&PA-2009/ 285-294 **Date: April 02, 2009**

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: 27th meeting of the Standing Committee on Power System Planning of Southern Region - Minutes of the meeting – **Issuing of Corrigendum**

Sir,

Minutes of 27th meeting of the Standing Committee on Power System Planning of Southern Region were issued vide our letter of even number dated 17-03-2009. KPTCL has given their observation regarding the Gooty-Yelahanka 400kV line and transmission system for Yeramas/Edlapur projects. Based on the observation of KPTCL, a corrigendum of the minutes of 27th meeting is enclosed at Annex-I.

Yours faithfully,

Encl: Corrigendum to 27th Minutes

(Pardeep Jindal)
Deputy Director (SP&PA)
(Telephone No. 011 26732325)

Annex – I

Standing Committee on Power System Planning of Southern Region (SCPSP SR)

Corrigendum to Minutes of the 27th Meeting of the Standing Committee on Power System Planning of Southern Region held on March 03, 2009 at Bangalore

Minutes of 27th meeting of the Standing Committee on Power System Planning of Southern Region were issued vide our letter of even number dated March 17, 2009. Director(Transmission), KPTCL, vide letter no KPTCL/CEE(P&C)/KCO-97/9055/2008-09 dated March 20, 2009, has given observation regarding the issues of the Gooty-Yelahanka 400kV line and transmission system for Yeramas/Edlapur projects..

Based on the observation of KPTCL, following changes are made in the Minutes of 27th meeting of the Standing Committee on Power System Planning of Southern Region:

(1) **Para 8.1:**

Following new Para 8.1.1 is inserted under Para 8.1:

8.1.1 Regarding the Gooty-Yelahanka 400kV D/C line for giving connectivity for PGCIL's Yelahanka 400kV S/S, KPTCL stated that concentrating more power at Gooty could result in heavy disruption of Bangalore load under the event of a bus-fault at Gooty 400kV S/S. SRLDC also apprehended that a bus fault at Gooty could make grid venerable to grid failure. Member(PS), CEA stated that, Planning Criteria envisages a SLG fault cleared and line restored from security angle. Further bus-fault occurring in a breaker-and-half arrangement can only happen in the event of implementing the protection system. Provisions to avoid a bus-fault are to be designed through appropriate protection scheme and operational practices. PGCIL also stated that as per the Planning Criteria bus-fault need not be considered for transmission planning. After further discussions it was decided that revised studies would be jointly conducted by CEA, PGCIL and KPTCL at a mutually convenient date in CEA and thereafter the proposal would be taken up in the next Standing Committee meeting."

(2) **Para 8.3:**

Para 8.3 is replaced as given below:

"The proposal of KPTCL for evacuation of power from Yeramas /Edlapur (2x800 + 1x800 MW) and augmentation of power injection to Bangalore main.

The agenda items were discussed and PGCIL representative expressed the concern about de-linking of RTPS-Gooty line for connecting Yeramas with Gooty in view of 400kV connectivity for 765kV Raichur (PGCIL) S/S. Considering PGCIL's opinion and KPTCL's concerns about providing additional connectivity from Gooty as given in Para 8.1.1 above, it was decided that revised studies would be conducted joint by CEA, PGCIL and KPTCL at mutual convenient date in CEA and thereafter the proposal would be taken up in the next Standing Committee meeting."

Appendix-II

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

No. 51/4/SP&PA-2009/ 389-390 **Date: April 23, 2009**

To

1. **Director (Transmission)**
   Karnataka Power Transmission Corporation Limited,
   Kaveri Bhavan,
   Bangalore-560009.

2. **General Manager(Engg-SEF),**
   Powergrid Corporation of India Ltd.,
   "Saudamini", Plot No. 2, Sector-29,
   Gurgaon – 122001, Haryana.

Subject: Transmission System for additional interconnection to proposed 400 kV sub-station at Yelahanka, evacuation of Power from Generation Projects in Karnataka and Ring Mains around Bangalore.

Sir,

Further to the discussions in the 27th meeting of the Standing Committee on Power System Planning of Southern Region, held on 3rd march 2009. System studies were carried out in CEA during 30th March-2nd April 2009 with participation of officers from CEA, PGCIL and KPTCL, for evolving transmission system for the following items:

1. Transmission System for Evacuation of Power from Yeramaras(2x800 MW) and Edlapur (1x800 MW) of KPCL near Raichur TPS.

2. Establishing connectivity to proposed 400 kV Yelahanka sub station. Additional connectivity to 400 kV SS at Electronic City in Bangalore

3. Strengthening/Restructuring of Bangalore 400 kV Ring Arrangement

Yours faithfully,

(Pardeep Jindal)
Director (SP&PA)
(Tel. No. 011 26732325)

Annex-I

REPORT ON STUDIES CARRIED OUT IN CEA FOR STRENGTHENING/ EVOLVING TRANSMISSION SYSTEM REQUIREMENTS IN KARNATAKA

1.0 Scope of Studies:

Further to the discussions in the 27th meeting of the Standing Committee on Power System Planning of Southern Region, system studies were carried out in CEA during 30th March - 2nd April 2009 with participation of officers from CEA, PGCIL and KPTCL for the following transmission systems:

- Evacuation of Yeramaras(2x800 MW)& Edlapur (1x800 MW) of KPCL near Raichur TPS.
- Establishing connectivity to proposed 400 kV Yelahanka sub station Additional ISTS In-feed for Bangalore.
- Strengthening/Restructuring of Bangalore 400 kV ring arrangement.

2.0 Basis for Studies:

The studies were carried out for the time frame of 2014-15. PGCIL informed that they have received new proposals from prospective power producers in Southern Region, mainly in Tamil Nadu and Andhra Pradesh, seeking Long Term Open Access(LTOA) for evacuation and transmission of their power within Southern Region and for export outside the Region. The transmission system for these new generation projects would depend upon the actual commitment by the developers for BPTA, actual progress of the generation project and identification of beneficiaries for the project. A suitable transmission system for these projects is still under planning stage, which was discussed during the course of these joint studies and broad transmission corridors were identified for the purpose of LTOA for these projects. These corridors were taken into account while evolving transmission systems mentioned under 'Scope' above of this report. The new proposals of IPP generations coming in the Tamilnadu /Andhra Pradesh coastal area generations and their ensuing transmission systems, therefore, were not specifically represented in the present studies. However, outcome of the present studies would be dovetailed in the studies being carried out specifically for evolving the transmission system for providing LTOA to these generation projects.

3.0 Transmission System for Evacuation of Power from Yeramaras(2x800 MW)& Edlapur (1x800 MW) Generation projects of KPCL near Raichur in Karnataka:

3.1 Considering the PGCIL's observation during the 27th meeting of SCPSP, studies were revised simulating exact connectivity for RTPS, Raichur (new) 765/400kV and Gooty substation.

3.2 KPTCL informed that these units would be commissioned during 2013-15 time period. Accordingly, studies were carried out for 2014-15 conditions. They also informed that the Edlapur (1x800MW) project was being located adjacent to the existing Raichur TPS (RTPS) and the Yeramaras (2x800MW) project about 6 km from the existing RTPS project.

3.3 Based on the studies following transmission system was arrived as a transmission system for evacuation of the proposed Yeramaras and Edlapur generation.

(i) Edlapur(1x800MW), being located adjacent to the RTPS project, will be connected to RTPS switchyard through extended bus arrangement.
(ii) Yeramaras (2x800MW) – Raichur(New)765/400kV (PGCIL) Sub-station, 400kV Quad D/C line.
(iii) Basavana Bagewadi 400/220kV 2x315 MVA S/S
(iv) Yeramaras - Basavana Bagewadi 400 kV Quad D/C line
(v) Basavana Bagewadi – Narendra 400 kV Twin D/C line

3.4 The above system would be implemented by KPTCL as transmission scheme for evacuation of power from Yeramaras(2x800MW & Edlapur (1x500 MW) generation projects in the time-frame matching with the commissioning schedule of these projects.

3.5 Results of the studies are given at Exhibit-I(a) (base case) and Exhibit-I(b) through Exhibit-I(e) (outage cases). Over loading is observed under outage of Raichur-Sholapur 765kV S/C line, which need to be addressed while planning additional inter-regional transmission capacity under LTOA projects.

4.0 Establishing connectivity to Yelahanka 2X500 MVA, 400/220 kV S/S and Additional ISTS In-feed for Bangalore

4.1 During the 27th meeting of the SCPSP Southern Region, following connectivity for Yelahanka 400/220kV S/S of PGCIL, have been agreed.

(i) LILO of Nelamangala - Hoody 400kV S/C line at Yelahanka 400/220kV S/S
(ii) LILO of Somanahalli – Hoody 400 kV S/C line at Yelahanka 400/220kV S/S.

4.2 The Yelahanka - Hiriyur 400kV D/C is already being taken up by KPTCL as a part of Bellary TPS evacuation system.

4.3 For the 220kV interconnections of Yelahanka with KPTCL grid, a 220kV Double LILO of Nelamangala – DB Pura line, LILO of Nelamangala – Hoody line and Peenya- Hebbal 220kV S/C line and a 220kV D/C line to proposed DG Plant was considered.

4.4 Regarding the Gooty – Yelahanka 400 kV D/C link and additional in-feed for Bangalore, studies were carried out considering two network configurations. Alternative-I is based on the system earlier planned/proposed in the 27th meeting of the SCPSP SR and Alternative-II based on optimization of configuration considering possible transmission system for providing LTOA to new projects in Tamil Nadu

4.5 **Alternative-I** :
Based on the system earlier planned/proposed in the 27th meeting of the SCPSP SR. The load flow study results are given at Exhibit-II(a).

(i) Gooty-Yelahanka 400kV D/C line – **to be implemented by PGCIL**
(ii) Hosur – Electronic City 400kV D/C line – **to be implemented by PGCIL**
(iii) Hiriyur - Yelahanka 400kV D/C line – **to be implemented by KPTCL**

(iv) Jindal TPS – Gooty 400kV D/C line – **to be implemented by the IPP as Dedicated Transmission line.**(Jindal TPS – Munirabad 400kV D/C option was also studied and results are given at Exhibit-II(b))

4.6 **Alternative-II** :
As, discussed above, during interaction with PGCIL for planning transmission system for evacuation of IPP generation projects coming up in Tamil Nadu and Andhra Pradesh area, it was brought out that a new 765/400kV S/S near Hiriyur would be required during 2014-15. Considering this opportunity the Gooty – Bangalore 400kV link could be planned via new Hiriyur, as it would be economical, provide better reliability and fits into future system development plans. **Accordingly, following network configuration was studied and is recommended in this report.** The load flow study results are given at Exhibit-III(a).

(i) Gooty-Hiriyur(New) (proposed new 765/400kV S/S by PGCIL) – **to be implemented by PGCIL.**
(ii) Hosur – Electronic City 400kV D/C line – to be implemented by PGCIL
(ii) Hiriyur(New) - Yelahanka 400kV D/C Quad line – **to be implemented by KPTCL**
(iii) Jindal TPS – Gooty 400kV D/C line instead of Jindal TPS-Munirabad 400kV D/C line – **to be implemented by the IPP as Dedicated Transmission line.** (Jindal TPS – Munirabad 400kV D/C option was also studied and results are given at Exhibit-III(b))

4.7 Results of the outage case studies are given at Exhibit-III(c) through Exhibit-III(e).

4.8 The Hosur – Electronic City 400kV D/C line could be built using Right of Way of the existing Peenya-Singarapet 220kV line(presently Yerandahally-Hosur line). This RoW could be used by building multi-circuit towers and/or dismantling part of the line depending upon practicability.

5.0 Strengthening/Restructuring of Bangalore 400 kV Ring Arrangement:

5.1 KPTCL has proposed rearrangement of the 400kV ring around Bangalore to achieve Nelamangala – Yelahanka DC line, Yelahanka – Hoody - Kolar D/C line, Kolar - Electronic City - Somanahalli S/C line and Somanahalli – Bidadi - Nelamangala D/C line.

5.2 Load flow results are given at Exhibit-IV.

6.0 Conclusion:

The above proposals may be taken up for discussion during next meeting of the Standing Committee on Power System Planning of Southern Region. PGCIL would consider the transmission system identified and recommended above while planning the transmission system for the new generation projects seeking LTOA.

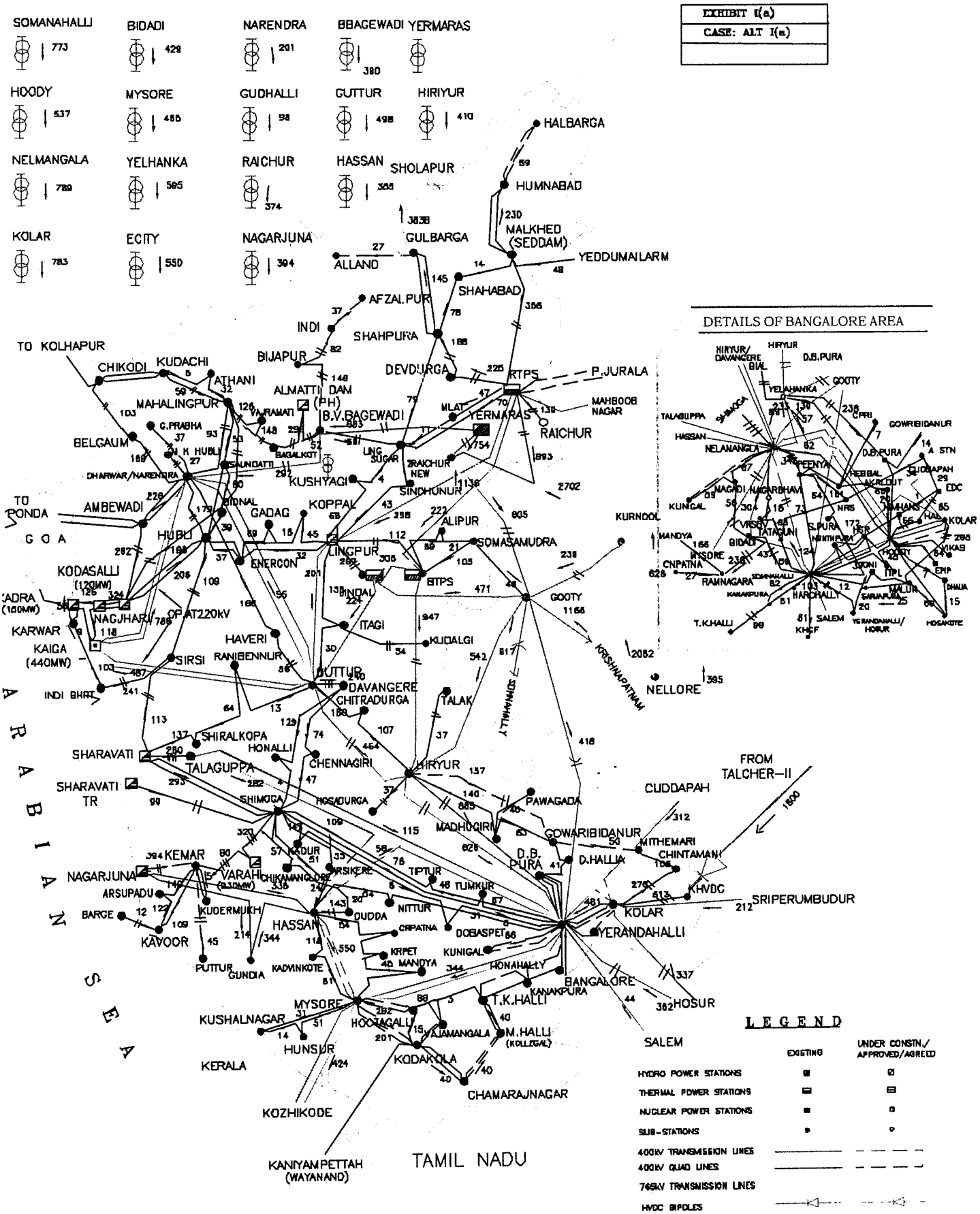
EXHIBIT I(a)
CASE: ALT I(a)
SOMANAHALLI
BIDADI
NARENDRA
BBAGEWADI
YERMARAS
HOODY
MYSORE
GUDHALLI
GUTTUR
HIRIYUR
NELMANGALA
YELHANKA
RAICHUR
HASSAN
SHOLAPUR
KOLAR
ECITY
NAGARJUNA
HALBARGA
HUMNABAD
MALKHED (SEDDAM)
YEDDUMAILARM
GULBARGA
ALLAND
AFZALPUR
SHAHABAD
INDI
SHAHPURA
TO KOLHAPUR
BIJAPUR
DEVDURGA
RTPS
P.JURALA
CHIKODI
KUDACHI
ATHANI
ALMATTI DAM (PH)
MAHALINGPUR
B.V.BAGEWADI
YERMARAS
MAHBOOB NAGAR
RAICHUR
BELGAUM
G.PRABHA
N.K.HUBLI
SAUNDATTI
BAGALKOT
LNG SUGAR
RAICHUR NEW
SINDHUNUR
DHARWAR/NARENDRA
KUSHTAGI
TO PONDA
AMBEWADI
BIDNAL
GADAG
KOPPAL
ALIPUR
KURNOOL
G O A
HUBLI
LINGPUR
SOMASAMUDRA
ENERCON
BTPS
KODASALLI (120MW)
GOOTY
NAGJHARI
OPAT220kV
ITAGI
KUDALGI
KARWAR
HAVERI
KAIGA (440MW)
SIRSI
RANIBENNUR
KRISHNAPATNAM
NELLORE
DAVANGERE
CHITRADURGA
TALAK
INDI BHRT
SHIRALKOPA
HONALLI
SHARAVATI
CHENNAGIRI
HIRIYUR
TALAGUPPA
SHARAVATI TR
SHIMOGA
HOSADURGA
PAWAGADA
MADHUGIRI
FROM TALCHER-II
CUDDAPAH
GOWARIBIDANUR
MITHEMARI
CHINTAMANI
D.B. PURA
D.HALLIA
KEMAR
NAGARJUNA
VARAHI (460MW)
CHIKAMAGALORE
ARSIKERE
TIPTUR
TUMKUR
KHVDC
SRIPERUMBUDUR
ARSUPADU
KUDERMUKH
NITTUR
KOLAR
BARGE
HASSAN
DUDDA
CRPATNA
DOBASPET
YERANDAHALLI
KAVOOR
KRIPET
KUNIGAL
PUTTUR
GUNDIA
KADVINKOTE
MANDYA
HONAHALLY
BANGALORE
KANAKPURA
MYSORE
T.K.HALLI
HOSUR
KUSHALNAGAR
HOOTAGALLI
RAJAMANGALA
M.HALLI (KOLLEGAL)
SALEM
HUNSUR
KODAKOLA
KERALA
CHAMARAJNAGAR
KOZHIKODE
KANIYAMPETTAH (WAYANAND)
TAMIL NADU
ARABIAN SEA
DETAILS OF BANGALORE AREA
HIRIYUR/ DAVANGERE
BVAL
D.B.PURA
GOOTY
YELAHANKA
CPRI
GOWRIBIDANUR
TALAGUPPA
HASSAN
NELAMANGLA
PEENYA
HEBBAL
NAGADI
NAGARBHAVI
KRCLOUT
KUNGAL
VRSGT
S.PURA
TATAGUNI
HGR
MANDYA
BIDADI
MYSORE
CNPATNA
RAMNAGARA
KANAMPURA
HAROHALLY
T.K.HALLI
SALEM
KHSF
YERANDAHALLI/ HOSUR
HOSAKOTE
KOLAR
LEGEND
EXISTING
UNDER CONSTN./ APPROVED/AGREED
HYDRO POWER STATIONS
THERMAL POWER STATIONS
NUCLEAR POWER STATIONS
SUB-STATIONS
400kV TRANSMISSION LINES
400kV QUAD LINES
765kV TRANSMISSION LINES
HVDC BIPOLES

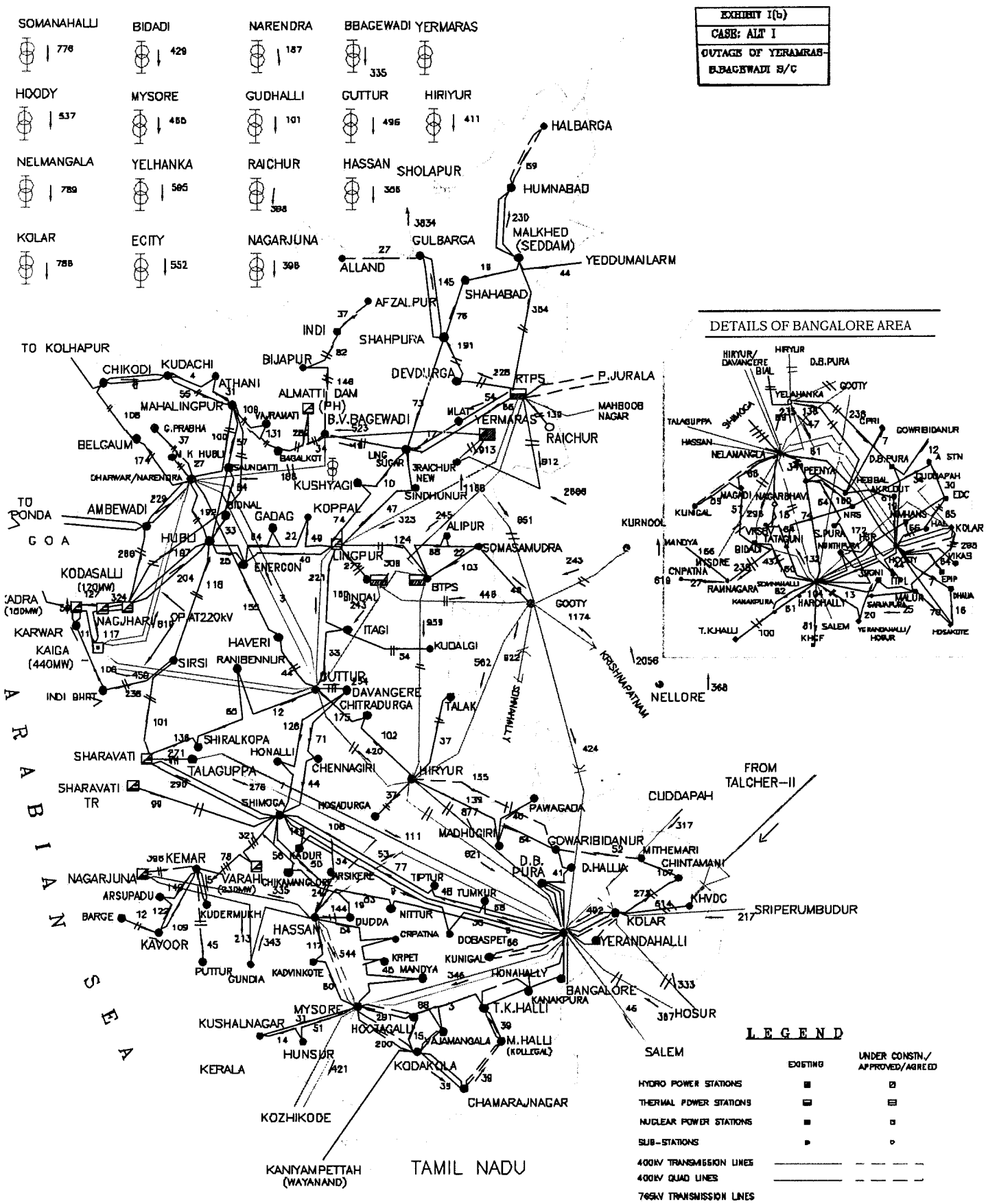
EXHIBIT I(b)
CASE: ALT I
OUTAGE OF YERAMRAS-B.BAGEWADI S/C
SOMANAHALLI
BIDADI
NARENDRA
BBAGEWADI
YERMARAS
HOODY
MYSORE
GUDHALLI
GUTTUR
HIRIYUR
NELMANGALA
YELHANKA
RAICHUR
HASSAN
SHOLAPUR
KOLAR
ECITY
NAGARJUNA
HALBARGA
HUMNABAD
MALKHED (SEDDAM)
YEDDUMAILARM
GULBARGA
ALLAND
AFZALPUR
SHAHABAD
INDI
SHAHPURA
BIJAPUR
DEVDURGA
RTPS
P.JURALA
TO KOLHAPUR
CHIKODI
KUDACHI
ATHANI
ALMATTI DAM (PH)
MAHALINGPUR
B.V.BAGEWADI
YERMARAS
MAHBOOB NAGAR
RAICHUR
BELGAUM
G.PRABHA
N.K.HUBLI
BAGALKOT
LNG SUGAR
JRAICHUR NEW
SINDHUNUR
DHARWAR/NARENDRA
KUSHYAGI
TO PONDA
AMBEWADI
GOA
BIDNAL
GADAG
KOPPAL
HUBLI
ENERCON
LINGPUR
ALIPUR
SOMASAMUDRA
KODASALLI (120MW)
BTPS
BINDAL
GOOTY
KURNOOL
NAGJHARI
OPAT220kV
ITAGI
KUDALGI
KARWAR
KAIGA (440MW)
HAVERI
SIRSI
RANIBENNUR
GUTTUR
DAVANGERE
CHITRADURGA
TALAK
INDI BHRT
SHIRALKOPA
SHARAVATI
HONALLI
CHENNAGIRI
HIRIYUR
TALAGUPPA
SHARAVATI TR
SHIMOGA
HOSADURGA
PAWAGADA
MADHUGIRI
GOWARIBIDANUR
CUDDAPAH
FROM TALCHER-II
MITHEMARI
CHINTAMANI
D.HALLIA
D.B. PURA
KEMAR
NAGARJUNA
VARAHI (230MW)
CHIKAMANGLORE
ARSIKERE
TIPTUR
TUMKUR
KHVDC
SRIPERUMBUDUR
ARSUPADU
BARGE
KUDERMUKH
NITTUR
DUDDA
HASSAN
KOLAR
KAVOOR
CRPATNA
DOBASPET
YERANDAHALLI
PUTTUR
GUNDIA
KADVINKOTE
KRPET
MANDYA
KUNIGAL
HONAHALLY
BANGALORE
KANAKPURA
T.K.HALLI
HOSUR
MYSORE
KUSHALNAGAR
HOOTAGALLI
HUNSUR
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KERALA
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SOMANALLY
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NAGADI
NAGARBHAVI
KOLAR
KUNIGAL
MANDYA
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CNPATNA
RAMNAGARA
BIDADI
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S.PURA
NRS
HOSUR
SALEM
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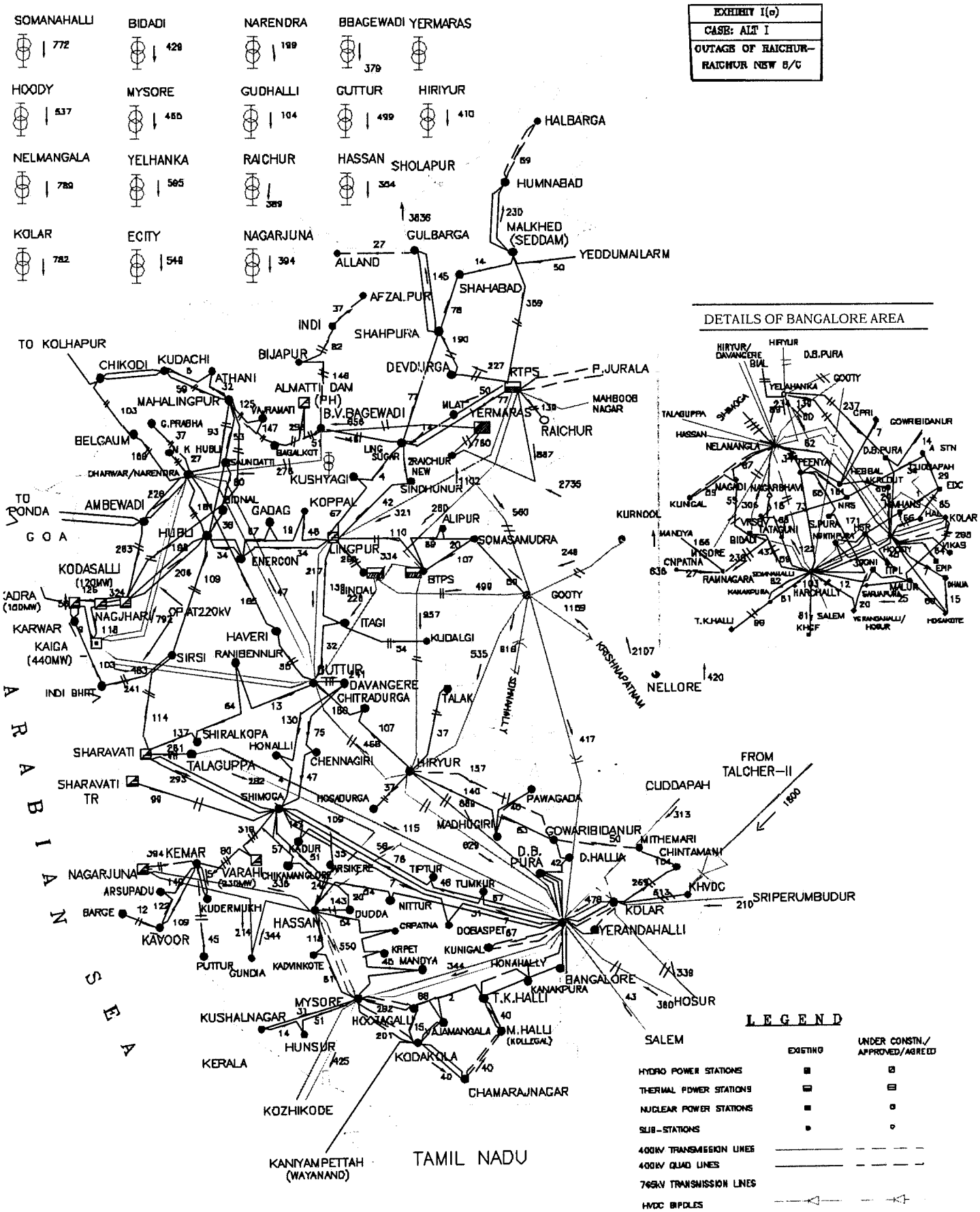
EXHIBIT I(a)
CASE: ALT I
OUTAGE OF RAICHUR-RAICHUR NEW S/C
SOMANAHALLI
BIDADI
NARENDRA
BBAGEWADI
YERMARAS
HOODY
MYSORE
GUDHALLI
GUTTUR
HIRIYUR
NELMANGALA
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KOLAR
ECITY
NAGARJUNA
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MYSORE
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CPRI
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PEENYA
HEBBAL
NAGADI
NAGARBHAVI
KUNIGAL
NRS
MANDYA
BIDADI
MYSORE
VRSKV
S.PURA
TATAGUNI
NIMHANS
HAL
KOLAR
HOODY
RAMNAGARA
KANAKPURA
HARDHALLI
JIGNI
ITPL
EMP
MALUR
SARJAPURA
T.K.HALLI
SALEM
KHCF
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HOSAKOTE
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400kV QUAD LINES
765kV TRANSMISSION LINES
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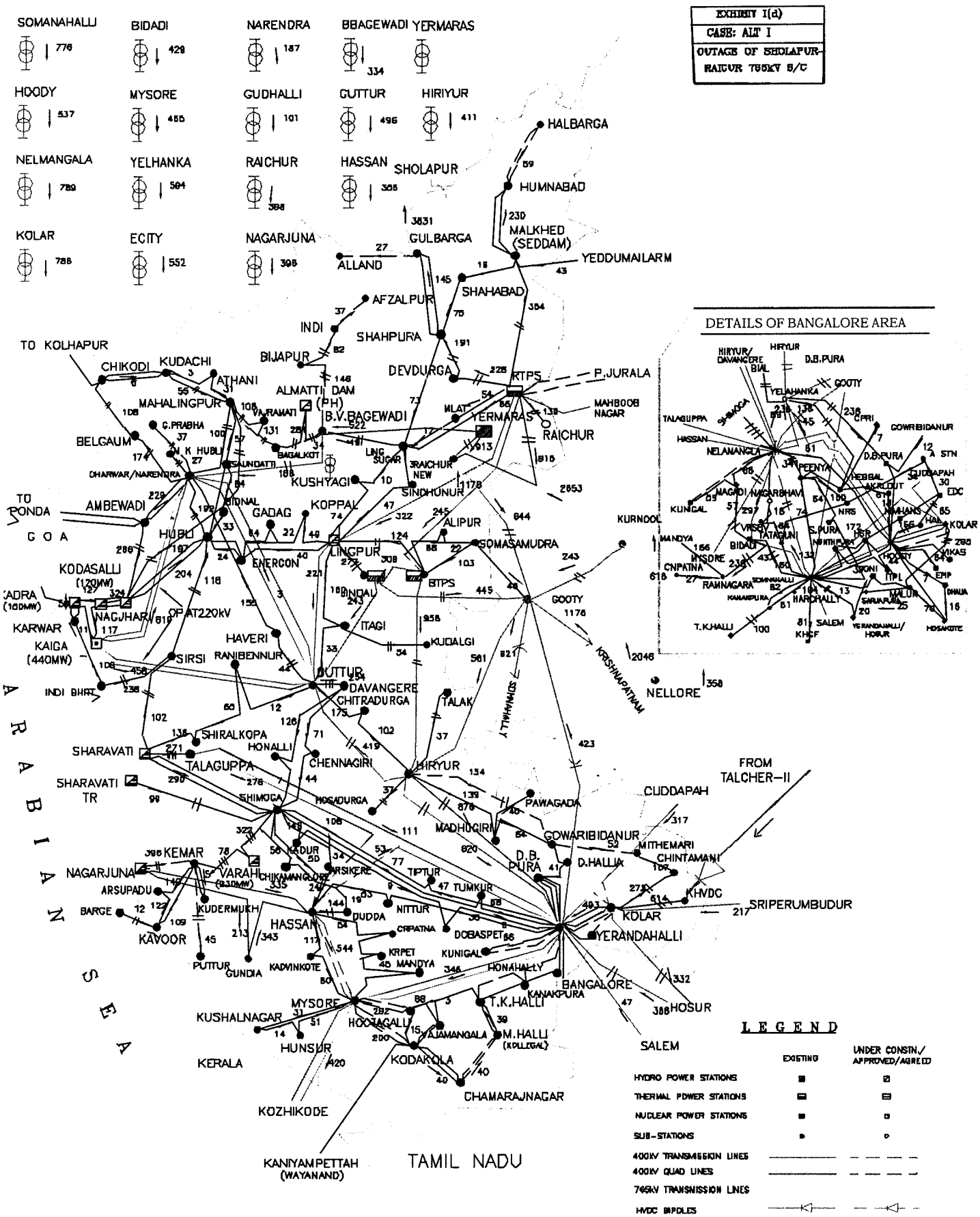
EXHIBIT I(d)
CASE: ALT I
OUTAGE OF SHOLAPUR-RAICUR 765KV S/C
SOMANAHALLI
BIDADI
NARENDRA
BBAGEWADI
YERMARAS
HOODY
MYSORE
GUDHALLI
GUTTUR
HIRIYUR
NELMANGALA
YELHANKA
RAICHUR
HASSAN
KOLAR
ECITY
NAGARJUNA
SHOLAPUR
HALBARGA
HUMNABAD
MALKHED (SEDDAM)
GULBARGA
ALLAND
YEDDUMAILARM
SHAHABAD
AFZALPUR
INDI
SHAHPURA
BIJAPUR
DEVDURGA
RTPS
P.JURALA
MAHBOOB NAGAR
YERMARAS
RAICHUR
B.V.BAGEWADI
ALMATTI DAM (PH)
TO KOLHAPUR
CHIKODI
KUDACHI
ATHANI
MAHALINGPUR
BELGAUM
KUSHYAGI
SINDHUNUR
KOPPAL
GADAG
TO PONDA
AMBEWADI
G O A
HUBLI
ENERCON
LINGPUR
ALIPUR
SOMASAMUDRA
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KODASALLI (120MW)
KADRA (100MW)
KARWAR
KAIGA (440MW)
NAGJHAR
OPAT220kV
BTPS
GOOTY
ITAGI
HAVERI
RANIBENNUR
SIRSI
KUDALGI
INDI BHRT
DAVANGERE
CHITRADURGA
TALAK
NELLORE
KRISHNAPATNAM
SONNAHALLY
SHARAVATI
SHIRALKOPA
HONALLI
CHENNAGIRI
HIRIYUR
SHARAVATI TR
TALAGUPPA
SHIMOGA
HOSADURGA
PAWAGADA
FROM TALCHER-II
CUDDAPAH
MADHUGIRI
GOWARIBIDANUR
MITHEMARI
CHINTAMANI
D.HALLIA
D.B. PURA
KEMAR
NAGARJUNA
VARAHI (230MW)
CHIKAMANGLORE
ARSIKERE
TIPTUR
TUMKUR
KHVDC
SRIPERUMBUDUR
ARSUPADU
BARGE
KUDERMUKH
NITTUR
KOLAR
HASSAN
DUDDA
KAVOOR
CPPATNA
DOBASPET
YERANDAHALLI
PUTTUR
GUNDIA
KADVINKOTE
KRPET
KUNIGAL
MANDYA
HONAHALLY
BANGALORE
KANAKPURA
MYSORE
T.K.HALLI
HOSUR
KUSHALNAGAR
HOOTAGALLI
M.HALLI (KOLLEGAL)
SALEM
HUNSUR
KODAKOLA
KERALA
CHAMARAJNAGAR
KOZHIKODE
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HASSAN
NELAMANGLA
COWRIBIDANUR
PEENYA
HEBBAL
KR.PURAM
KUDDAPAH
EDC
KUNIGAL
NAGARBHAVI
NRS
NIMHANS
KOLAR
MANDYA
BIDADI
TATAGUNI
S.PURA
MYSORE
HOSKOTE
CNPATNA
RAMNAGARA
KANAKPURA
HARDHALLI
SARJAPURA
T.K.HALLI
SALEM
KHDC
YERANDAHALLI/ HOSUR
LEGEND
EXISTING
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THERMAL POWER STATIONS
NUCLEAR POWER STATIONS
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400kV TRANSMISSION LINES
400kV QUAD LINES
765kV TRANSMISSION LINES
HVDC BIPOLES

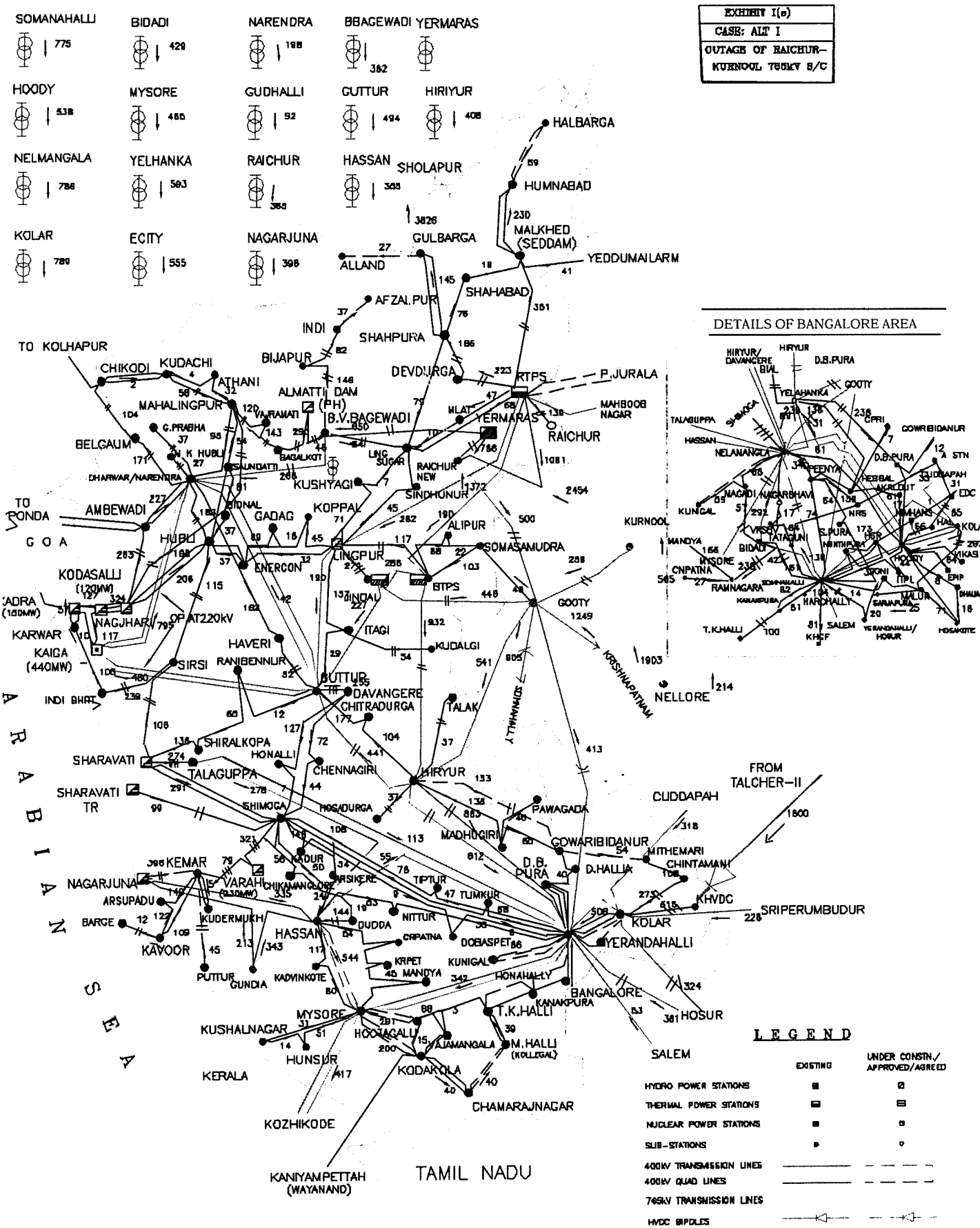
EXHIBIT I(a)
CASE: ALT I
OUTAGE OF RAICHUR–KURNOOL 765KV S/C
SOMANAHALLI 775
BIDADI 429
NARENDRA 198
BBAGEWADI 382
YERMARAS
HOODY 538
MYSORE 455
GUDHALLI 92
GUTTUR 494
HIRIYUR 408
NELMANGALA 786
YELHANKA 593
RAICHUR 365
HASSAN 305
KOLAR 789
ECITY 555
NAGARJUNA 398
HALBARGA
SHOLAPUR
HUMNABAD
MALKHED (SEDDAM)
YEDDUMAILARM
GULBARGA
ALLAND
AFZALPUR
SHAHABAD
INDI
SHAHPURA
DEVDURGA
RTPS
P.JURALA
TO KOLHAPUR
CHIKODI
KUDACHI
ATHANI
BIJAPUR
ALMATTI DAM (PH)
MAHALINGPUR
B.V.BAGEWADI
YERMARAS
MAHBOOB NAGAR
RAICHUR
BELGAUM
G.PRABHA
N.K.HUBLI
DHARWAR/NARENDRA
KUSHTAGI
SINDHANUR
TO PONDA
AMBEWADI
GADAG
KOPPAL
ALIPUR
SOMASAMUDRA
KURNOOL
GOA
HUBLI
ENERCON
LINGPUR
BTPS
KODASALLI (120MW)
NAGJHARI
OPAT220kV
KARWAR
KAIGA (440MW)
HAVERI
SIRSI
RANIBENNUR
ITAGI
KUDALGI
GUTTUR
DAVANGERE
CHITRADURGA
TALAK
INDI BHAT
SHIRALKOPA
HONALLI
CHENNAGIRI
HIRIYUR
SHARAVATI
TALAGUPPA
SHARAVATI TR
SHIMOGA
HOSADURGA
PAWAGADA
MADHUGIRI
GOWARIBIDANUR
D.B. PURA
D.HALLI
MITHEMARI
CHINTAMANI
FROM TALCHER–II
CUDDAPAH
KHVDC
SRIPERUMBUDUR
KOLAR
YERANDAHALLI
KEMAR
NAGARJUNA
VARAHI (230MW)
CHIKKANGLORE
ARSIKERE
TIPTUR
TUMKUR
ARSUPADU
KUDERMUKH
NITTUR
DUDDA
BARGE
HASSAN
KAVOOR
PUTTUR
GUNDIA
KADMINKOTE
KRIPET
MANDYA
KUNIGAL
DOBASPET
HONAHALLY
BANGALORE
KANAKPURA
T.K.HALLI
HOSUR
SALEM
MYSORE
KUSHALNAGAR
HOOTAGALLI
M.HALLI (KOLLEGAL)
HUNSUR
KODAKOLA
CHAMARAJNAGAR
KERALA
KOZHIKODE
KANIYAMPETTAH (WAYANAND)
TAMIL NADU
ARABIAN SEA
DETAILS OF BANGALORE AREA
LEGEND
EXISTING
UNDER CONSTN./ APPROVED/AGREED
HYDRO POWER STATIONS
THERMAL POWER STATIONS
NUCLEAR POWER STATIONS
SUB-STATIONS
400kV TRANSMISSION LINES
400kV QUAD LINES
765kV TRANSMISSION LINES
HVDC BIPOLES

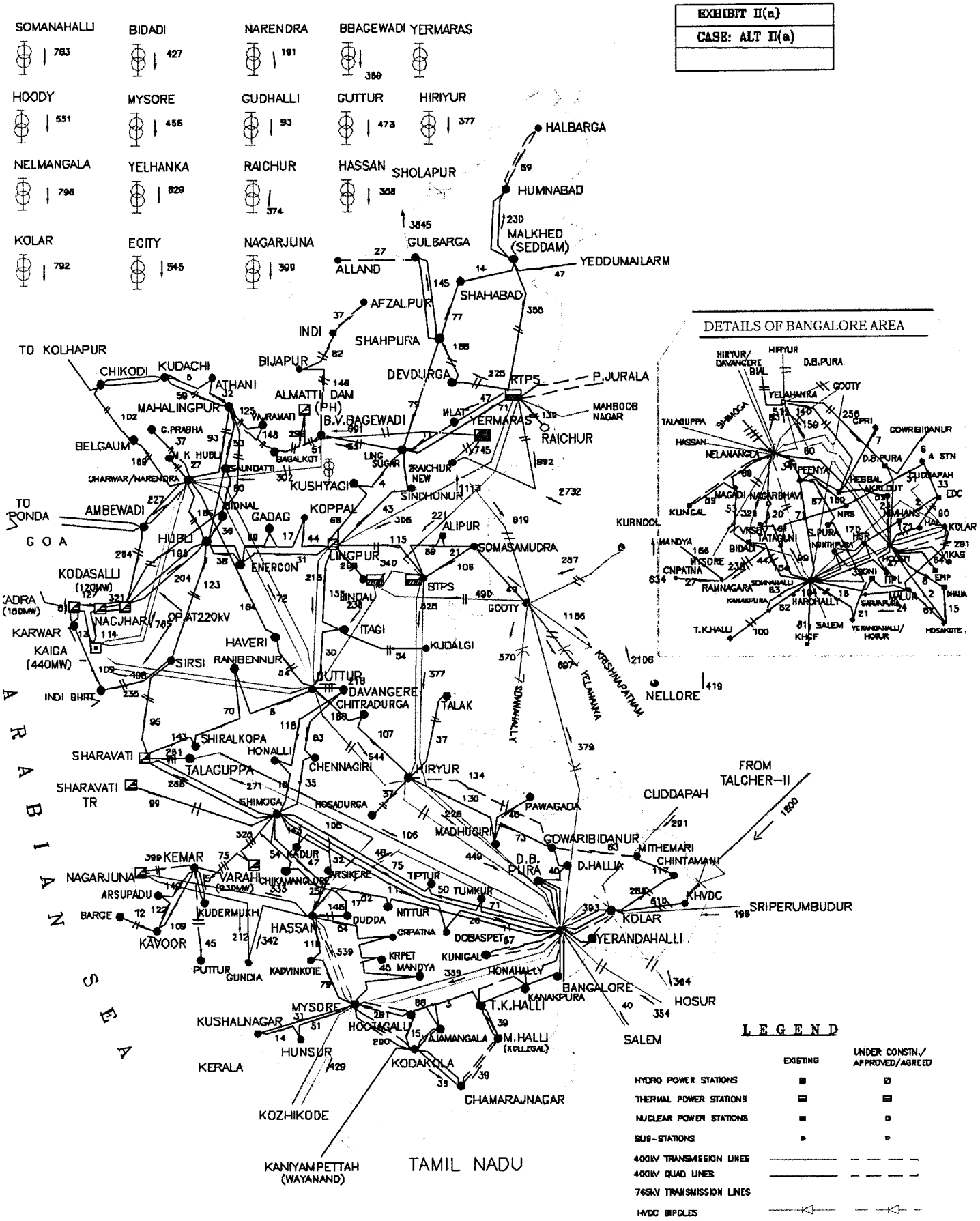
EXHIBIT II(a)
CASE: ALT II(a)
SOMANAHALLI 763
BIDADI 427
NARENDRA 191
BBAGEWADI 389
YERMARAS
HOODY 551
MYSORE 455
GUDHALLI 93
GUTTUR 473
HIRIYUR 377
NELMANGALA 798
YELHANKA 829
RAICHUR 374
HASSAN 308
KOLAR 792
ECITY 545
NAGARJUNA 399
SHOLAPUR
HALBARGA
HUMNABAD
MALKHED (SEDDAM)
YEDDUMAILARM
GULBARGA
ALLAND
AFZALPUR
INDI
SHAHPURA
SHAHABAD
DEVDURGA
RTPS
P.JURALA
BIJAPUR
TO KOLHAPUR
CHIKODI
KUDACHI
ATHANI
ALMATTI DAM (PH)
MAHALINGPUR
B.V.BAGEWADI
MAHBOOB NAGAR
BELGAUM
G.PRABHA
N.K.HUBLI
BAGALKOT
DHARWAR/NARENDRA
SAUNDATTI
KUSHTAGI
LNG SUGAR
RAICHUR NEW
SINDHUNUR
TO PONDA
AMBEWADI
GADAG
KOPPAL
ALIPUR
SOMASAMUDRA
KURNOOL
G O A
HUBLI
GONAL
LINGPUR
ENERCON
BTPS
GOOTY
KODASALLI (120MW)
NAGJHARI
OPAT220kV
KARWAR
KAIGA (440MW)
HAVERI
ITAGI
KUDALGI
SIRSI
RANIBENNUR
GUTTUR
DAVANGERE
CHITRADURGA
TALAK
INDI BHRT
SHARAVATI
SHIRALKOPA
HONALLI
CHENNAGIRI
HIRYUR
SHARAVATI TR
TALAGUPPA
SHIMOGA
HOSADURGA
PAVAGADA
MADHUGIRI
GOWARIBIDANUR
D.B. PURA
D.HALLIA
MITHEMARI
CHINTAMANI
FROM TALCHER-II
CUDDAPAH
KHVDC
SRIPERUMBUDUR
KOLAR
YERANDAHALLI
BANGALORE
HOSUR
SALEM
KEMAR
NAGARJUNA
VARAHI (230MW)
CHIKAMANGALORE
ARSIKERE
TIPTUR
TUMKUR
ARSUPADU
BARGE
KUDERMUKH
NITTUR
DUDDA
HASSAN
CRIPATNA
DOBASPET
KAVOOR
PUTTUR
GUNDIA
KADVINKOTE
KRPET
MANDYA
KUNIGAL
HONAHALLY
KANAKPURA
T.K.HALLI
MYSORE
KUSHALNAGAR
HOOTAGALLI
NAJAMANGALA
M.HALLI (KOLLEGAL)
HUNSUR
KODAKOLA
CHAMARAJNAGAR
KERALA
KOZHIKODE
KANIYAMPETTAH (WAYANAND)
TAMIL NADU
ARABIAN SEA
KRISHNAGAPTNAM
YELAHANKA
SONNAHALLY
NELLORE
DETAILS OF BANGALORE AREA
LEGEND
EXISTING
UNDER CONSTN./ APPROVED/AGREED
HYDRO POWER STATIONS
THERMAL POWER STATIONS
NUCLEAR POWER STATIONS
SUB-STATIONS
400kV TRANSMISSION LINES
400kV QUAD LINES
765kV TRANSMISSION LINES
HVDC BIPOLES

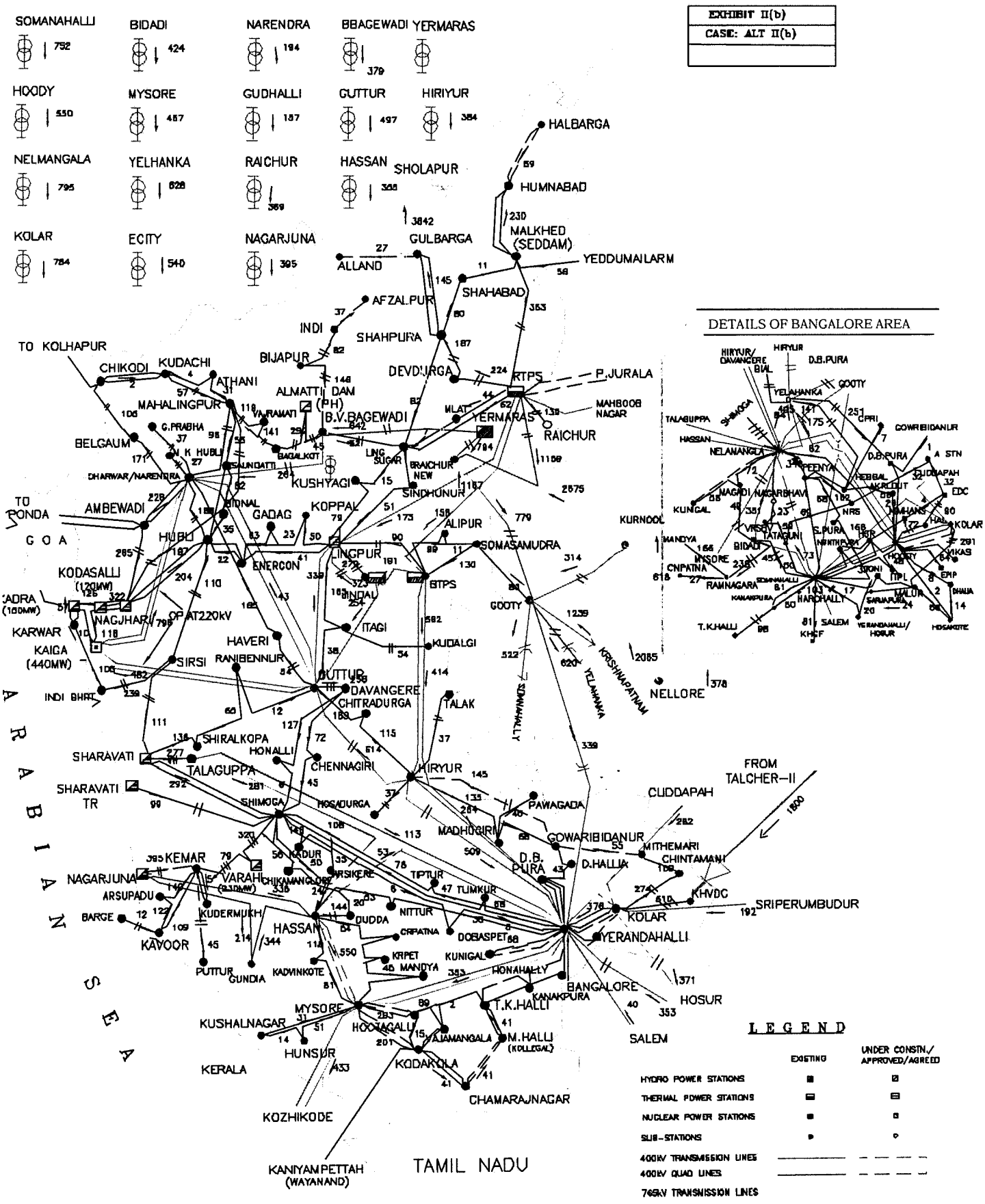
EXHIBIT II(b)
CASE: ALT II(b)
SOMANAHALLI 752
BIDADI 424
NARENDRA 194
BBAGEWADI 379
YERMARAS
HOODY 550
MYSORE 457
GUDHALLI 187
GUTTUR 497
HIRIYUR 384
NELMANGALA 795
YELHANKA 628
RAICHUR 369
HASSAN 355
SHOLAPUR
KOLAR 784
ECITY 540
NAGARJUNA 395
HALBARGA
HUMNABAD
MALKHED (SEDDAM)
YEDDUMAILARM
GULBARGA
ALLAND
AFZALPUR
INDI
SHAHPURA
SHAHABAD
BIJAPUR
DEVDURGA
RTPS
P.JURALA
TO KOLHAPUR
CHIKODI
KUDACHI
ATHANI
ALMATTI DAM (PH)
MAHALINGPUR
V.A.RAMATI
B.V.BAGEWADI
MLAT
MAHBOOB NAGAR
G.PRABHA
BELGAUM
N.K.HUBLI
BAGALKOT
LNG SUGAR
BRAICHUR NEW
SINDHUNUR
DHARWAR/NARENDRA
SAUNDATTI
KUSHYAGI
TO PONDA
AMBEWADI
KOPPAL
GADAG
ALIPUR
KURNOOL
G O A
HUBLI
INGPUR
SOMASAMUDRA
KODASALLI (120MW)
ENERCON
BTPS
GOOTY
NAGJHARI
OPAT220kV
ITAGI
KUDALGI
KARWAR
KAIGA (440MW)
HAVERI
RANIBENNUR
SIRSI
DAVANGERE
CHITRADURGA
TALAK
INDI BHRT
NELLORE
SHIRALKOPA
HONALLI
SHARAVATI
TALAGUPPA
CHENNAGIRI
HIRIYUR
SHARAVATI TR
SHIMOGA
HOSADURGA
PAWAGADA
MADHUGIRI
GOWARIBIDANUR
CUDDAPAH
FROM TALCHER-II
MITHEMARI
CHINTAMANI
D.B. PURA
D.HALLIA
KEMAR
KADUR
TIPTUR
TUMKUR
KHVDC
SRIPERUMBUDUR
NAGARJUNA
VARAHI (230MW)
CHIKAMANGLORE
ARSIKERE
ARSUPADU
NITTUR
KOLAR
BARGE
KUDERMUKH
HASSAN
DUDDA
CRPATNA
DOBASPET
YERANDAHALLI
KAVOOR
KRIPET
KUNIGAL
PUTTUR
GUNDIA
KADVINKOTE
MANDYA
HONAHALLY
BANGALORE
KANAKPURA
HOSUR
MYSORE
T.K.HALLI
KUSHALNAGAR
HOOTAGALLI
AJJAMANGALA
M.HALLI (KOLLEGAL)
SALEM
HUNSUR
KODAKOLA
KERALA
CHAMARAJNAGAR
KOZHIKODE
KANIYAMPETTAH (WAYANAND)
TAMIL NADU
ARABIAN SEA
KRISHNAPATNAM
YELAHANKA
SUNNAHALLI
DETAILS OF BANGALORE AREA
HIRIYUR/ DAVANGERE
HIRIYUR
D.B.PURA
BIAL
YELAHANKA
GOOTY
TALAGUPPA
SHIMOGA
HASSAN
NELAMANGLA
CPRI
GOWRIBIDANUR
PEENYA
HEBBAL
CUDDAPAH
NAGADI
NAGARBHAVI
KUNGAL
NRS
HOSKOTE
KOLAR
MANDYA
BIDADI
MYSORE
CNPATNA
RAMNAGARA
KANAKPURA
HARDHALLY
T.K.HALLI
SALEM
KHDF
VIKAS
EMP
BHAJA
MALUR
SARJAPURA
YERANDAHALLI/ HOSUR
LEGEND
EXISTING
UNDER CONSTN./ APPROVED/AGREED
HYDRO POWER STATIONS
THERMAL POWER STATIONS
NUCLEAR POWER STATIONS
SUB-STATIONS
400kV TRANSMISSION LINES
400kV QUAD LINES
765kV TRANSMISSION LINES
HVDC BIPOLES

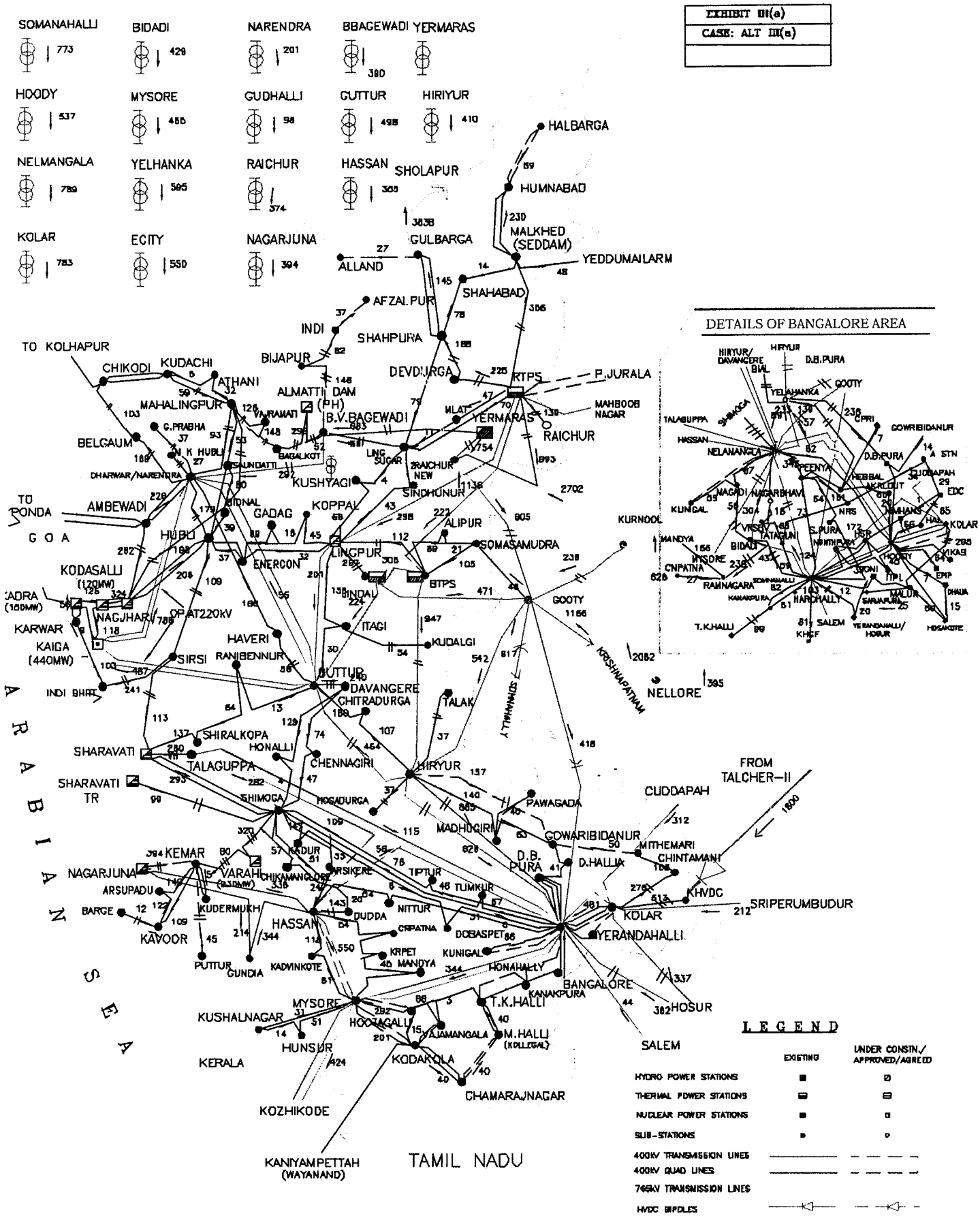
EXHIBIT III(a)
CASE: ALT III(a)
SOMANAHALLI 773
BIDADI 429
NARENDRA 201
BBAGEWADI 380
YERMARAS
HOODY 537
MYSORE 455
GUDHALLI 98
GUTTUR 498
HIRIYUR 410
NELMANGALA 789
YELHANKA 585
RAICHUR 374
HASSAN
SHOLAPUR 369
KOLAR 783
ECITY 550
NAGARJUNA 394
HALBARGA
HUMNABAD
MALKHED (SEDDAM)
YEDDUMAILARM
GULBARGA
ALLAND
AFZALPUR
INDI
SHAHPURA
SHAHABAD
BIJAPUR
DEVDURGA
RTPS
P.JURALA
TO KOLHAPUR
CHIKODI
KUDACHI
ATHANI
ALMATTI DAM (PH)
MAHALINGPUR
B.V.BAGEWADI
MLAT
YERMARAS
MAHBOOB NAGAR
RAICHUR
BELGAUM
C.PRABHA
M K HUBLI
BAGALKOT
LNG SUGAR
RAICHUR NEW
SINDHNUR
KUSHTAGI
DHARWAR/NARENDRA
SAUNDATTI
TO PONDA
AMBEWADI
GADAG
KOPPAL
ALIPUR
KURNOOL
G O A
HUBLI
LINGPUR
SOMASAMUDRA
KODASALLI (120MW)
ENERCON
BTPS
BINDAL
GOOTY
NAGJHARI
OPAT220kV
KARWAR
KAIGA (440MW)
ITAGI
KUDALGI
HAVERI
RANIBENNUR
SIRSI
INDI BHRT
HUTTUR
DAVANGERE
CHITRADURGA
TALAK
SIMHADRI
KRISHNAPATNAM
NELLORE
SHIRALKOPA
HONALLI
SHARAVATI
TALAGUPPA
CHENNAGIRI
HIRIYUR
SHARAVATI TR
SHIMOGA
HOSADURGA
PAWAGADA
FROM TALCHER-II
CUDDAPAH
MADHUGIRI
GOWARIBIDANUR
MITHEMARI
CHINTAMANI
D.B. PURA
D.HALLIA
KEMAR
VARAH (230MW)
CHIKAMANGALORE
TIPTUR
TUMKUR
KHVDC
SRIPERUMBUDUR
ARSUPADU
KUDERMUKH
NITTUR
KOLAR
BARGE
HASSAN
DUDDA
CRPATNA
DOBASPET
YERANDAHALLI
KAVOOR
KRIPET
KUNIGAL
PUTTUR
GUNDIA
KADVINKOTE
MANDYA
HONAHALLY
BANGALORE
KANAKPURA
MYSORE
T.K.HALLI
HOSUR
KUSHALNAGAR
HOOTAGALLI
AJAMANGALA
M.HALLI (KOLLEGAL)
SALEM
HUNSUR
KERALA
KODAKOLA
CHAMARAJNAGAR
KOZHIKODE
KANIYAMPETTAH (WAYANAND)
TAMIL NADU
ARABIAN SEA
DETAILS OF BANGALORE AREA
HIRIYUR/ DAVANGERE
BIAL
D.B.PURA
YELAHANKA
GOOTY
TALAGUPPA
SHIMOGA
HASSAN
NELAMANGLA
CPRI
GOWRIBIDANUR
PEENYA
NEBBAL
AKKALOUT
NAGADI
NAGARBHAVI
KUNGAL
NRS
NIMHANS
KOLAR
MANDYA
VRSS
TATAGUNI
S.PURA
NIMHPURA
BIDADI
MYSORE
CNPATNA
RAMNAGARA
KANAKPURA
HARCHALLY
SARJAPURA
T.K.HALLI
SALEM
KHCF
YERANDAHALLI/ HOSUR
HOSAKOTE
LEGEND
EXISTING
UNDER CONSTN./ APPROVED/AGREED
HYDRO POWER STATIONS
THERMAL POWER STATIONS
NUCLEAR POWER STATIONS
SUB-STATIONS
400kV TRANSMISSION LINES
400kV QUAD LINES
765kV TRANSMISSION LINES
HVDC BIPOLES

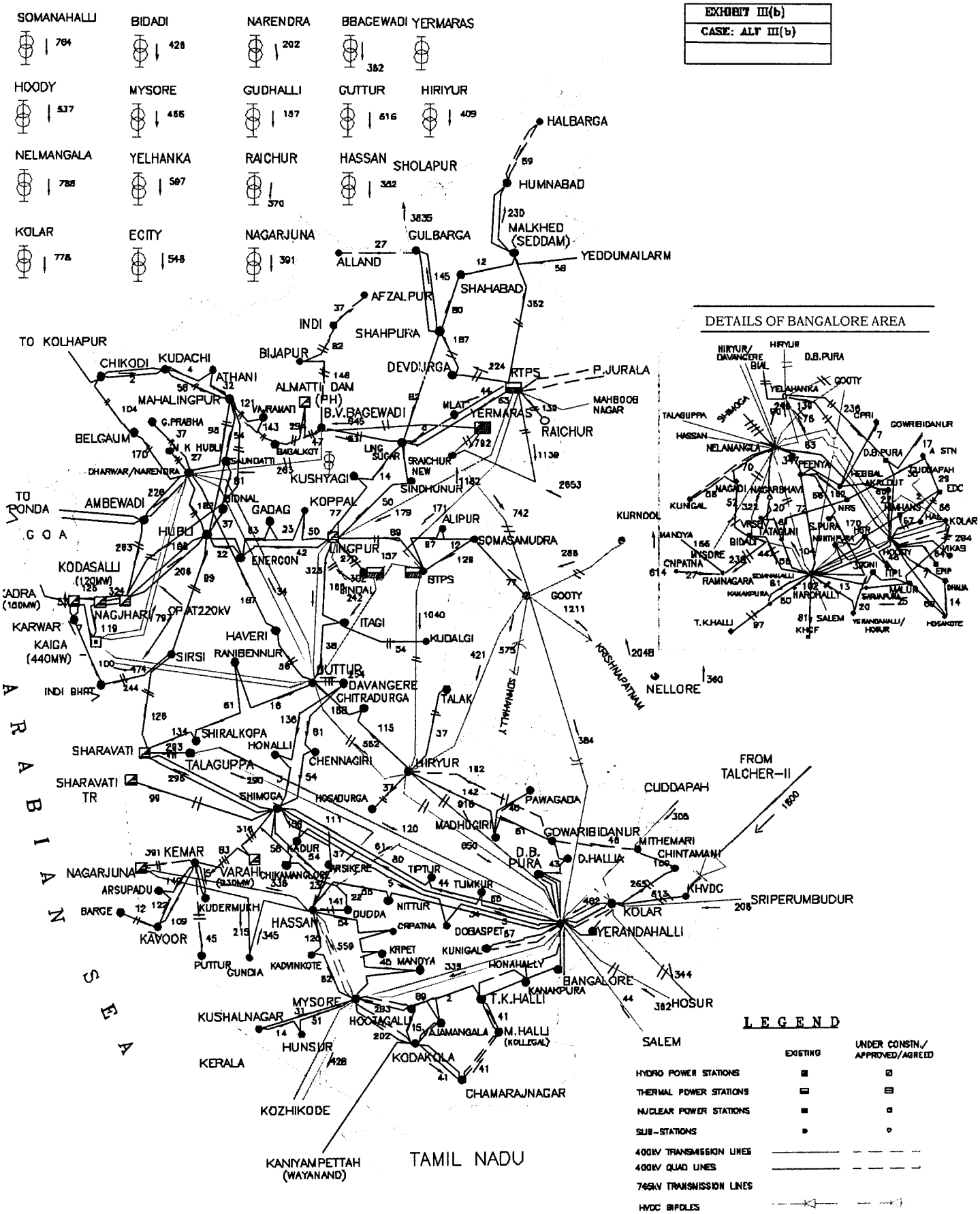
EXHIBIT III(b)
CASE: ALT III(b)
SOMANAHALLI
BIDADI
NARENDRA
BBAGEWADI
YERMARAS
HOODY
MYSORE
GUDHALLI
GUTTUR
HIRIYUR
NELMANGALA
YELHANKA
RAICHUR
HASSAN
KOLAR
ECITY
NAGARJUNA
DETAILS OF BANGALORE AREA
HALBARGA
SHOLAPUR
HUMNABAD
MALKHED (SEDDAM)
YEDDUMAILARM
GULBARGA
ALLAND
AFZALPUR
SHAHABAD
INDI
SHAHPURA
TO KOLHAPUR
CHIKODI
KUDACHI
BIJAPUR
DEVDURGA
RTPS
P.JURALA
ATHANI
ALMATTI DAM (PH)
MAHALINGPUR
B.V.BAGEWADI
YERMARAS
MAHBOOB NAGAR
RAICHUR
BELGAUM
G.PRABHA
N.K.HUBLI
BAGALKOT
SAUNDATTI
DHARWAR/NARENDRA
KUSHTAGI
SRAICHUR NEW
SINDHUNUR
TO PONDA
AMBEWADI
GADAG
KOPPAL
ALIPUR
KURNOOL
GOA
HUBLI
ENERCON
LINGPUR
SOMASAMUDRA
BTPS
KODASALLI (120MW)
KADRA (150MW)
NAGJHARI
OPAT220kV
KARWAR
KAIGA (440MW)
HAVERI
ITAGI
KUDALGI
SIRSI
RANIBENNUR
GOOTY
KRISHNAPATNAM
NELLORE
INDI BHRT
DAVANGERE
CHITRADURGA
TALAK
SHIRALKOPA
SHARAVATI
HONALLI
CHENNAGIRI
HIRIYUR
TALAGUPPA
SHARAVATI TR
SHIMOGA
HOSADURGA
PAWAGADA
FROM TALCHER-II
CUDDAPAH
MADHUGIRI
GOWARIBIDANUR
MITHEMARI
D.B. PURA
D.HALLIA
CHINTAMANI
KEMAR
NAGARJUNA
VARAHI (230MW)
CHIKAMAGALORE
TIPTUR
TUMKUR
KHVDC
SRIPERUMBUDUR
ARSUPADU
KUDERMUKH
NITTUR
KOLAR
BARGE
HASSAN
DUDDA
KAVOOR
KRPATNA
DOBASPET
YERANDAHALLI
KRIPET
KUNIGAL
PUTTUR
GUNDIA
KADVINKOTE
MANDYA
HONAHALLY
BANGALORE
KANAKPURA
MYSORE
T.K.HALLI
HOSUR
KUSHALNAGAR
HOOTAGALLI
AJJAMANGALA
M.HALLI (KOLLEGAL)
SALEM
HUNSUR
KODAKOLA
KERALA
CHAMARAJNAGAR
KOZHIKODE
KANIYAMPETTAH (WAYANAD)
TAMIL NADU
ARABIAN SEA
LEGEND
EXISTING
UNDER CONSTN./ APPROVED/AGREED
HYDRO POWER STATIONS
THERMAL POWER STATIONS
NUCLEAR POWER STATIONS
SUB-STATIONS
400kV TRANSMISSION LINES
400kV QUAD LINES
765kV TRANSMISSION LINES
HVDC BIPOLES

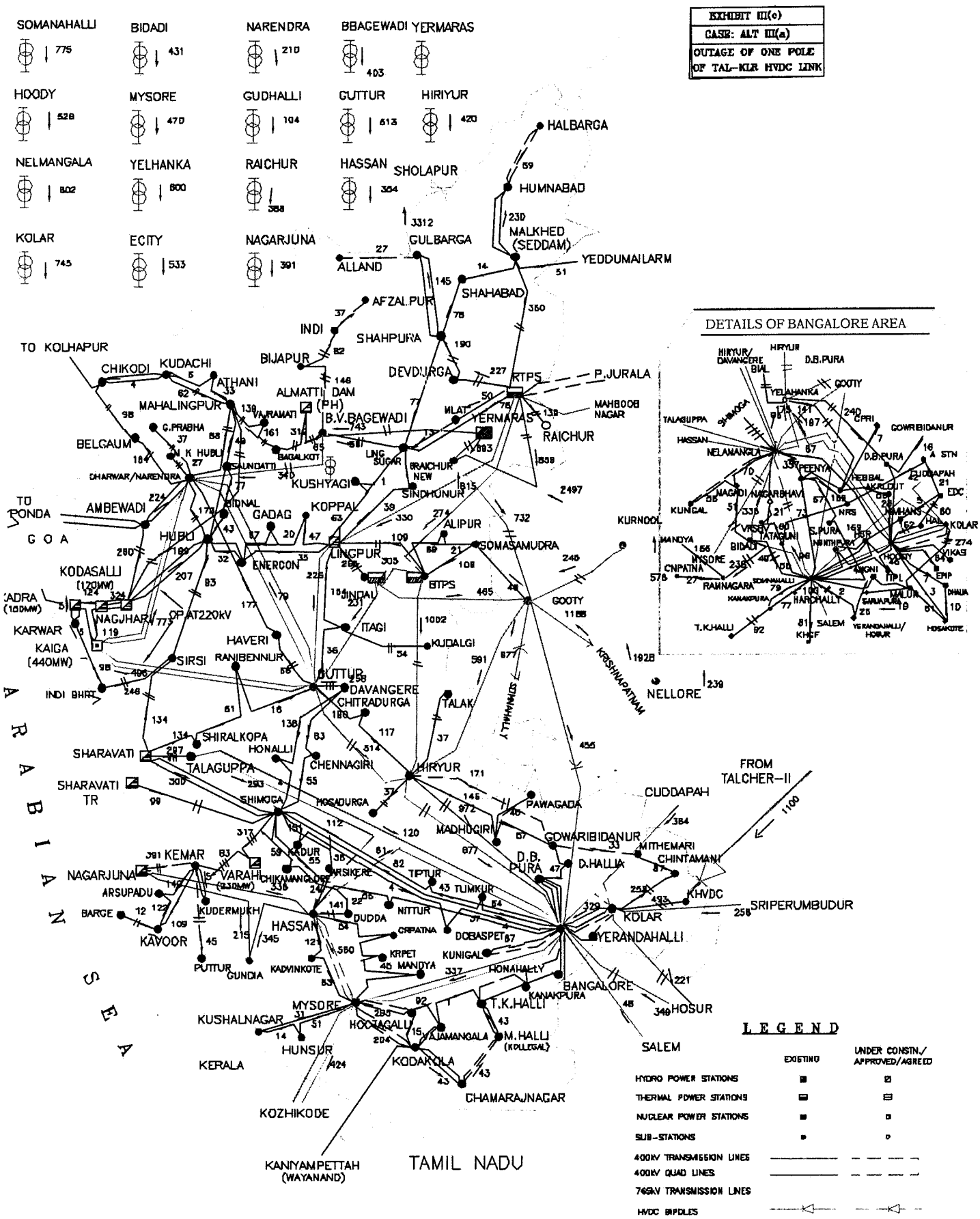
EXHIBIT III(c)
CASE: ALT III(a)
OUTAGE OF ONE POLE OF TAL-KLR HVDC LINK
SOMANAHALLI
BIDADI
NARENDRA
BBAGEWADI
YERMARAS
HOODY
MYSORE
GUDHALLI
GUTTUR
HIRIYUR
NELMANGALA
YELHANKA
RAICHUR
HASSAN
KOLAR
ECITY
NAGARJUNA
DETAILS OF BANGALORE AREA
HALBARGA
HUMNABAD
SHOLAPUR
MALKHED (SEDDAM)
YEDDUMAILARM
GULBARGA
ALLAND
SHAHABAD
AFZALPUR
INDI
SHAHPURA
TO KOLHAPUR
CHIKODI
KUDACHI
ATHANI
BIJAPUR
DEVDURGA
RTPS
P.JURALA
ALMATTI DAM (PH)
MAHALINGPUR
B.V.BAGEWADI
YERMARAS
MAHBOOB NAGAR
RAICHUR
BELGAUM
G.PRABHA
N.K.HUBLI
BAGALKOT
SINDHNUR
KUSHYAGI
DHARWAR/NARENDRA
SAUNDATTI
TO PONDA
AMBEWADI
BIDNAL
GADAG
KOPPAL
ALIPUR
G O A
HUBLI
ENERCON
LINGPUR
SOMASAMUDRA
KODASALLI (120MW)
BTPS
GOOTY
KADRA (150MW)
NAGJHARI
OPAT220kV
KARWAR
KAIGA (440MW)
ITAGI
KUDALGI
HAVERI
RANIBENNUR
SIRSI
GUTTUR
DAVANGERE
CHITRADURGA
INDI BHRT
TALAK
SHIRALKOPA
SHARAVATI
HONALLI
CHENNAGIRI
HIRYUR
SHARAVATI TR
TALAGUPPA
SHIMOGA
HOSADURGA
PAWAGADA
MADHUGIRI
GOWRIBIDANUR
CUDDAPAH
MITHEMARI
CHINTAMANI
D.B. PURA
D.HALLIA
KEMAR
NAGARJUNA
VARAHI (230MW)
CHIKKANGLOOR
ARSIKERE
TIPTUR
TUMKUR
KHVDC
SRIPERUMBUDUR
ARSUPADU
KUDERMUKH
NITTUR
KOLAR
BARGE
HASSAN
DUDDA
CRIPATNA
DOBASPET
YERANDAHALLI
KAVOOR
PUTTUR
GUNDIA
KADVINKOTE
KRIPET
KUNIGAL
MANDYA
HONAHALLY
BANGALORE
KANAKPURA
MYSORE
T.K.HALLI
HOSUR
KUSHALNAGAR
HOOTAGALLI
RAMANGALA
M.HALLI (KOLLEGAL)
SALEM
HUNSUR
KERALA
KODAKOLA
CHAMARAJNAGAR
KOZHIKODE
KANIYAMPETTAH (WAYANAND)
TAMIL NADU
ARABIAN SEA
KRISHNAPATNAM
NELLORE
SOMANHALLY
FROM TALCHER-II
KURNOOL
LEGEND
EXISTING
UNDER CONSTN./ APPROVED/AGREED
HYDRO POWER STATIONS
THERMAL POWER STATIONS
NUCLEAR POWER STATIONS
SUB-STATIONS
400kV TRANSMISSION LINES
400kV QUAD LINES
765kV TRANSMISSION LINES
HVDC BIPOLES

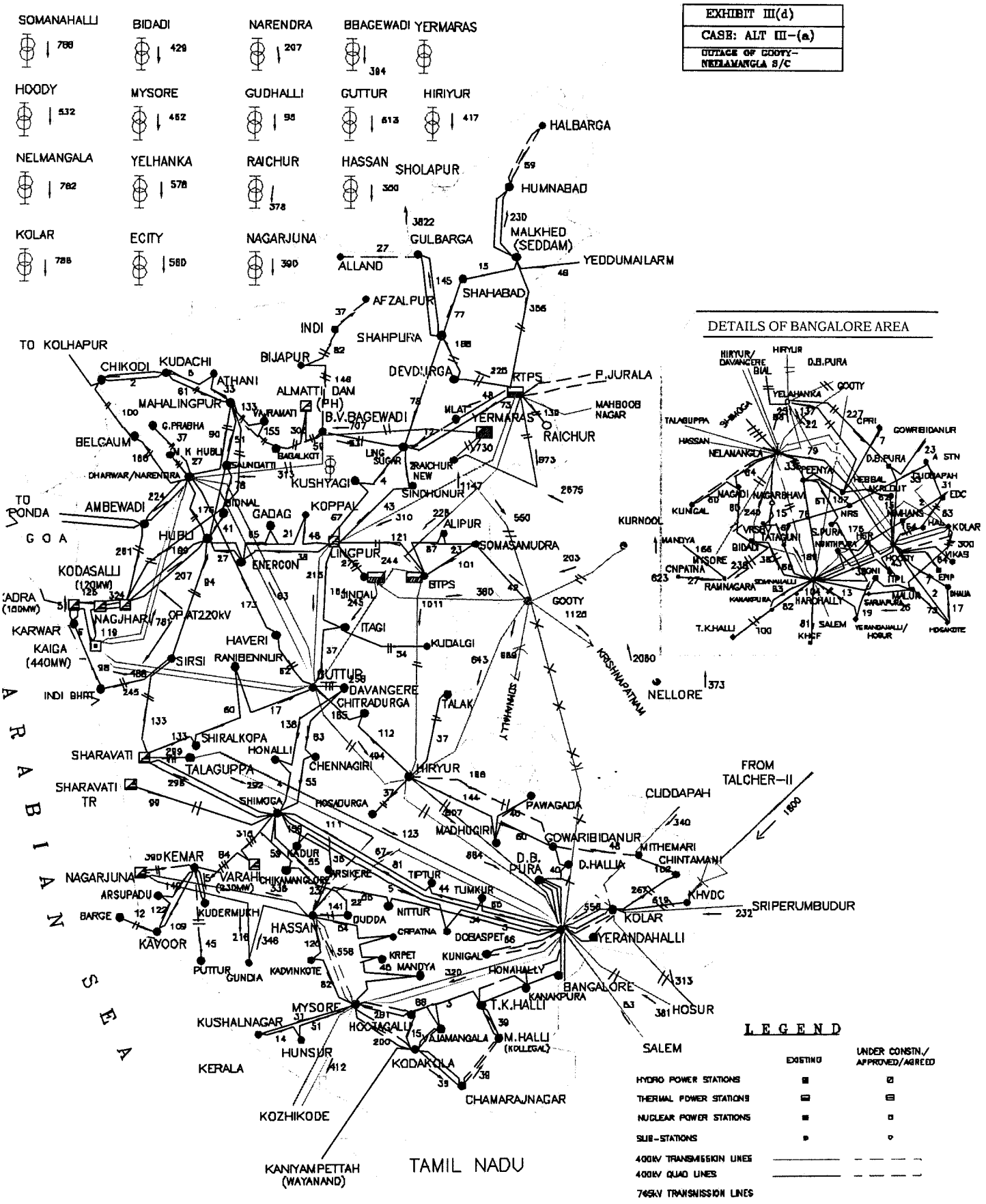
EXHIBIT III(d)
CASE: ALT III-(a)
OUTAGE OF GOOTY-NELAMANGLA S/C
SOMANAHALLI
BIDADI
NARENDRA
BHAGEWADI
YERMARAS
HOODY
MYSORE
GUDHALLI
GUTTUR
HIRIYUR
NELMANGALA
YELHANKA
RAICHUR
HASSAN
KOLAR
ECITY
NAGARJUNA
DETAILS OF BANGALORE AREA
HALBARGA
SHOLAPUR
HUMNABAD
GULBARGA
MALKHED (SEDDAM)
YEDDUMAILARM
ALLAND
SHAHABAD
AFZALPUR
INDI
SHAHPURA
TO KOLHAPUR
CHIKODI
KUDACHI
ATHANI
BIJAPUR
DEVDURGA
RTPS
P.JURALA
ALMATTI DAM (PH)
MAHALINGPUR
B.V.BAGEWADI
YERMARAS
MAHBOOB NAGAR
RAICHUR
BELGAUM
G.PRABHA
K HUBLI
DHARWAR/NARENDRA
SUNDATTI
KUSHTAGI
SINDHNUR
TO GOA
AMBEWADI
HUBLI
GADAG
KOPPAL
ALIPUR
KURNOOL
KODASALLI (120MW)
KARWAR
KAIGA (440MW)
NAGJHARI
OPAT220kV
ENERCON
LINGPUR
SOMASAMUDRA
BTPS
GOOTY
ITAGI
KUDALGI
HAVERI
SIRSI
RANIBENNUR
GUTTUR
DAVANGERE
CHITRADURGA
TALAK
KRISHNAPATNAM
NELLORE
SHIRALKOPA
SHARAVATI
TALAGUPPA
HONALLI
CHENNAGIRI
HIRIYUR
SHARAVATI TR
SHIMOGA
HOSADURGA
PAWAGADA
FROM TALCHER-II
CUDDAPAH
MADHUGIRI
GOWRIBIDANUR
MITHEMARI
CHINTAMANI
D.B. PURA
D.HALLIA
KEMAR
NAGARJUNA
VARAHI (230MW)
CHIKAMANGLORE
ARSIKERE
TIPTUR
TUMKUR
KHVDC
SRIPERUMBUDUR
ARSUPADU
BARGE
KUDERMUKH
NITTUR
DUDDA
KOLAR
HASSAN
CRPATNA
DOBASPET
YERANDAHALLI
KAVOOR
PUTTUR
GUNDIA
KADMINKOTE
KRPET
MANDYA
KUNIGAL
HONAHALLY
BANGALORE
KANAKPURA
MYSORE
KUSHALNAGAR
HOOTAGALLI
T.K.HALLI
HOSUR
HUNSUR
AJJAMANGALA
M.HALLI (KOLLEGAL)
SALEM
KERALA
KODAKOLA
CHAMARAJNAGAR
KOZHIKODE
KANIYAMPETTAH (WAYANAD)
TAMIL NADU
ARABIAN SEA
LEGEND
EXISTING
UNDER CONSTN./ APPROVED/AGREED
HYDRO POWER STATIONS
THERMAL POWER STATIONS
NUCLEAR POWER STATIONS
SUB-STATIONS
400kV TRANSMISSION LINES
400kV QUAD LINES
765kV TRANSMISSION LINES
HVDC BIPOLES

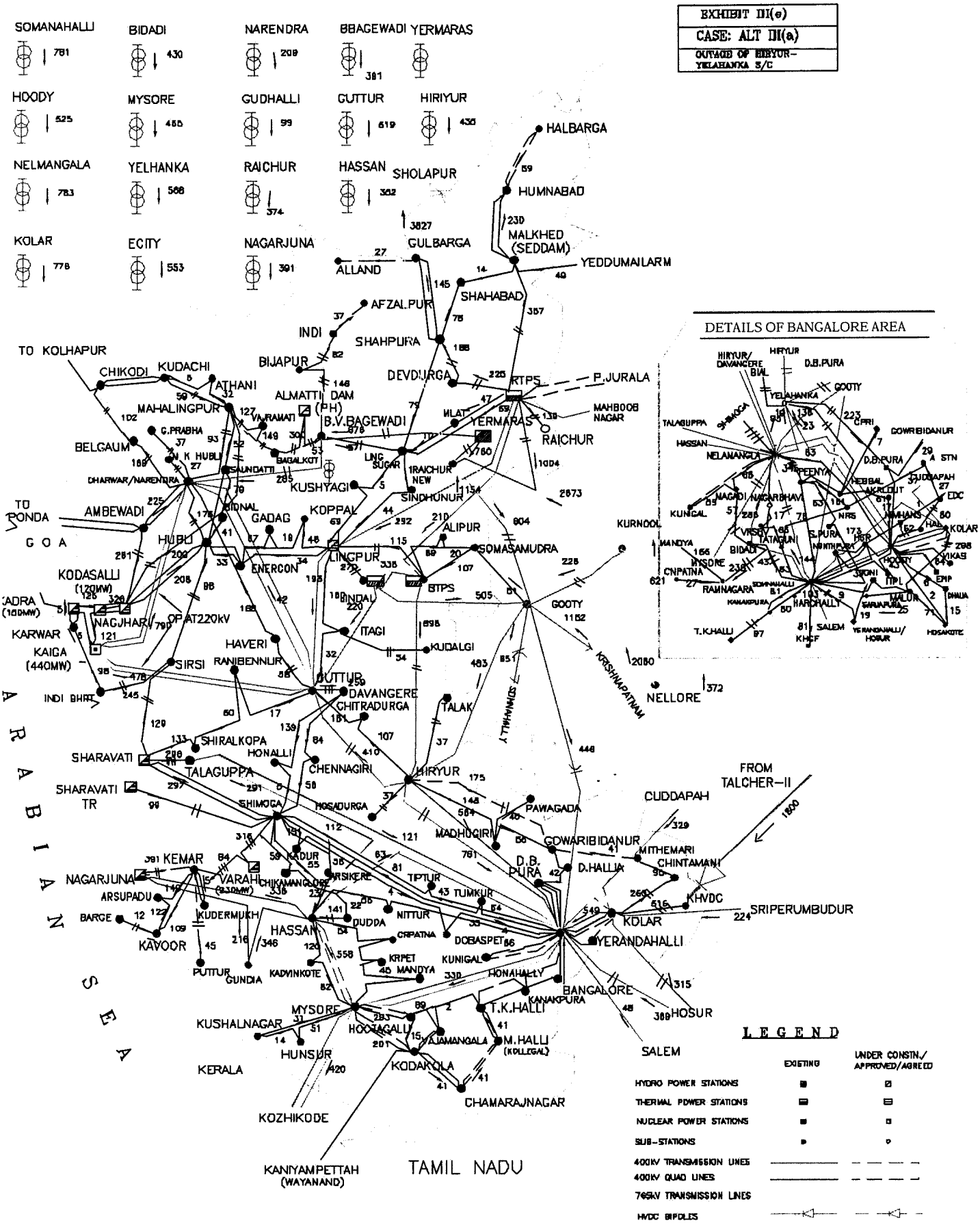
EXHIBIT III(e)
CASE: ALT III(a)
OUTAGE OF HIRIYUR-YELAHANKA S/C
SOMANAHALLI
BIDADI
NARENDRA
BBAGEWADI
YERMARAS
HOODY
MYSORE
GUDHALLI
GUTTUR
HIRIYUR
NELMANGALA
YELHANKA
RAICHUR
HASSAN
KOLAR
ECITY
NAGARJUNA
HALBARGA
HUMNABAD
SHOLAPUR
MALKHED (SEDDAM)
GULBARGA
ALLAND
YEDDUMAILARM
SHAHABAD
AFZALPUR
INDI
SHAHPURA
BIJAPUR
TO KOLHAPUR
CHIKODI
KUDACHI
ATHANI
ALMATTI DAM (PH)
MAHALINGPUR
B.V.BAGEWADI
DEVDURGA
RTPS
P.JURALA
MAHBOOB NAGAR
YERMARAS
RAICHUR
BELGAUM
C.PRABHA
M K HUBLI
SAUNDATTI
DHARWAR/NARENDRA
KUSHYAGI
SINDHANUR
LINGPUR
TO PONDA
AMBEWADI
GOA
BIDNAL
GADAG
KOPPAL
HUBLI
ENERCON
ALIPUR
SOMASAMUDRA
KURNOOL
KODASALLI (120MW)
KADRA (100MW)
NAGJHARI
OPAT220kV
BTPS
GOOTY
KARWAR
KAIGA (440MW)
HAVERI
ITAGI
KUDALGI
SIRSI
RANIBENNUR
INDI BHRT
DAVANGERE
CHITRADURGA
TALAK
SOMANHALLY
KRISHNAPATNAM
NELLORE
ARABIAN SEA
SHIRALKOPA
SHARAVATI
HONALLI
CHENNAGIRI
HIRIYUR
SHARAVATI TR
TALAGUPPA
SHIMOGA
HOSADURGA
PAVAGADA
FROM TALCHER-II
CUDDAPAH
MADHUGIRI
GOWRIBIDANUR
MITHEMARI
CHINTAMANI
D.B. PURA
D.HALLIA
KEMAR
NAGARJUNA
VARAHI (230MW)
CHIKAMANGLORE
ARSIKERE
TIPTUR
TUMKUR
KHVDC
SRIPERUMBUDUR
ARSUPADU
BARGE
KUDERMUKH
KADUR
NITTUR
DUDDA
KOLAR
HASSAN
CRIPATNA
DOBASPET
YERANDAHALLI
KAVOOR
PUTTUR
GUNDIA
KADVINKOTE
KRIPET
MANDYA
KUNIGAL
HONAHALLY
BANGALORE
KANAKPURA
T.K.HALLI
HOSUR
MYSORE
KUSHALNAGAR
HOOTAGALLI
M.HALLI (KOLLEGAL)
SALEM
HUNSUR
KERALA
KODAKOLA
CHAMARAJNAGAR
KOZHIKODE
KANIYAMPETTAH (WAYANAND)
TAMIL NADU
DETAILS OF BANGALORE AREA
HIRIYUR
D.B.PURA
GOOTY
YELAHANKA
HASSAN
NELAMANGLA
MAGADI
KUNIGAL
MYSORE
RAMNAGARA
BIDADI
CNPATNA
KANAKPURA
T.K.HALLI
SALEM
HOSAKOTE
LEGEND
EXISTING
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HYDRO POWER STATIONS
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400kV TRANSMISSION LINES
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765kV TRANSMISSION LINES
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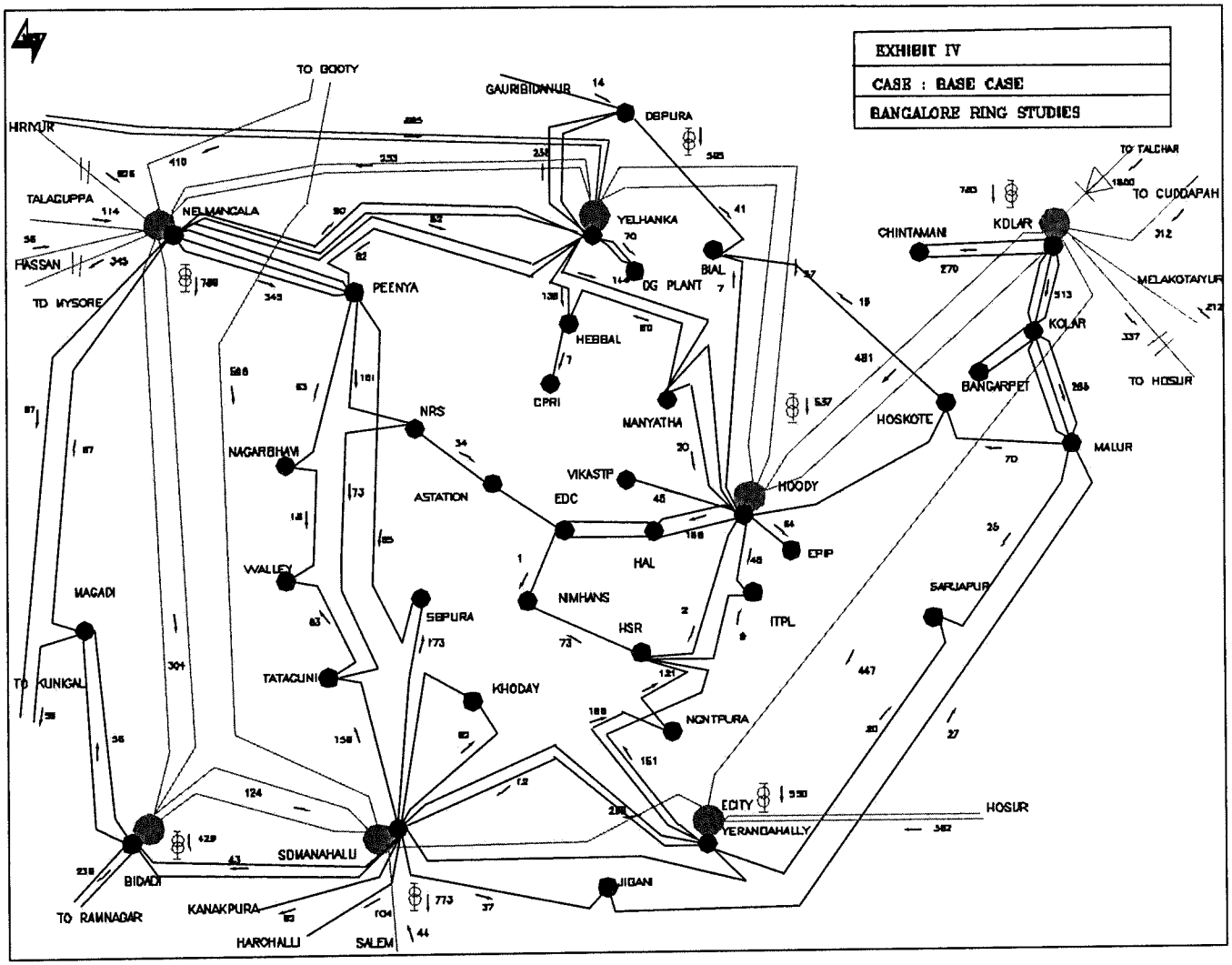


EXHIBIT IV
CASE : BASE CASE
BANGALORE RING STUDIES
TO GOOTY
GAURIBIDANUR
DEPURA
HIRIYUR
TALAGUPPA
NELMANGALA
YELHANKA
HASSAN
TO MYSORE
PEENYA
BIAL
DG PLANT
HEBBAL
CPRI
MANYATHA
NRS
NAGARBHAVI
VIKASTP
ASTATION
EDC
HOODY
HAL
EPIP
WALLEY
NIMHANS
ITPL
HSR
MAGADI
SBPURA
TATAGUNI
KHODAY
NGNTPURA
TO KUNIGAL
SOMANAHALLI
BIDADI
TO RAMNAGAR
KANAKPURA
HAROHALLI
SALEM
JIGANI
ECITY
YERANDAHALLY
HOSUR
SARJAPUR
HOSKOTE
CHINTAMANI
KOLAR
BANGARPET
MALUR
TO TALCHAR
TO CUDDAPAH
MELAKOTAIYUR
TO HOSUR

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

No. 51/4/SP&PA-2009/ 629-638 **Date: July 15, 2009**

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: **28th meeting** of the Standing Committee on Power System Planning of Southern Region - Minutes of the meeting.

Sir,

The **28th meeting** of the Standing Committee on Power System Planning of Southern Region was held on **15th June 2009 (Monday)** at 10:00 AM at Orange County, Karadigodu Post, Siddapur, Coorg, Karnataka. Minutes of the meeting are enclosed.

The minutes are also available at CEA's website, **www.cea.nic.in**.

Yours faithfully,

15/07/2009

(Pardeep Jindal)
Director (SP&PA)
(Telephone: 26732325
FAX No.: 011 26102045)

Minutes of 28th Meeting of the Standing Committee on Power System Planning in Southern Region (SCPSPSR) held on June 15, 2009 (Monday) at Orange County, Karadigodu Post, Siddapur, Coorg, Karnataka

List of participants is given at Annex-I.

1.0 Member(PS), CEA thanked Power Grid Corporation of India Ltd (PGCIL) for arranging the meeting in very serene ambience and natural surrounding. He stated that the Southern Region Power Committee meeting was scheduled for 2nd July 2009 and the transmission system for the Tamil Nadu Ultra Mega Power Project (TNUMPP) of 4000 MW needs to be finalized for putting up to the SRPC for approval. The associated transmission system for this project is proposed to be implemented by a Transmission Service Provider to be selected through tariff based competitive bidding process. Considering the time required in processing award of the project to successful bidder through this process, there was an urgency to finalize the transmission system for TNUMPP. He further stated that for optimizing total investment in transmission development and for optimizing right-of-way it is necessary to assess total generation addition in a particular area. In Southern Region, many Independent Power Producers(IPPs) had applied for long-term open Access in the Tuticorin, Cuddalore, Nellore and Srikakulam areas. Total generation addition was much in excess of requirements of SR and, therefore, some quantum of power was likely to be exported out of SR. Similar was the situation in HP, NER, Chhatisgarh, Jharkhand and Orissa. This aspect needs to be considered while planning a comprehensive transmission system for a particular time frame. Also, the IPPs, in addition to obtaining open access for transmission, have to go through arranging a lot of inputs like land, fuel, finances and selection of beneficiaries, which introduces an element of uncertainty in the planning process. The E.Act2003 has mandated CTU to provide non-discriminatory open access to IPPs and consumers. We of course need to see if the indicated beneficiaries and the indicated time frames for their CoD are realistic or not so that we do not land up with stranded transmission assets. For the transmission developers, obtaining right of way and implementation of the transmission system was difficult. Investment needs to be under-written by some one. So, we need to work out a 'Transmission Master Plan', which would give a larger picture of the transmission developments. An when, actual IPPs/generation projects come up, we will identify specific transmission elements that would need to be implemented. It was under this back-ground that we have to discuss the issues in current meeting.

2.0 Confirmation of the minutes of 28th meeting of the Standing Committee

2.1 Director, CEA stated that minutes of 27th meeting of the Standing Committee on Power System Planning of Southern Region, held on 03rd March 2009 at Bangalore, were issued vide CEA's letter number 51/4/SP&PA-2009/ 246-255 dated March 17, 2009. KPTCL, vide letter no KPTCL/CEE(P&C)/KCO-97/9055/2008-09 dated March 20, 2009, had given observation regarding the issues of the Gooty-Yelahanka 400kV line and transmission system

for Yeramas/Edlapur projects and accordingly, a corrigendum to the minutes was issued vide CEA letter number 51/4/SP&PA-2009/ 285-294 dated April 02, 2009. There were no further observations and the minutes as circulated and amended as per the corrigendum were confirmed by the Standing Committee.

3.0 Status of Under Construction / Approved Schemes:

3.1 POWERGRID informed about the progress of the transmission works that were being implemented by them as part of regional schemes. A copy of the implementation status is **given at Annex-II.**

3.2 Member(PS), CEA stated that transmission schemes of State utilities should be implemented matching with the respective generation projects and also with the development of central sector schemes so that adequate state level network becomes available to take benefit from commissioned generating stations. In particular, he mentioned that the progress on transmission system for evacuation of power from Vijayawada Stage-IV and Bhoopalapally TPS in Andhra Pradesh and Nagarjuna TPS in Karnataka were not matching with schedule of commissioning of the generation projects. Director, KPTCL and Chief Engineer, APTRANSCO assured to take up necessary actions in this regard.

4.0 Transmission System for Evacuation of Power from Yeramaras(2x800 MW)& Edlapur (1x800 MW) Generation projects of KPCL near Raichur in Karnataka:

4.1 Director, CEA explained that, the transmission system for Evacuation of Yeramaras(2x800 MW)& Edlapur (1x800 MW) of KPCL near Raichur TPS, Connectivity to proposed 400 kV Yelahanka(PGCIL) Sub-station and Strengthening/Restructuring of Bangalore 400kV Ring were discussed in the 27th meeting of the Standing Committee on Power System Planning of Southern Region and subsequently, system studies were revised during 30th March - 2nd April 2009 with participation of officers from CEA, PGCIL and KPTCL. He stated that as the exact transmission system associated with new generation projects, in Southern Region, mainly in Tamil Nadu and Andhra Pradesh, who have sought Long Term Open Access(LTOA) for evacuation and transmission of their power within Southern Region(SR) and for export outside the Region, was not available at the time of studies and therefore, broad transmission corridors that would be needed for export of power from SR, were kept in mind while carrying out the studies. He further explained that as per the assessment, about 14000 MW of power would need to be exported out of SR to WR/NR. Out of this 14000 MW, transmission corridors for about 7000-8000 MW capacity would be needed from Tamil Nadu-Andhra Pradesh/Karnataka in SR to Western Region. For this, two high capacity transmission corridors viz. Salem(Tamil Nadu) - Hiriyur(Karnataka) - Basvana Bagewadi(Karnataka) - Sholapur(Western Region) and Tiruvalam (Tamil Nadu) – Kurnool(Andhra Pradesh) – Raichur(Karnataka) – Sholapur(Western Region) were considered for export of surplus power from SR. Considering these scenarios it was found that connecting Yeramaras and Edlapur generating stations with export points in Southern Region would optimize the additional transmission requirements both for Inter State Transmission System (ISTS) as well as for State transmission system. The transmission system that has been evolved based on the system studies include connecting Yeramaras with Raichur(765/400kV S/S) and Basavana Bagewadi 400kV S/S with 400kV D/C quad lines and Basavana Bagewadi-Narendra 400kV D/C line with a 400/220kV S/S at Basavana Bagewadi to be built by KPTCL. GM, PGCIL stated that this system was also taken in the studies carried out by them for panning the transmission system for evacuation/export of power from LTOA projects and thus was found to be fulfill system requirements under both cases i.e with considering LTOA projects and without considering LTOA projects.

4.2 PGCIL stated that for connecting the Basavana Bagewadi – Narendra 400kV D/C line sufficient bay space may not be available at Narendra, therefore it was suggested that in which case, the Basavana Bagewadi – Narendra line can be LILOed into one circuit of the existing Narendra – Guttur(Davangere) 400kV D/C line.

4.3 PGCIL informed that JSW Power Trading Company Limited has confirmed that beneficiaries of the entire quantum of 600 MW from their Torangallu TPS in Karnataka would be Southern Region only. Further, they have also agreed to provide Jindal- Gooty 400kV D/C line as dedicated transmission line. After discussions, the members of the Standing Committee agreed for this line.

4.4 Member(PS), CEA stated that considering requirement of a new 765/400kV S/S near Hiriyur/north of Bangalore, the connectivity of Gooty to Yelahanka S/S can be routed via the New Hiriyur/(North) Bangalore S/S which falls almost en-route this line and by providing New Hiriyur – Yelahanka line as 400kV quad line requirement of another D/C line from Hiriyur – Yelahanka can be avoided. Additionally, this system also meets transmission requirement for evacuation of power from Torangallu TPS and Bellary TPS. He also stated that as the export for power from SR would take place trough displacement method from Basavana Bagewadi/Raichur points, as explained above, the Bangalore loads can be met by strengthening and restructuring of Bangalore 400kV Ring. For this, he said, a scheme had been worked out based on the joint system studies, which includes connecting Hosur(Tamil Nadu) with Electronic City(Bangalore) and re-arranging the existing 400kV connections around Bangalore so as to obtain Somanahalli – Bidadi – Nelamangla – Yelahanka – Hoody – Kolar 400kV D/C links and Kolar – Electronic City – Somanahalli 400kV S/C links. The scheme to make Kolar – Electronic City – Somanahalli section of the Bangalore 400kV Ring also as a D/C link would be considered at a later stage. He also stated that in long-term, the Talcher – Kolar HVDC link could also be used to export power from SR rather than importing power in SR, and therefore, strengthening of Bangalore ring becomes essential.

4.5 PGCIL stated that the land/site at proposed New Hiriyur/Bangalore 765/400kV S/S needs to be selected and procured at the earliest. KPTCL stated that they would help PGCIL to select and procure new site location and stated they were examining possibility of a suitable location around Madhugiri, which could be as close to Bangalore as possible. Members suggested that the new 765/400kV S/S may be named as Madhugiri for future references.

4.6 Based on the discussions <u>following transmission schemes were agreed</u>:

4.6.1 Transmission System for Evacuation of Power from Yeramaras(2x800 MW) and Edlapur(1x800 MW) Generation Projects of KPCL:

(i) Edlapur(1x800MW), being located adjacent to the RTPS project, will be connected to RTPS switchyard through extended bus arrangement.

(ii) Yeramaras (2x800MW) – Raichur(New)765/400kV (PGCIL) Sub-station, 400kV Quad D/C line.

(iii) Basavana Bagewadi 400/220kV 2x315 MVA S/S

(iv) Yeramaras - Basavana Bagewadi 400 kV Quad D/C line

(v) Basavana Bagewadi – Narendra (PGCIL) 400 kV Twin D/C line *

* - Incase 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 400kV D/C line would be explored.

The above system would be implemented by KPTCL as transmission scheme for evacuation of power from Yeramaras(2x800MW) & Edlapur (1x500 MW) generation projects in the time-frame matching with the commissioning schedule of these projects.

4.6.2 Establishing new 765/400kV S/S at Madhugiri, Connectivity to Yelahanka 2X500 MVA 400/220 kV S/S and Additional ISTS In-feed for Bangalore:

(i) Madhugiri 400/220kV S/S with provision of establishing a 765/400kV S/S in the same switchyard - **to be implemented by PGCIL**

(ii) Gooty – Madhugiri(proposed new 765/400kV S/S by PGCIL), 400kV D/C line – **to be implemented by PGCIL.**

(iii) Madhugiri - Yelahanka 400kV D/C Quad line – **to be implemented by PGCIL**

(iv) Hosur – Electronic City 400kV D/C line – **to be implemented by PGCIL**
(The Hosur – Electronic City 400kV D/C line could be built using Right of Way of the existing Peenya-Singarapet 220kV line(presently Yerandahally-Hosur line). This RoW could be used by building multi-circuit towers and/or dismantling part of the line depending upon practicability. SRTS,PGCIL, would examine feasibility of using RoW of existing 220kV circuit for implementation of this line with help provided by TNEB and KPTCL)

(v) Instead of Hiriyur – Yelahanka 400kV D/C line to be built by KPTCL for Bellary TPS, KPTCL would extend the Bellary TPS- Hiriyur 400kV D/C line up to Madhugiri S/S – **to be implemented by KPTCL**

(vi) PGCIL would provide a total of ten (10) numbers of 220kV bays at Yelahanka S/S. These bays would at the cost of KPTCL.

4.6.3 Strengthening/Restructuring of Bangalore 400 kV Ring Arrangement:
The existing 400kV connections around Bangalore would be rearranged to achieve Nelamangala – Yelahanka DC line, Yelahanka – Hoody - Kolar D/C line, Kolar - Electronic City - Somanahalli S/C line and Somanahalli – Bidadi - Nelamangala D/C line. Any revisions required in the protection schemes would also be carried out by PGCIL as System Strengthening Scheme for SR – **to be implemented by PGCIL.**

5.0 Transmission System Associated with Simhadri-II TPS:

5.1 ED, PGCIL informed that for evacuation of power from the Simhadri-II TPS of NTPC, Simhadri-II – Gazuwaka 400 kV D/C line was inter-alia agreed in the 25th meeting of Standing Committee. Due to growth of residential area in the vicinity, right of way problem and various existing 220 kV and 400 kV existing lines in position, termination of proposed Simhadri-II – Gazuwaka 400 kV D/C line at Gazuwaka was extremely difficult. Also, two numbers of adjacent bays for termination of both circuits were not available at Gazuwaka substation hence these have to be terminated at two opposite ends of the switchyard requiring single circuit line approach from two different sides.

5.2 The issue was discussed and following was agreed:

(i) Instead of the Simhadri-II TPS to Gazuwaka 400kV D/C line, the Gazuwaka – Vemagiri 400kV D/C line would be LILOed at the Simhadri-II TPS through 2x400kV D/C lines – **to be implemented by PGCIL as ATS for Simhadri-II TPS.**

(ii) NTPC would provide four number of 400kV line bays at their generation switchyard.

6.0 Transmission System Associated with Cheyyur UMPP in Tamil Nadu 4000 MW

6.1 Member(PS), CEA stated that the transmission system for this project was presently proposed to be implemented by private developer selected through tariff based competitive bidding process. Considering the time required in processing award of the project to successful bidder through this process, there was an urgency to finalize the transmission system for TNUMPP so that necessary approvals and back-to-back contractual agreements between State utilities buying power from TNUMPP, the Generation developer and the Transmission developer could be obtained in time.

6.2 Director, CEA explained that the Cheyyur UMPP (TNUMPP) at Cheyyur Taluk, Kanchipuram District, Tamil Nadu was being taken up by Coastal Tamil Nadu Power Ltd, an SPV company of PFC, who had applied to POWERGRID seeking Long Term Open Access for evacuation and transmission of power from the project to its beneficiaries. As per the allocation of power from this UMPP, 3100 MW has been allocated for Southern Region and rest 900 MW for Western and Northern Regions:

Southern Region (3100 MW):		
Tamil Nadu	-	1600 MW
Karnataka	-	800 MW
Andhra Pradesh	-	400 MW
Kerala	-	300 MW
Western Region (400 MW):		
Maharashtra	-	400 MW
Northern Region (500 MW):		
Uttar Pradesh	-	300 MW
Punjab	-	200 MW

The project was presently expected to be commissioned in the time frame of 2015-17. A comprehensive transmission requirement has been assessed for evacuation of power from the new IPP projects, including TNUMPP, coming in Andhra Pradesh and Tamil Nadu who have applied for LTOA.

6.3 The system was discussed and following transmission system was agreed:

1. TNUMPP – Tiruvalam 765kV 2xS/C or D/C line **$**
2. Tiruvalam – Kurnool 765kV S/C line
3. Kurnool – Raichur 765kV 2xS/C or D/C line **$**
4. TNUMPP – Salem 765kV S/C line
5. Salem – Madhugiri 765kV S/C line (line no.# 2)*

$ - PGCIL would assess technical feasibility of constructing and maintaining 765kV D/C lines and submit the same to CEA. Decision regarding building the TNUMPP-Tiruvalam and Kurnool-Raichur links as 2xS/C or D/C lines would be taken up after examining the feasibility report submitted by PGCIL.

* - Another Salem-Madhugiri 765kV line (line no.# 1) alongwith Salem and Madhugiri 765kV pooling stations is being planned to be implemented by PGCIL as part of evacuation system from IPP generation projects in Tuticorin area of Tamil Nadu, which would be initially charged at 400kV. These two S/Ss and the Salem-Madhugiri line would be charged at 765kV matching commissioning of TNUMPP or IPP generating stations coming in Cuddalore area, which ever would be earlier. The Cuddalore and Tiruvalam 765kV pooling Sub-stations are planned to be implemented by PGCIL as part of transmission system for evacuation of power from IPP generation projects coming in Tamil Nadu and Andhra Pradesh. A final decision in this regard would be taken after reviewing the progress on IPP generation projects.

6.4 Accordingly, it was decided that the power at TNUMPP would be stepped up to 765kV level. The generation switchyard at TNUMPP would have five number of 765kV line bays. Out of these five line bays, three would be for the transmission lines mentioned above and two line bays would be for LILO of Cuddalore- Tiruvalam 765kV S/C line at TNUMPP. The Cuddalore- Tiruvalam 765kV S/C line is being planned for evacuation of power from IPP projects in Tamil Nadu. In addition to above, provision for two more 765kV bays would have to be kept in the generation switchyard for two number of bus reactors.

7.0 Tiruvalam 765/400kV and 400/230kV Sub-Stations:

7.1 Member(PS), CEA said that the during the 27th meeting of this Committee, the issue of setting up a 765/400/230kV sub-station by TNEB/POWERGRID came up for discussion while discussing the transmission system for Vallur TPS and NCTPS-II projects. TNEB informed that since conception of 765kV S/S may take longer time, they would initially establish the 400/230kV S/S to match with the commissioning schedule of the NCTPS-II and Vallur JV projects. Later, the 765kV side could be executed by PGCIL in the same premises in such a way that 400/230kV S/S owned by TNEB will be part of the 765kV S/S. TNEB also informed that they have identified about 140 acre of land at Illayanallur village about 6 km from Tiruvalam 230/110kV S/S.

7.2 It was decided that both TNEB and PGCIL would procure suitable contiguous land. TNEB would build their 400/230kV S/S for terminating their Alamathi-Tiruvalam 400kV D/C line and Singarapet-Tiruvalam 400kV Quad D/C line. And PGCIL would initially build their 400kV part of the 765/400kV S/S as extended bus of TNEB's 400kV bus and separated from it by bay sectionalizer. The Chittoor – Tiruvalam 400kV D/C line of PGCIL would be terminated at the PGCIL part of the Tiruvalam S/S.

8.0 Transmission System Strengthening in Tamil Nadu:

8.1 CE, TNEB stated that they have yet to estimate the quantum of surplus power to be exported out from Tamil Nadu and would revert back after due assessment. Accordingly, following was decided:

(i) TNEB would go ahead in implementing following transmission works:
- Establishment of 400/230kV S/S at Singarapet with 2x315 MVA ICT.

- LILO of both the circuits of Pugalur – Ottiampakkam (Sholinganallur) 400kV DC Quad line at Singarapet 400kV S/S with Quad Conductor.

(ii) The Hosur – Singarapet 400kV DC line of TNEB was deferred pending assessment of export from Tamil Nadu.

9.0 Start-up Power for Vallur JV TPS of NTPC and TNEB:

9.1 NTPC representative stated that for start-up power for the Vallur project, they require connectivity with Nellore S/S. He said that Vallur TPS (3x500 MW) is to be connected to Alamathi and Melakottaiyur both of which are load centers, and the Nellore-Sriperumbudur 400kV D/C line would be restored for making way to connect Vallur and Chennai TPS-II at Alamathi.

9.2 The issue was discussed and it was decided that initially, only one circuit of the Nellore-Sriperumbudur 400kV D/C line would be restored and Vallur would be connected with Alamathi. With this arrangement, the Vallur TPS can draw start-up power from Nellore via Alamathi using the second Nellore-Alamathi-Sriperumbudur circuit. **NTPC-TNEB JV company would coordinate with PGCIL for this arrangement.**

10.0 Temporary Arrangements for Connecting Bhoopalapally TPS of APGENCO with the Grid:

10.1 APTRANSCO representative stated that the Bhoopalapally generation may be available by December 2009, but the Bhoopalapally – Warrangal 400kV D/C line was getting delayed and also that the required 400kV bays for this line at the Warrangal S/S of PGCIL would not be available by that time. They have proposed a temporary arrangement through LILO of Ramagundam – Khammam 400kV S/C line with part of the Bhoopalapally – Warrangal 400kV D/C line.

10.2 The issue was discussed and following was decided:

(i) APTRANSCO would construct the 400kV Bhoopalapally – Warangal D/C line upto the line alignment of Ramagundam – Khammam 400kV S/C line and LILO one circuit of this line to provide start up power to Bhoopalapally TPS.

(ii) The above arrangement would be a temporary arrangement till completion of the Bhoopalapally – Warrangal 400kV D/C line. APTRANSCO would speed up construction of the Bhoopalapally – Warrangal 400kV D/C line and also complete Warangal – Nagaram 220kV D/C line in time. APTRANSCO would report latest progress of these works to CEA and SRPC on regular basis.

11.0 Fourth transformer at Ghanapur by PGCIL:

11.1 ED, PGCIL stated that they were facing difficulty due to over-loading of their 3x315 MVA transformers at the Ghanapur 400/220kV S/S in Hyderabad. PGCIL had, therefore, proposed installation of 4^{th} 400/220kV transformer at Ghanapur. Member(PS), CEA stated that the Gajwel 400/220kV S/S has been commissioned and the 400/220kV S/S at Malkaram was scheduled to be commissioned shortly. APTRANSCO need to re-arrange their 220kV network to draw power from Gajwel and relieve Ghanapur S/S. PGCIL stated in case APTRANSCO does not relieve loading on the Ghanapur S/S, any fault at the S/S may adversely affect power supply to Hyderabad city and also may affect grid security.

11.2 The issue was discussed and following was decided:

(i) APTRANSCO would re-arrange their 220kV network to draw power from Gajwel and Malkaram 400kV S/S.

(ii) As another 400/220kV S/S at Yeddumailaram was also being implemented, which would further relieve loading on the Ghanapur S/S, the addition of fourth transformer at Ghanapur need not be taken up.

12.0 Issue Regarding Stringing of Neyveli – Pugalur 400kV D/C line:

Director, NLC stated that they have been asked by PGCIL for shutdown of 400kV feeders from NLC TPS-I Expansion to Trichy and TPS-II for one day for stringing work of new Neyveli – Pugalur 400kV D/C line. This, he said would involve shutdown of units at TPS-I Expansion. NLC had discussed the matter with PGCIL and have given alternate proposals. The issue was discussed and it was decided that NLC would refer the matter to CEA and SRPC furnishing details for resolving this issue.

13.0 Issue Regarding LTOA and Signing of BPTA for the Nagarjuna TPS in Nandikur, Karnataka:

Director(Transmission), KPTCL stated that M/s UPCL (i.e. Nagarjuna TPS) is establishing a Thermal Power station with 1015 MW Capacity at Nandikur in Udupi District. Out of this 915 MW of power will be utilized in Karnataka and remaining 94MW will be sent to Punjab State Electricity Board and KPTCL was constructing 400kV quad moose DC line from UPCL switch yard to Shanthigrama, Hassan (PGCIL) sub station and 220 kV DC line to 220kV Khemar sub station. In this regard, he stated that, UPCL is requesting necessary directions regarding signing of Bulk Transmission Agreement with Power Grid Corporation of India. The issue was discussed and it was decided that KPTCL would refer the matter to CEA furnishing details for resolving this issue.

14.0 Discussions on the Inter State Transmission System(ISTS) Issues in respect of Long Term Open Access Applications(LTOA) made to the Central Transmission Utility(CTU) for Projects in Southern Region:

Minutes of the LTOA discussions issued by POWERGRID are given at Annex-III.

Annex-I

List of participants for the 28th meeting of Standing Committee on Power System Planning held on 15th June, 2009 at Koorg

Sl. No.	Name and Organization	Designation
	Central Electricity Authority (CEA)	
1.	V Ramakrishna	Member (PS)
2.	Pardeep Jindal	Director (SP&PA)
	Southern Region Power Committee (SRPC)	
3.	M.L.Batra	Member Secretary
4.	S R Bhat	SE
	Power Grid Corporation of India Ltd (POWERGRID)	
5.	I.S.Jha	ED
6.	M. Krishna Kumar	GM (Proj.)
7.	Pankaj Kumar	GM(Engg.)
8.	M.R.V. Holla	AGM
9.	Dilip Rozekar	Chief Design Engr.
10.	K.P.Balanarayan	CM /Mysore
11.	A.Naga Raju	CM(Comm.)
	National Thermal Power Corp. (NTPC)	
12.	Abhijit Sen	DGM(PE-Elect.)
13.	S.R.Bhat	DGM(NTECL)
	Nuclear Power Corp of India Ltd (NPCIL)	
14.	Sandeep Sarvate	Dy. CE
	Neyveli Lignite Corp. (NLC)	
15.	V. Seturaman	Director(Elect)
16.	S Muthu	GM/Ele.
	Transmission Corp. of Andhra Pradesh Ltd. (APTRANSCO)	
17.	M.Jayachandra	CE(PS)
18.	M Balasubramanyam	DE/System Studies
	Karnataka Power Transmission Corp. Ltd. (KPTCL)	
19.	Pratap Kumar	Director(Trans.)
20.	Suresh Babu	SEE(Planning)
21.	K Paramesha	AEE (Elect)
	Kerala State Electricity Board (KSEB)	
22.	K.S.Antony Thomas	Dy. Chief Manager(Grid)

Annex-II

Status of Southern Region New Schemes

Sl. No.	Name of Scheme & Elements	Standing Committee Approval	FR Date	Investment approval by POWERGRID Board/CCEA	Target as of now	Comments/Reasons of delay
1.	**Neyveli TS-II Expn Tr. System** a) Neyveli TS-II Expansion – Neyveli TS-II 400 kV 2xS/c b) Neyveli TS-II- Pugalur 400 kV D/c c) Pugalur – Madurai 400 kV D/c d) Udumalpet – Arasur 400 kV D/c e) LILO of Ramagundam-Khammam 400 kV S/c at Warrangal f) LILO of Neyveli – Sriperumbudur 400 kV S/c at Pondicherry g) Establishment of new 400/220 kV substations at Pugalur, Arasur, Pondicherry and Warrangal with 2x315 MVA transformer each.	16th Meeting on 20.01.03	Aug, 03	CCEA Approval – January, 2005	**Sep' 09**	– Commn schedule as per CCEA is Dec'07. – However, NLC have indicated that generation project has been delayed to Feb'10 – In 8th SPRC meeting held on 15th Feb, 08, NLC have indicated a further **delay of generation revised schedule – Feb' 10 / Jun' 10**
2.	**Kaiga U-3&4 Tr. System** a) Narendra – Davangere 400 kV D/c line b) Mysore – Kozhikode 400 kV D/c line c) LILO of existing Kolar – Sriperumbudur 400 kV S/c at new 400/220 kV substation at Melakottaiyur d) Establishment of new 400/220 kV substations at Kozhikode and Melakottaiyur with 2x315 MVA, 400/220 kV transformers e) Provision of 2nd 315 MVA, 400/220 kV transformer at Hiriyur 400/220 kV substations each.	16th Meeting on 20.01.03	Oct, 03	CCEA Approval – March, 2005	**Commissioned** Except Mysore - Kozhikode	– Mysore – Kozhikode is getting **delayed due to ROW** (50 Kms) of coffee planters in Kranataka portion, forest clearance problem in Kerala & Karnataka portion. The matter is taken with highest level with State Governments and further being

Sl. No.	Name of Scheme & Elements	Standing Committee Approval	FR Date	Investment approval by POWERGRID Board/CCEA	Target as of now	Comments/Reasons of delay
						followed up through intervention of Ministry of Power.
3.	**Kudankulam Tr. System** a) Kudankulam – Tirunelveli 2x400 kV D/c lines with Quad conductors b) Tirunelveli – Udumalpet 400 kV D/c lines with Twin conductors. c) LILO of both circuits of Madurai – Trivandrum 400 kV D/c line at Tirunelveli d) Tirunelveli – Edamon 400 kV Multi-ckt line (2 ckts of quad & 2 ckts of twin) e) Edamon – Muvattupuzha 400 kV D/c line (with Quad conductors) constructed in new ROW corridor f) Muvattupuzha - North Trichur 400 kV D/c line with quad conductor g) Establishment of new 400/220 kV transformers with 2x315 MVA transformers at Tirunelveli and Muvattupuzha. h) Transformation augmentations witn 1x315 MVA transformers at Udumalpet and Trivandrum 400/220 kV substations.	18th Meeting on 05.03.04	June, 04	CCEA – May, 2005		– **Generation project is delayed to Dec'09.** – System to be commissioned Matching with generation project. – Tirunelveli 400/220 kV S/stsn and LILO of Madurai – Trivandrum commissioned – **Severe ROW problems facing in Edamon – Muvattupuzha – North Trichur corridor**
4.	**System Strengthening – VII** a) Establishment of 400/220 kV new substation with 2x315 MVA transformers at Karaikudi.	18th Meeting on 05.03.04	July, 04	POWERGRID Board Approval - April, 05	**July' 09**	– Construction of line & substation are in progress.

Sl. No.	Name of Scheme & Elements	Standing Committee Approval	FR Date	Investment approval by POWERGRID Board/CCEA	Target as of now	Comments/Reasons of delay
	b) LILO of one circuit of Madurai-Trichy 400 kV D/c line at Karaikudi c) Establishment of 400/220 kV new substation with 2x315 MVA transformers at Hassan. d) LILO of one circuit of existing Talguppa-Neelmangla 400 kV D/c line at Hassan					
5.	**System Strengthening – VIII** a) 11 nos. of 63 MVAR Reactors (7 bus reactors + 4 line reactors)	23rd Meeting on 22.01.07	Mar, 07	POWERGRID Board Approval –Jan, 08	**Mar' 10 - Nov' 10**	– Award placed in **July 08** – Implementation work are in progress
6.	**Kalpakkam PFBR Tr. System** a) KPFBR - Kanchepuram 230 kV D/c line b) KPFBR – Arni 230 kV D/c line c) KPFBR – Sirucheri 230 kV D/c line d) 2 nos of 230 kV bays each at Kancheepuram, Arni and Sirucheri 230 kV substations of TNEB	20th Meeting on 07.10.04	Mar, 08		**Nov' 11**	– Commissioning schedule for D/c line to Sirucheri is **Apr' 11** – Complete system by **Nov' 11**
7.	**Transmission System associated with Tuticorin JV** a) Tuticorin – Madurai 400kV D/c line (Quad conductor)	22nd Meeting on 18.06.07	Jun, 07	POWERGRID Board Approval –Feb, 09	**Feb' 12**	– Award placed in **Feb' 09**
8.	**Transmission system associated with Chennai NTPC-TNEB JV TPS** a) LILO of Alamanthy – Sriperumbudur 400 kV D/c line at North Chennai TPS JV	24th Meeting on 18.06.07	Nov, 07	POWERGRID Board Approval –May' 08	**April' 09**	– Activities in progress, to be commissioned six months ahead of Gen, Gen. likely by **Oct'2010**
9.	**System Strengthening – IX** a) Hassan - Mysore 400 kV	24th Meeting on	Aug, 08	POWERGRID Board Approval	**Feb' 12**	– Award placed in

Sl. No.	Name of Scheme & Elements	Standing Committee Approval	FR Date	Investment approval by POWERGRID Board/CCEA	Target as of now	Comments/Reasons of delay
	D/c line	18.06.07		–Feb, 09		**Mar' 09**
10.	**Simhadri-II Tr. System** a) Simhadri – Gazuwaka 400 kV D/c with 95 degC conductor temperature	24th Meeting on 18.06.07	Sept, 08		**18 months** from investment approval	– FR prepared – **Tr. System under revision** – Investment to be taken shortly
11.	**System Strengthening – X** a) Establishment of new 400/220 kV substation at Bidadi with 7x167 MVA 400/220 kV transformers and 1x63 MVAR bus reactor b) LILO of one circuit of Neelamangla – Somnahalli 400 kV D/c line at Bidadi 400 kV substation	24th Meeting on 18.06.07	Sept, 08		**36 months** from investment approval	– FR prepared – Investment to be taken shortly
12.	**System Strengthening – XI** a) Establishment of new 400/220 kV substation at Chulliar (Palakkad) with 2x315 MVA transformers and 1x63 MVAR bus reactor. b) LILO of both circuits of Udumalpet - Madakathara (North Trichur) 400kV D/C line at Chulliar 400 kV substation	25th Meeting on 28.03.08	Oct, 08	POWERGRID Board Approval –Feb, 09	**Jul' 11**	– Award placed in **Mar' 09**
13.	**System Strengthening – XII** a) Establishment of new 400/220 kV substation at Yelahanka with 2x500 MVA transformers and 1x63 MVAR bus reactor. b) LILO of Neelamangla-Hoody 400kV S/c line at Yelahanka 400kV substation c) LILO of Somanhally-Hoody 400kV S/c line at Yelahanka 400kV substation	27th Meeting on 03.03.09	Jun, 08	FR under approval	**28 months** from investment approval	

Annexure – II

पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)
पावरग्रिड

केन्द्रीय कार्यालय : "सौदामिनी" प्लॉट सं. 2, सैक्टर-29, गुडगाँव-122 001, हरियाणा
फोन : 2571700 - 719, फैक्स : 2571760, 2571761 तार 'नेटग्रिड'
Corporate Office : "Saudamini" Plot No. 2, Sector-29, Gurgaon-122 001. Haryana
Tel. : 2571700 - 719, Fax : 2571760, 2571761 Gram : 'NATGRID'

संदर्भ संख्या/Ref. Number
Ref. No. : C/ENG/SEF/S/09/LTOA

Date : 5 June 2009

1.Sh. J.R.D. Rajakumar Vice President North Chennai Power Co. Ltd. 113, Pantheon Road, Egmore, Chennai – 600 008 (T.N.)	2.Sh. G Vijaya Kumar COO (Thermal Projects) PEL Power Ltd. #6-3-635, 4th Floor, Akash Ganga, Khairatabad, Hyderabad – 500 004 (A.P.)
3.Sh. Haziq Beg Sr. Vice President IL&FS Tamil Nadu Power Company Ltd. Eros Business Complex, Hotel Shngri-la, Ashoka Road, New Delhi – 110 001	4.Sh. D. Sundararajan Director & CEO SRM Energy Pvt. Ltd. 43, Free Press House, 215, Nariman Point, Mumbai - 400 021 (Maharashtra)
5.Sh. S. P. Pathak Chief Executive Coastal Tamil Nadu Power Limited, Urjanidhi, 1, Barakhamba Lane, New Delhi - 110 001	6.Shri K. Thiruppathi Director - Projects Coastal Energen Pvt. Ltd. 5th Floor Buhari Towers, 4 Moores Road, Chennai – 600 006
7.Sh. Raghu K. Chairman & Managing Director Ind-Barath Power (Madras) Ltd. 20/129, Ind-Barath House. Chamiers Road, Nandanam, Chennai – 600 035 (T.N.)	8.Sh. B. S. Rao General Manager NSL Power Private Limited, NSL Icon, Road No. 12, Banjara Hills, Hyderabad - 500 034
9.Shri K. Prakasa Rao East Coast Energy Private Limited 7-1-24, B Block, 5th Floor Roxana Towers, Green Lands, Begumpet, Hyderabad – 500 016 (A.P.)	10.Sh. KJBV Subrahmanyam Vice President –Projects NCC Infrastructure Holding Ltd. 4th Floor, MJ Towers, Road No. 12, Banjara Hills, Hyderabad – 500 034 (A.P

Sub: Agenda for meeting on Long Term Open Access applications in Southern Region

Dear Sir,

Please find enclosed the agenda for the Long Term Open Access applications in Southern Region. The meeting would be held at Orange County, Siddapur, Coorg, Karnataka on 15th June 2009 after the 28th meeting of the Standing Committee on Power System Planning of Southern Region from 2:00 PM onwards. It is requested to kindly make it convenient to attend the aforesaid meeting.

Thanking You,

Yours faithfully

5/6/2009

(Pankaj Kumar)
General Manager (Engg.-SEF)

Encl: Agenda

Agenda Note for Long Term Open Access Applications of New Generation in Southern Region

EXECUTIVE SUMMARY

1. *Long Term Open Access Applications*

POWERGRID has received following Long Term Open Access applications in Inter-State Transmission System (ISTS).

Sl. No.	Applicant	Generation Capacity (MW)	LTOA applied for (MW)	Location	Time Frame	Quantum allocated in the region		
						SR	WR	NR
1.	North Chennai Power Co. Ltd.	1200	820	Near Chennai, T.N.	Jan, 2012 / Dec, 2013	350	470	
2.	PEL Power Ltd.	1000	1000	Nagapattinam Dist, T.N.	Dec, 2011	250	750	
3.	IL&FS Tamil Nadu Power Co. Ltd.	1500	1500	Cuddalore, T.N.	Dec, 2012 / Jun, 2013	750	750	
4.	SRM Energy Pvt. Ltd.	1800	1665	Cuddalore, T.N.	Dec, 2012	665	500	500
5.	Coastal Tamil Nadu Power Ltd.	4000	4000	Kanchipuram, T.N.	2013-14	2800	400	500
6.	Coastal Energen Pvt. Ltd.	1200	720	Tuticorin, T.N.	Mar, 2011	720		
7.	IND-Barath Power (Madras) Ltd.	1400	945	Tuticorin, T.N.	Mar, 2011	599	236	425
8.	NSL Power Pvt. Ltd.	1320	800	Nagapattinam, T.N.	Oct, 2011			
9.	East Coast Energy Pvt. Ltd.	2640	2640	Srikakulam, A.P.	Oct, 2010	750	600	1100
10.	NCC Vamsadhara Power Project	1980	1980	Srikakulam Dist., A.P.	Nov, 2011			
	Total	**18040**	**16070**			**6884**	**3706**	**2525**

Note: The total of allocation is not exactly matching with the capacity addition (18190 MW) because some of the applicants have not given the beneficiaries and some have sought open access for quantum lesser than its Installed capacity

2. *Power Supply Position*

(a) Demand

Year	Projected Load (MW)
2011-12 (end of 11th Plan)	40367
2012-13	43760
2013-14	47438
2014-15	51425
2015-16	55747
2016-17 (end of 12th Plan)	60433

(b) Capacity Additions Including LTOA projects

Sl. No.	***Capacity Addition (MW)***	***Hydro (MW)***	***Thermal incl. Nuclear***	***Total (MW)***
1.	*11th Capacity Additions programme of 78500 MW on All India basis*	*1217*	*14601*	*15818*
2.	*Additional Projects under State sector/State IPP not covered under 11th Plan*	*-*	*2590*	*2590*
3.	*Open Access Capacity Addition*	*-*	*28641*	*28641*
	Total	***1217***	***45832***	***47049***

(c) Surplus/Deficit

Summer	***13828***
Winter	*14705*
Winter Off-Peak	***24317***

IN other words, *during 2014-15 and beyond, SR shall be having surplus power of the order of 14,000 MW during summer peak conditions and about 24,000 MW during winter off-peak conditions.*

However East-Coast (2640 MW) & NCC Vamshadra (1980 MW) are located in SR but are close to Orissa, ER and their can be conveniently and effectively connected to ER for onward dispersal to WR/NR.

Accordingly the net inter-regional capacity requirement for the Southern region shall be atleast of the order of 10,000 MW.

3. Transmission System Proposed with Different LTOA Projects

A) *Project Name* : ***M/s Coastal Energen Pvt. Ltd.***

Open Access Quantum : *720 MW*

Beneficiaries : *Tamil Nadu-520MW, Karnataka-200MW*

Date of Effectiveness for BPTA : *March, 2011*

Transmission System requirement : ***Dedicated System***

a) Establishment of 765 kV Tuticorin Pooling station at Coastal Energen (or any other convenient point) initially charged 400 kV

Cost - about Rs. 100 Crs.

B)	*Project Name*	:	***M/s Ind-Barath Power (Madras) Ltd.***
	Open Access Quantum	:	*945 MW*
	Beneficiaries	:	*Tamil Nadu-315MW, SR-284MW, WR-236, NR-425MW*
	Date of Effectiveness for BPTA	:	*March, 2011*
	Transmission System requirement	:	***Dedicated System*** *a) Ind-Barath Switchyard - Tuticorin Pooling station 400 kV Quad/high capacity D/c line* ***Cost - about Rs. 40 Crs.*** ***Grid Strengthening for Coastal Energen & Ind-Barath*** *a) Tuticorin pooling station – Tuticorin JV switchyard 400 kV Quad/high capacity D/c line* *b) Establishment of new 765kV (initially charged at 400kV) 2x1500 MVA substation at Salem* *c) Tuticorin pooling station – Salem 765kV D/c line (initially charged at 400kV)* ***Cost - about Rs. 1325 Crs.***
C)	*Project Name*	:	***M/s Coastal Tami Nadu Power Ltd.***
	Open Access Quantum	:	*4000 MW*
	Beneficiaries	:	*Tamil Nadu-1600MW, Karnatak-800MW, Andhra Pradesh-400MW, Kerala-300MW, Maharashtra-400MW, Uttar Pradesh-300MW, Punjab-200MW*
	Date of Effectiveness for BPTA	:	*2013-14*
	Transmission System requirement	:	***Dedicated System*** *a) TN UMPP – Tiruvalem 765kV D/c line* *b) TN UMPP – Salem 765kV S/c line* ***Cost - about Rs. 750 Crs.*** ***Grid Strengthening for Coastal TN*** *a) Establishment of Pooling stations; 765kV at Tiruvelam and 765kV (initially charged at 400kV) at Hiriyur/New Banaglore* *b) Tiruvalem – Kurnool 1st 765kV S/c line* *c) Kurnool – Raichur 765kV D/c line (two circuits already planned one with Krishnapatnam UMPP and other*

G)	*Project Name*	:	***M/s SRM Energy Pvt. Ltd.***
	Open Access Quantum	:	*1665 MW*
	Beneficiaries	:	*SR-40%, WR-30%, NR-30%*
	Date of Effectiveness for BPTA	:	*December, 2012*
	Transmission System requirement	:	***Dedicated System*** *a) SRM Switchyard – Cuddalore Pooling station 400kV D/c Quad line* ***Cost - about Rs. 100 Crs.*** ***Grid Strengthening for NSL, PEL, IL&FS & SRM*** *a) Establishment of 765/400kV Pooling station at Cuddalore by LILO of TN UMPP – Salem 765kV S/c line* *b) Cuddalore – Salem 765kV D/c line* *c) Cuddalore – TN UMPP – Tiruvalem 765kV 1xS/c line* *d) Tiruvalem – Kurnool 2nd 765kV S/c line* *e) Raichur – Sholhapur 765kV 1xS/c line (two circuits already planned with Krishnapatnam UMPP)* ***Cost - about Rs. 1950 Crs.***
H)	*Project Name*	:	***M/s North Chennai Power Co. Ltd.***
	Open Access Quantum	:	*820 MW*
	Beneficiaries	:	*Maharashtra-470MW, Karnataka-350MW, Tamil Nadu-284MW*
	Date of Effectiveness for BPTA	:	*January, 2012 / December, 2013*
	Transmission System requirement	:	***Dedicated System*** *a) North Chennai (Aban) Switchyard – Tiruvelam 400kV D/c Quad/high capacity line* ***Cost - about Rs. 250 Crs.*** ***Grid Strengthening common for Coastal Energen, Ind-Barath, NSL, PEL, IL&FS, SRM, Coastal TN & North Chennai*** *a) Establishment of 765/400kV Pooling station at Salem, Tiruvelam, Hiriyur/New Banaglore and Basawan Bagewadi* *b) Salem – Hiriyur/New Banaglore 765kV D/c line* *c) Hiriyur/New Banaglore – Basawan Bagewadi*

765kV D/c line
d) Basawan Bagewadi – Sholhapur 765kV D/c line
e) Tamil Nadu UMPP – Tiruvalem 3 circuits of 765kV line
f) Tiruvelam – Kurnool 765kV 2xS/c line
g) Kurnool – Raichur 765kV D/c line
h) Raichur – Sholhapur 1 circuit of 765kV line

Cost - about Rs. 6190 Crs.

I)	Project Name	:	**M/s East Coast Energy Pvt. Ltd**
	Open Access Quantum	:	2640 MW
	Beneficiaries	:	Andhra Pradesh0-200MW, Karnataka-550MW, Maharashtra-500MW, Goa-100MW, Rajasthan-600MW, Punjab-500MW
	Date of Effectiveness for BPTA	:	October, 2010
	Transmission System requirement	:	**Dedicated System** a) Establishment of 765kV/400kV pooling station in Srikakulam area within the switchyard of either East-coast energy or NCC Vamshadhra. b) Step-up of East-coast energy generation projects to 765kV c) LILO of both circuits of Behrampur – Gazuwaka 400 kV D/c line at Pooling station. d) 765kV D/c line from Srikakulam Pooling Station to Angul Pooling station in Orissa **Cost - about Rs. 1400 Crs.**
J)	Project Name	:	**M/s NCC Vamsadhara Power Project**
	Open Access Quantum	:	1980 MW
	Beneficiaries	:	Merchant based power plant
	Date of Effectiveness for BPTA	:	November, 2011
	Transmission System requirement	:	**Dedicated System** a) 765 kV interconnection lines from NCC Vamshadhra generation projects to Pooling Station. b) 1xS/c 765 kV lines from Srikakulam Pooling Station to Angul Pooling station in Orissa **Cost - about Rs. 560 Crs.**

1.0 INTRODUCTION

POWERGRID has received number of applications from various generation developers seeking long term Open Access in Inter-State Transmission System (ISTS) for transfer of power from their proposed generation projects to various beneficiaries in Southern Regions, Western and Northern region as indicted below.

Table – 1 – Application for Long Term Open Access

Sl. No.	Applicant	Generation Capacity (MW)	LTOA applied for (MW)	Location	Time Frame	Quantum allocated in the region		
						SR	WR	NR
1.	North Chennai Power Co. Ltd.	1200	820	Near Chennai, T.N.	Jan, 2012 / Dec, 2013	350	470	
2.	PEL Power Ltd.	1000	1000	Nagapattinam Dist, T.N.	Dec, 2011	250	750	
3.	IL&FS Tamil Nadu Power Co. Ltd.	1500	1500	Cuddalore, T.N.	Dec, 2012 / Jun, 2013	750	750	
4.	SRM Energy Pvt. Ltd.	1800	1665	Cuddalore, T.N.	Dec, 2012	665	500	500
5.	Coastal Tamil Nadu Power Ltd.	4000	4000	Kanchipuram, T.N.	2013-14	2800	400	500
6.	Coastal Energen Pvt. Ltd.	1200	720	Tuticorin, T.N.	Mar, 2011	720		
7.	IND-Barath Power (Madras) Ltd.	1400	945	Tuticorin, T.N.	Mar, 2011	599	236	425
8.	NSL Power Pvt. Ltd.	1320	800	Nagapattinam, T.N.	Oct, 2011			
9.	East Coast Energy Pvt. Ltd.	2640	2640	Srikakulam, A.P.	Oct, 2010	750	600	1100
10.	NCC Vamsadhara Power Project	1980	1980	Srikakulam Dist., A.P.	Nov, 2011			
	Total	**18040**	**16070**			**6884**	**3706**	**2525**

Note: The total of allocation is not exactly matching with the capacity addition (18190 MW) because some of the applicants have not given the beneficiaries and some have sought open access for quantum lesser than its Installed capacity

Following broad observations can be made from the Table – I above

- From above it is seen that out of the **18040 MW** capacity addition through Open Access projects about **6884 MW** is allocated to beneficiaries of SR and balance about **6231 MW** is allocated to beneficiaries outside SR (about 3706 MW in WR and about 2525 MW in NR).
- Further earlier POWERGRID has processed 7 nos of applications with an installed of 8351 MW out of which 3535 MW has been allocated as target beneficiaries to SR and about 4375 MW allocated as target beneficiaries outside SR.

- Additionally, transmission system has been finalized for Krishnapatnam UMPP (4000 MW) of which 3200 MW has been allocated to SR constituents and 800 MW to Maharashtra in WR.
- Taking above into considerations, it may be seen that about 30391 MW capacity addition (including Krishnapatnam UMPP) has been envisaged in Southern region out of which substantial power (11,406 MW) is targeted to be transferred to beneficiaries out side the region. In other words, the inter-regional transfer of power from generation projects in SR is quite substantial and shall require strengthening of inter-regional links from SR.

2.0 PROJECTED POWER SUPPLY SITUATION OF SOUTHERN REGION

- The projected **peak demand** of **SR** as per **17th EPS** is **40367 MW** by the by the end of **11th Plan (2011-12) and 60433 MW** by the end of **12th Plan** (2016-17). The projected load for intermediate years have been calculated through extrapolation method as shown below:

Table – 2 – Load Projection

Year	Projected Load (MW)
2011-12 (end of 11th Plan)	40367
2012-13	43760
2013-14	47438
2014-15	51425
2015-16	55747
2016-17 (end of 12th Plan)	60433

- **Capacity Additions (2014-15 Time Frame)**

In southern region following generation addition programme has been projected

Table – 3 – Generation Capacity addition in SR

Sl. No.	Capacity Addition (MW)	Hydro (MW)	Thermal incl. Nuclear	Total (MW)
1.	11th Capacity Additions programme of 78500 MW on All India basis	1217	14601	15818
2.	Additional Projects under State sector/State IPP not covered under 11th Plan	-	2590	2590
3.	Open Access Capacity Addition (List given below)	-	28641	28641
	Total	**1217**	**45832**	**47049**

Table – 4 – Capacity Addition under Open Access

S.No	Project Name	Capacity (MW)
Project for which TR. System already planned		
1.	Lanco Nagarjuna Power	1015
2.	Simhapuri	540
3.	Meenakshi	540
4.	Lanco Kondapalli	366
5.	Krishnapatnam UMPP	4000
6.	Krishnapatnam Power Corporation Ltd.	1860
Project for which TR. System proposed in present study		
7.	Kenita Power Private Ltd.	1830
8.	East Coast Energy Pvt. Ltd.	2640
9.	NCC Vamsadhara Power Project	1980
10.	JSW Power Trading Co. Ltd.	600
11.	North Chennai Power Co. Ltd.	1200
12.	PEL Power Ltd.	1000
13.	IL&FS Tamil Nadu Power Co. Ltd.	1500
14.	SRM Energy Pvt. Ltd.	1800
15.	Coastal Tamil Nadu Power Ltd.	4000
16.	Coastal Energen Pvt. Ltd.	1050
17.	IND-Barath Power (Madras) Ltd.	1400
18.	NSL Power Pvt Ltd	1320
	Total	**28641**

** *the above list does not figure Krishnapatnam (APPDCL) as this is already covered under 11th Plan capacity addition of 15818 MW in SR*

- **Power Supply Situation:** Based on above capacity additions programme and projected load growth the power supply scenario can be worked out as

Table – 5 – Power Supply Situation in SR in2014-15 Time Frame

	Th	Hy	Wind	Total
Installed Capacity				
Existing	21789	11300	4604	37693
Additions	45832	1217		47049
Total Installed capacity by 2014-15	67621	12517	4604	84742
Availability factors				
Summer	80%	70%	52%	65253
Winter	85%	50%	52%	66130
Winter Off-Peak	80%	10%	52%	57743
Load				
Summer				51425
Winter				51425
Winter Off-Peak @65% of Winter Peak Load				33426
Surplus/Deficit				
Summer				**13828**
Winter				14705
Winter Off-Peak				**24317**

- From above, it may be seen that during 2014-15 and beyond SR shall be having surplus power of the order of 14,000 MW during summer peak conditions and about 24,000 MW during winter off-peak conditions. Here, it is to be noted that above surplus includes 11,400 MW of targeted power allocated to beneficiaries outside SR. Further this allocation shall increase as some of the generation projects have not indicated their firm beneficiaries.

- The above list of generation projects include East-Coast (2640 MW) and NCC Vamshadra (1980 MW) which though are located in Southern region but are quite close to Orissa, Eastern region. The power from these projects can be conveniently and effectively connected to eastern region grid for onward dispersal to Western/Northern regions. Accordingly the net inter-regional capacity requirement for the Southern region shall be atleast of the order of 10,000 MW.

- The generation addition in SR likely during the 12th plan period under central sector is yet to be finalized. However, looking into overwhelming response from private developers for setting up power project based on coastal sites it is likely that SR shall continue to be huge surplus of power.

3.0 DEVELOPMENT OF TRANSMISSION SYSTEM

The transmission system requirement for the above scenarios can be seen as two sub-requirements; one concerning adequacy of inter-regional capacity to cater the surplus power of the order of 10,000 MW and second the immediate evacuation & strengthening within SR for each of the generation projects seeking open access to ISTS.

3.1 Inter-regional Transmission Capacity requirement

As mentioned above, the SR shall be having peak surplus of the order of 14,000 MW during 2014-15 time frame. The 2014-15 time frame was considered because in this time frame all the identified generation projects under central sector (as mentioned in the Table-4 above) as well as those applied under Long Term Open access shall be commissioned (like Simhadri-II, Vallur TPS, Tuticorin JV, Krishnapatnam UMPP, Tamil Nadu UMPP etc.). Beyond this time frame the generation projects are not

identified and only load projection is available, which may not give the realistic power scenario.

From the above, it may be seen that the existing Chandrapur 1000 MW HVDC back-to-back, Gazuwaka 1000 MW HVDC back-to-back, proposed 1000 MW Kolhapur HVDC back-to-back and proposed Raichur – Sholapur 2x765 kV S/c lines shall not be adequate to cater to the inter-regional transmission capacity requirement. Additionally, the regulation of power order over Talcher – Kolar HVDC bipole and reverse flow can also be used for transfer of power from SR to WR/NR via ER subject to limitation of transmission capacity in ER and ER-WR corridor. For this purpose, it would be necessary to augment strengthening in ER beyond Talcher and enhancement of ER-WR capacity to facilitate this transfer of power.

3.2 Evolution of Transmission Capacity within Southern Region

It is seen that the applications seeking open access basically belongs to following coastal areas in Eastern Coast

Table – 6 – Generation Time Frame

Sl. No.	Area/Project	Generation Project Capacity (MW)	Time Frame
	Tuticorin, T.N.		
1.	Coastal Energen Pvt. Ltd.	1200	Mar, 2011
2.	IND-Barath Power (Madras) Ltd.	1400	Mar, 2011
	Nagapattinam/Cuddalore Dist, T.N.		
3.	NSL Power Pvt. Ltd.	1320	Oct, 2011
4.	PEL Power Ltd.	1000	Dec, 2011
5.	IL&FS Tamil Nadu Power Co. Ltd.	1500	Dec, 2012 / Jun, 2013
6.	SRM Energy Pvt. Ltd.	1800	Dec, 2012
	Near Chennai, T.N.		
7.	North Chennai Power Co. Ltd.	1200	Jan, 2012 / Dec, 2013
	Kanchipuram, T.N.		
8.	Coastal Tamil Nadu Power Ltd.	4000	2013-14
	Srikakulam, A.P.		
9.	East Coast Energy Pvt. Ltd.	2640	Oct, 2010
10.	NCC Vamsadhara Power Project	1980	Nov, 2011
	Total	**18040**	

For the above mentioned generation projects a comprehensive transmission system shall have to be evolved for the 2014-15 time frame to transfer power from these generation projects to the beneficiaries with reliability & security. Once the comprehensive transmission is evolved then it has to phased accordingly to link with each of the generation projects under LTOA to ensure the evacuation & supply of power to its targeted beneficiaries. While doing this care has to be taken to tackle the

element of uncertainty with regard to actual materialization of Open Access projects, so that there is least dependency of commissioning of one project over other as far as its evacuation is concerned. Therefore it is prudent that pooling stations of requisite voltage level are created in each of these generation pockets. Further, these pooling stations are integrated and high capacity transmission highways alongwith intermediate pooling stations are established for hauling bulk power from these generation resources to potential/target places of consumption.

3.3 Comprehensive Transmission System required for all Open Access generation projects in Tamil Nadu

Considering all the identified generation projects under central sector as well as under Long Term Open access in Tamil Nadu are available by the 2014-15 time frame, it is seen that high capacity transmission corridors shall required to be developed northwards Taking quantum of capacity additions in the area into considerations it is found that two nos of 765 kV transmission corridors from Tamil Nadu shall required to be developed alongwith inter-mediate 765 kV substations viz. one via Salem – Hiriyur/New Banaglore – Basvanbagewadi - Sholapur and other via Thiruvelam – Kurnool – Raichur – Sholapur. Accordingly, studies have been conducted with the following transmission system and the load flow results are placed at **Exhibit-I**.

a) Establishment of 6 nos. of 765/400kV Pooling station at Cuddalore, Tiruvelam, Salem, Hiriyur/New Banaglore, Basawan Bagewadi and Tuticorin
b) Tuticorin pooling – Tuticorin JV 400kV D/c (Quad/high capacity twin) line
c) Tuticorin pooling – Salem pooling 765kV D/c (initially charged at 400kV) line
d) Salem – Hiriyur/New Banaglore 765kV D/c line
e) Hiriyur/New Banaglore – Basawan Bagewadi 765kV D/c line
f) Basawan Bagewadi – Sholhapur 765kV D/c line
g) Tamil Nadu UMPP – Cuddalore 765kV 2xS/c line
h) Cuddalore – Salem 765kV 3 circuits (1xD/c & 1xS/c) of 765kV line
i) Tamil Nadu UMPP – Tiruvalem 3 circuits (1xD/c & 1xS/c) of 765kV line
j) Tiruvelam – Kurnool 765kV 2xS/c line
k) Kurnool – Raichur 765kV D/c line
l) Raichur – Sholhapur 765kV 1xS/c line

From the study results following is observed

i. Loading on TN UMPP to Tiruvelam & beyond to Kurnool is about 3880MW & 2202 MW respectively.
ii. Loading on Kurnool – Raichur & Raichur – Sholapur is about 5135 MW & & 4693 MW respectively.
iii. Loading on Cuddalore pooling station to Salem is about 4488 MW
iv. Loading on Salem – Hiriyur/New Banaglore, Hiriyur/New Banaglore – Basawan Bagewadi and Basawan Bagewadi – Sholapur is about 3365 MW, 1495 MW and 1335 MW respectively.
v. The above loadings in two different corridors towards Sholapur are well within the limits as per Transmission Planning criteria under normal as well as contingency conditions.

3.4 Phasing of Comprehensive Transmission System

3.4.1 Tuticorin Area

From **Table-6**, it is seen that two applications for generation projects viz Coastal Energen Pvt. Ltd. (1200 MW) and Ind-Barath Power (Madras) Ltd. (1400 MW) are located in Tuticorin area which are proposed to be materialized by March, 2011.

Apart from above, Tuticorin JV TPS (2x500 MW) has been proposed in the same vicinity which is likely to be commissioned by February 2012. The transmission system comprising of Tutiocorin – Madurai 400 kV (Quad) D/c line associated with Tuticorin JV has already been finalized and is under implementation.

It is pertinent to mention here that NPCIL have indicated expansion of their under construction Kudankulam APP (2x1000 MW) by 4 more units of 1000 MW each. Therefore it would be prudent that the transmission corridor constructed from Tuticorin area northwards should be 765 kV to accommodate future requirement.

Phasing of the transmission system which is required in 2014-15 time frame has been worked out to evolve the minimum transmission system that should be available in the intermediate time frame of 2011-12 corresponding to load-generation, for meeting the evacuation requirement of Coastal Energen and Ind-

Barath generation projects. The transmission system is as below and the base case load flow results with the following transmission system is given at **Exhibit-II.**

a) Establishment of 765 kV Pooling station at Coastal Energen (or any other convenient point) initially charged at 400 kV.
b) Ind-Barath Switchyard - Tuticorin Pooling station 400 kV Quad/high capacity D/c line
c) Establishment of new 765kV (initially charged at 400kV) 2x1500 MVA substation at Salem
d) Tuticorin pooling station – Tuticorin JV switchyard 400 kV Quad/high capacity D/c line
e) Tuticorin pooling station – Salem 765kV D/c line (initially charged at 400kV)

From the study results following may is observed

i. Loading on Tuticorin pooling station – Salem is about 1290 MW and Tuticorin pooling station – Tuticorin JV switchyard is about 930 MW
ii. Loading on some of the lines under normal condition is on higher side and loading may further increase under contingency conditions

Therefore, the transmission system is capable to evacuate power from these generation projects with some constraints under contingency conditions. This situation shall improve with the commissioning of strengthening schemes linked with other generation projects.

Further, the inter-regional transmission link viz. Raichur – Sholapur 765 kV line associated with Krishnapatnam UMPP may not be available by this time frame hence the inter-regional power transfer shall be constrained to the extent capacity that shall be available.

3.4.2 Kanchipuram area

Coastal Tamil Nadu Power Ltd. has applied for LTOA for 4000 MW (TN UMPP) located in Kanchipuram. The power from generation project has been considered to be stepped-up at 765kV level. For evacuation of power two corridors have been considered viz. one towards Raichur via Tiruvelam and another towards Salem 765kV sub-station proposed alongwith generation projects of Tuticorin area. The

load flow study results for base case are given at **Exhibit-III** and for contingency at **Exhibit-IIIa**.

a) Establishment of Pooling stations; 765kV at Tiruvelam and 765kV (initially charged at 400kV) at Hiriyur/New Banaglore
b) TN UMPP – Tiruvalem 765kV D/c line
c) Tiruvalem – Kurnool 1st 765kV S/c line
d) Kurnool – Raichur 765kV D/c line (two circuits already planned one with Krishnapatnam UMPP and other with other open access projects in Nellore area)
e) TN UMPP – Salem 765kV S/c line
f) Charging of Salem substation at 765kV
g) Salem – Hiriyur/New Banaglore 765kV D/c line (initially charged at 400kV)

From the results it may be seen that

i. Loading on TN UMPP -Tiruvelam 765kV D/c line is about 2300 MW and TN UMPP – Salem 765kV S/c is about 1250 MW.
ii. Similarly the Kurnool – Raichur and Raichur – Sholapur 765kV lines are adequately loaded.
iii. The Salem – Hiriyur/New Banaglore 765kV D/c line (initially charged at 400kV) relives the transmission loading on corridor towards Bangalore.

Therefore, it may be seen that the proposed transmission system is adequate to transfer power from Tamil Nadu UMPP under normal as well contingency conditions.

3.4.3 Cuddalore/Nagapattinam area

Four (4) nos. of projects of about 5600 MW have been proposed in the Cuddalore & Nagapattinam area which are 100 Kms apart from each other. Two nos. of applications of generation projects viz. NSL Power Pvt. Ltd. (1320 MW) and PEL Power Ltd. (1000 MW) are located in Nagapattinam area which are proposed to be materialized by October, 2011 and December, 2011 respectively. Further, two nos. of applications for generation projects viz IL&FS Tamil Nadu Power Co. Ltd. (1500 MW) and SRM Energy Pvt. Ltd. (1800 MW) are located in Cuddalore area which are proposed to be materialized by December, 2012. To evacuate power from these projects the two nos. of transmission corridors developed above have been considered for strengthening through following transmission lines.

a) Establishment of 765/400kV Pooling station at Cuddalore by LILO of TN UMPP – Salem 765kV S/c line
b) PEL Switchyard – Cuddalore Pooling station 400kV D/c High Capacity line
c) NSL Switchyard – Cuddalore Pooling station 400kV D/c High Capacity line
d) IL&FS TN Switchyard – Cuddalore Pooling station 400kV D/c Quad line
e) SRM Switchyard – Cuddalore Pooling station 400kV D/c Quad line
f) Cuddalore Pooling station – TN UMPP - Tiruvalem 765kV S/c line
g) Tiruvalem – Kurnool 2nd 765kV S/c line
h) Cuddalore Pooling station – Salem 765kV D/c line
i) Charging of Salem – Hiriyur/New Banaglore line at 765kV level
j) Establishment of 765kV substation at Basavan Bagewadi
k) Hiriyur/New Banaglore – Basavan Bagewadi – Sholapur 765kV D/c line
l) Raichur – Sholhapur 765kV 1xS/c line (two circuits already planned with Krishnapatnam UMPP)

The load flow study result with the above transmission system is given at **Exhibit-IV**. Here it is assumed that the transmission system considered above for Tuticorin area is available.

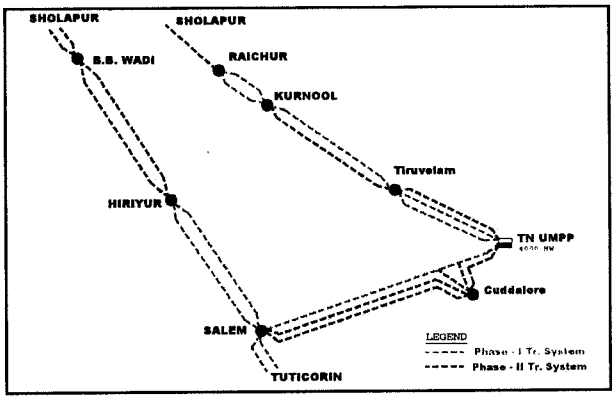
From the results it may be seen that the transmission system is adequate to transfer power from these generation projects under normal as well contingency conditions and following is observed:

i. Loading on Cuddalore pooling station - Salem 765kV lines is about 4488MW and TNUMPP – Tiruvelam is about 3880 MW in the base case. These loadings are well within limits for the base case as well under the contingency of one circuit.
ii. Beyond Tiruvelam & Salem stations towards Sholapur through these two high capacity corridors, the observed loading is in limits under normal as well as contingency conditions.

Phasing of the Transmission system

From the para 3.4.2 & 3.4.3 above it may be seen that the transmission system requirement for TN UMPP and projects in Cuddalore/Naggapattinam area involve

establishment of two nos. of transmission corridors in Phase-I and its subsequent strengthening in Phase-II as depicted below.



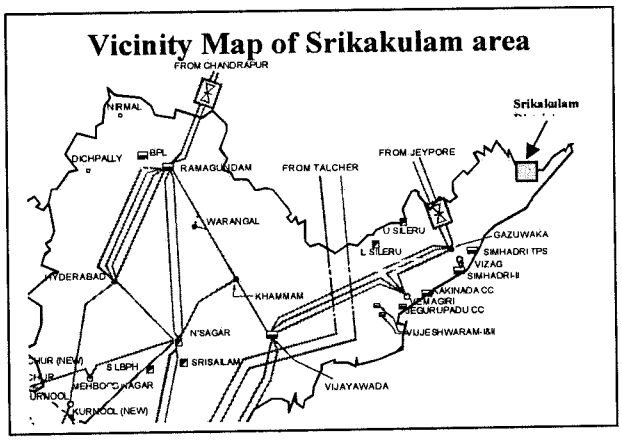
In the studies, Phase-I has been considered to be associated with TN UMPP while Phase-II with the generation projects in Cuddalore/ Naggapattinam area. As quantum of power injection through TN UMPP and generation projects in Cuddalore/Naggapattinam area are of the similar order, therefore, any changes in the actual materialization of generation projects may require change in the associated transmission system. In any case phase-I transmission system shall be required with generation coming earlier.

3.4.4 Chennai area

In the Chennai area North Chennai Power Co. Ltd. has applied for LTOA for 820 MW located in Chennai, Tamil Nadu proposed to be materialized by Jan, 2012/ Dec, 2013. This generation project is also considered for evolution of comprehensive transmission system and it is connected to Tiruvelam station with a dedicated 400kV D/c Quad line (or high capacity line). From **Exhibit-IV** it is observed that the transmission system is adequate to evacuate generated power and loading on North Chennai – Tiruvelam line is about 1020 MW. Further loading on other outgoing lines from Tiruvelam are well within limits.

3.5 Development of Transmission system for LTOA in Srikakulam area

From Table-1, it is seen that two nos. of applications for generation projects viz East Coast Energy Pvt. Ltd. (2640 MW) and NCC Vamsadhara Power Project (1980 MW) are located in Srikakulam district of Andhra Pradesh which are proposed to be materialized by October, 2010 and November,



2011 respectively. These generating plants though are physically located in Andhra Pradesh but are closer to the ER grid than that of SR grid. Further, the planned Talcher – Behrampur – Gazuwaka 400kV D/c line shall have alignment close to vicinity of these generation projects.

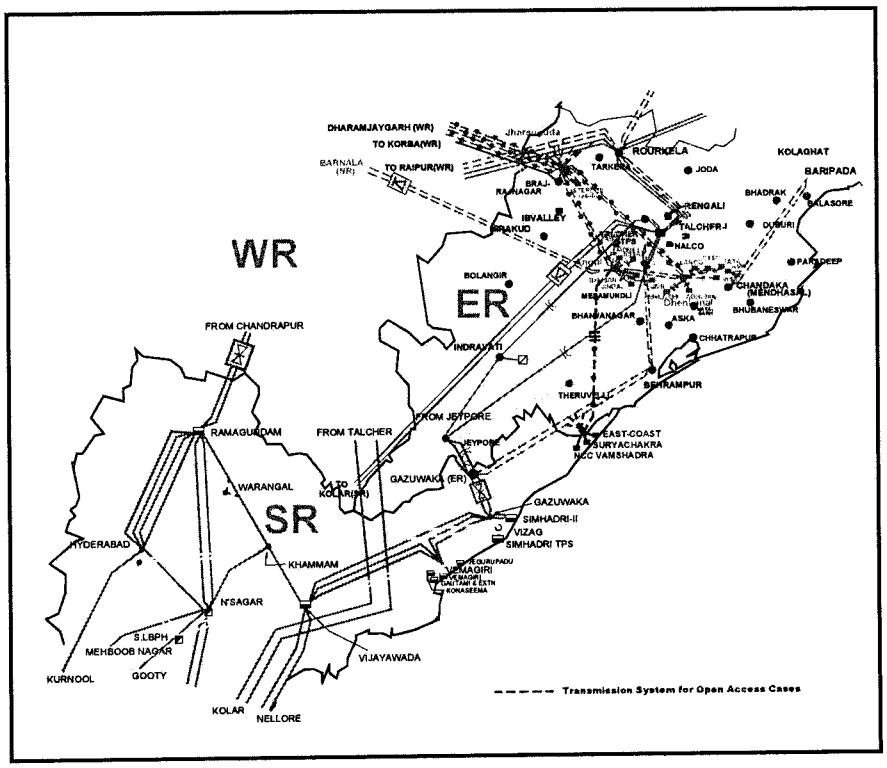
a) Development of Transmission System

- The power from these new generation projects shall have to be pooled at a conveniently located pooling station for onward transmittal through high capacity transmission corridors through ER grid.
- The time frame mentioned for these generation are mostly 2011-12 by which time it is expected that Talcher-Behrampur-Gazuwaka 400 kV D/c line proposed to be implemented through private participation and RfQ for which is already sought by REC shall be available.
- Looking into large size of proposed generation projects, the mere LILO of Behrampur-Gazuwaka 400 kV D/c line at generation switchyard of any of large size generation shall not be adequate to evacuate power. This establishes necessity of pooling station right at the initial stage itself.
- For evacuation of such a huge quantum of power to distantly located target beneficiaries, a high capacity transmission corridors shall required to be established. Further, immediate evacuation of about 4,700 MW power from pooling station, keeping into consideration (n-1) criteria, shall require 3xS/c 765 kV or 3xD/c 400 kV Quad lines.
- The above pooling station in Srikakulam area shall be interconnected through the high capacity AC lines to Angul pooling station proposed as a part of high capacity system evolved for LTOA applications in Orissa. From Angul pooling station power shall be transferred to NR/WR beneficiaries.
- Taking above into consideration, following transmission system is proposed for immediate connectivity of above mentioned new generation projects in Srikakulam district. The load flow study results for SR is given at **Exhibit-IV** and for Eris given at **Exhibit-V**.
  a) Establishment of 765kV/400kV pooling station in Srikakulam area preferably within the switchyard of either East-coast energy or NCC Vamshadhra whichever project materializes first.

b) Step-up of East-coast energy or NCC Vamshadhra generation projects to 765kV and 765 kV interconnection lines to Pooling Station.

c) LILO of both circuits of Behrampur – Gazuwaka 400 kV D/c line at Pooling station.

d) 3 circuits of 765 kV lines from Srikakulam Pooling Station to Angul Pooling station in Orissa



b) Phasing of Transmission System

i. <u>East Coast Energy Pvt. Ltd. (2640 MW)</u>

The proposed generation project of M/s East Coast Energy Pvt. Ltd. as indicated shall be materialized by October, 2010, therefore, the transmission system required for evacuation of the power is as below

2. Establishment of 765kV/400kV pooling station in Srikakulam area within the switchyard of either East-coast energy or NCC Vamshadhra.
3. Step-up of East-coast energy generation projects to 765kV
4. LILO of both circuits of Behrampur – Gazuwaka 400 kV D/c line at Pooling station.

5. 765kV D/c line from Srikakulam Pooling Station to Angul Pooling station in Orissa

ii. NCC Vamsadhara Power Project (1980 MW)

The proposed generation project of M/s NCC Vamsadhara Power Project as indicated shall be materialized by November, 2011, therefore, the transmission system required for evacuation of the power is as below

1. 765 kV interconnection lines from NCC Vamshadhra generation projects to Pooling Station.
2. 1xS/c 765 kV lines from Srikakulam Pooling Station to Angul Pooling station in Orissa

4.0 CONCLUSION

In view of the above long term open access may be permitted for new generation projects with following system strengthening

A)	Project Name	:	**M/s Coastal Energen Pvt. Ltd.**
	Open Access Quantum	:	720 MW
	Beneficiaries	:	Tamil Nadu-520MW, Karnataka-200MW
	Date of Effectiveness for BPTA	:	March, 2011
	Transmission System requirement	:	**Dedicated System** a) Establishment of 765 kV Tuticorin Pooling station at Coastal Energen (or any other convenient point) initially charged 400 kV **Cost - about Rs. 100 Crs.**
B)	Project Name	:	**M/s Ind-Barath Power (Madras) Ltd.**
	Open Access Quantum	:	945 MW
	Beneficiaries	:	Tamil Nadu-315MW, SR-284MW, WR-236, NR-425MW
	Date of Effectiveness for BPTA	:	March, 2011

	Transmission System requirement	:	**Dedicated System** a) Ind-Barath Switchyard - Tuticorin Pooling station 400 kV Quad/high capacity D/c line **Cost - about Rs. 40 Crs.** **Grid Strengthening for Coastal Energen & Ind-Barath** a) Tuticorin pooling station – Tuticorin JV switchyard 400 kV Quad/high capacity D/c line b) Establishment of new 765kV (initially charged at 400kV) 2x1500 MVA substation at Salem c) Tuticorin pooling station – Salem 765kV D/c line (initially charged at 400kV) **Cost - about Rs. 1325 Crs.**
C)	Project Name	:	**M/s Coastal Tami Nadu Power Ltd.**
	Open Access Quantum	:	4000 MW
	Beneficiaries	:	Tamil Nadu-1600MW, Karnatak-800MW, Andhra Pradesh-400MW, Kerala-300MW, Maharashtra-400MW, Uttar Pradesh-300MW, Punjab-200MW
	Date of Effectiveness for BPTA	:	2013-14
	Transmission System requirement	:	**Dedicated System** a) TN UMPP – Tiruvalem 765kV D/c line b) TN UMPP – Salem 765kV S/c line **Cost - about Rs. 750 Crs.** **Grid Strengthening for Coastal TN** a) Establishment of Pooling stations; 765kV at Tiruvelam and 765kV (initially charged at 400kV) at Hiriyur/New Banaglore b) Tiruvalem – Kurnool 1st 765kV S/c line c) Kurnool – Raichur 765kV D/c line (two circuits already planned one with Krishnapatnam UMPP and other with other open access projects in Nellore area) d) Charging of Salem substation at 765kV e) Salem – Hiriyur/New Banaglore 765kV D/c line (initially charged at 400kV) **Cost - about Rs. 2400 Crs.**
d)	Project Name	:	**M/s NSL Power Pvt. Ltd.**
	Open Access Quantum	:	800 MW

	Beneficiaries	:	Spread over SR, WR, NR
	Date of Effectiveness for BPTA	:	October, 2011
	Transmission System requirement	:	**Dedicated System** a) NSL Switchyard – Cuddalore Pooling station 400kV D/c High Capacity line **Cost - about Rs. 250 Crs.**
E)	Project Name	:	**M/s PEL Power Ltd.**
	Open Access Quantum	:	1000 MW
	Beneficiaries	:	TNEB-25%, PTC-65%, Others-10%
	Date of Effectiveness for BPTA	:	June, 2011
	Transmission System requirement	:	**Dedicated System** a) PEL Switchyard – Cuddalore Pooling station 400kV D/c High Capacity line **Cost - about Rs. 250 Crs.**
F)	Project Name	:	**M/s IL&FS Tamil Nadu Power Co. Ltd.**
	Open Access Quantum	:	1500 MW
	Beneficiaries	:	SR-750MW, WR-750MW
	Date of Effectiveness for BPTA	:	December, 2012 / June, 2013
	Transmission System requirement	:	**Dedicated System** a) IL&FS TN Switchyard – Cuddalore Pooling station 400kV D/c Quad line **Cost - about Rs. 100 Crs.**
G)	Project Name	:	**M/s SRM Energy Pvt. Ltd.**
	Open Access Quantum	:	1665 MW
	Beneficiaries	:	SR-40%, WR-30%, NR-30%
	Date of Effectiveness for BPTA	:	December, 2012
	Transmission System	:	**Dedicated System**

	requirement		a) SRM Switchyard – Cuddalore Pooling station 400kV D/c Quad line **Cost - about Rs. 100 Crs.** **Grid Strengthening for NSL, PEL, IL&FS & SRM** a) Establishment of 765/400kV Pooling station at Cuddalore by LILO of TN UMPP – Salem 765kV S/c line b) Cuddalore – Salem 765kV D/c line c) Cuddalore – TN UMPP – Tiruvalem 765kV 1xS/c line d) Tiruvalem – Kurnool 2nd 765kV S/c line e) Raichur – Sholhapur 765kV 1xS/c line (two circuits already planned with Krishnapatnam UMPP) **Cost - about Rs. 1950 Crs.**
H)	Project Name	:	**M/s North Chennai Power Co. Ltd.**
	Open Access Quantum	:	820 MW
	Beneficiaries	:	Maharashtra-470MW, Karnataka-350MW, Tamil Nadu-284MW
	Date of Effectiveness for BPTA	:	January, 2012 / December, 2013
	Transmission System requirement	:	**Dedicated System** a) North Chennai (Aban) Switchyard – Tiruvelam 400kV D/c Quad/high capacity line **Cost - about Rs. 250 Crs.** **Grid Strengthening common for Coastal Energen, Ind-Barath, NSL, PEL, IL&FS, SRM, Coastal TN & North Chennai** a) Establishment of 765/400kV Pooling station at Salem, Tiruvelam, Hiriyur/New Banaglore and Basawan Bagewadi b) Salem – Hiriyur/New Banaglore 765kV D/c line c) Hiriyur/New Banaglore – Basawan Bagewadi 765kV D/c line d) Basawan Bagewadi – Sholhapur 765kV D/c line e) Tamil Nadu UMPP – Tiruvalem 3 circuits of 765kV line f) Tiruvelam – Kurnool 765kV 2xS/c line g) Kurnool – Raichur 765kV D/c line h) Raichur – Sholhapur 1 circuit of 765kV line **Cost - about Rs. 6190 Crs.**

I)	Project Name	:	**M/s East Coast Energy Pvt. Ltd**
	Open Access Quantum	:	2640 MW
	Beneficiaries	:	Andhra Pradesh0-200MW, Karnataka-550MW, Maharashtra-500MW, Goa-100MW, Rajasthan-600MW, Punjab-500MW
	Date of Effectiveness for BPTA	:	October, 2010
	Transmission System requirement	:	**Dedicated System** a) Establishment of 765kV/400kV pooling station in Srikakulam area within the switchyard of either East-coast energy or NCC Vamshadhra. b) Step-up of East-coast energy generation projects to 765kV c) LILO of both circuits of Behrampur – Gazuwaka 400 kV D/c line at Pooling station. d) 765kV D/c line from Srikakulam Pooling Station to Angul Pooling station in Orissa **Cost - about Rs. 1400 Crs.**
J)	Project Name	:	**M/s NCC Vamsadhara Power Project**
	Open Access Quantum	:	1980 MW
	Beneficiaries	:	Merchant based power plant
	Date of Effectiveness for BPTA	:	November, 2011
	Transmission System requirement	:	**Dedicated System** a) 765 kV interconnection lines from NCC Vamshadhra generation projects to Pooling Station. b) 1xS/c 765 kV lines from Srikakulam Pooling Station to Angul Pooling station in Orissa **Cost - about Rs. 560 Crs.**

Members may discuss the above proposal and decide.

Exhibit – I

SYSTEM STUDIES - LONG TERM OPEN ACCESS CASES

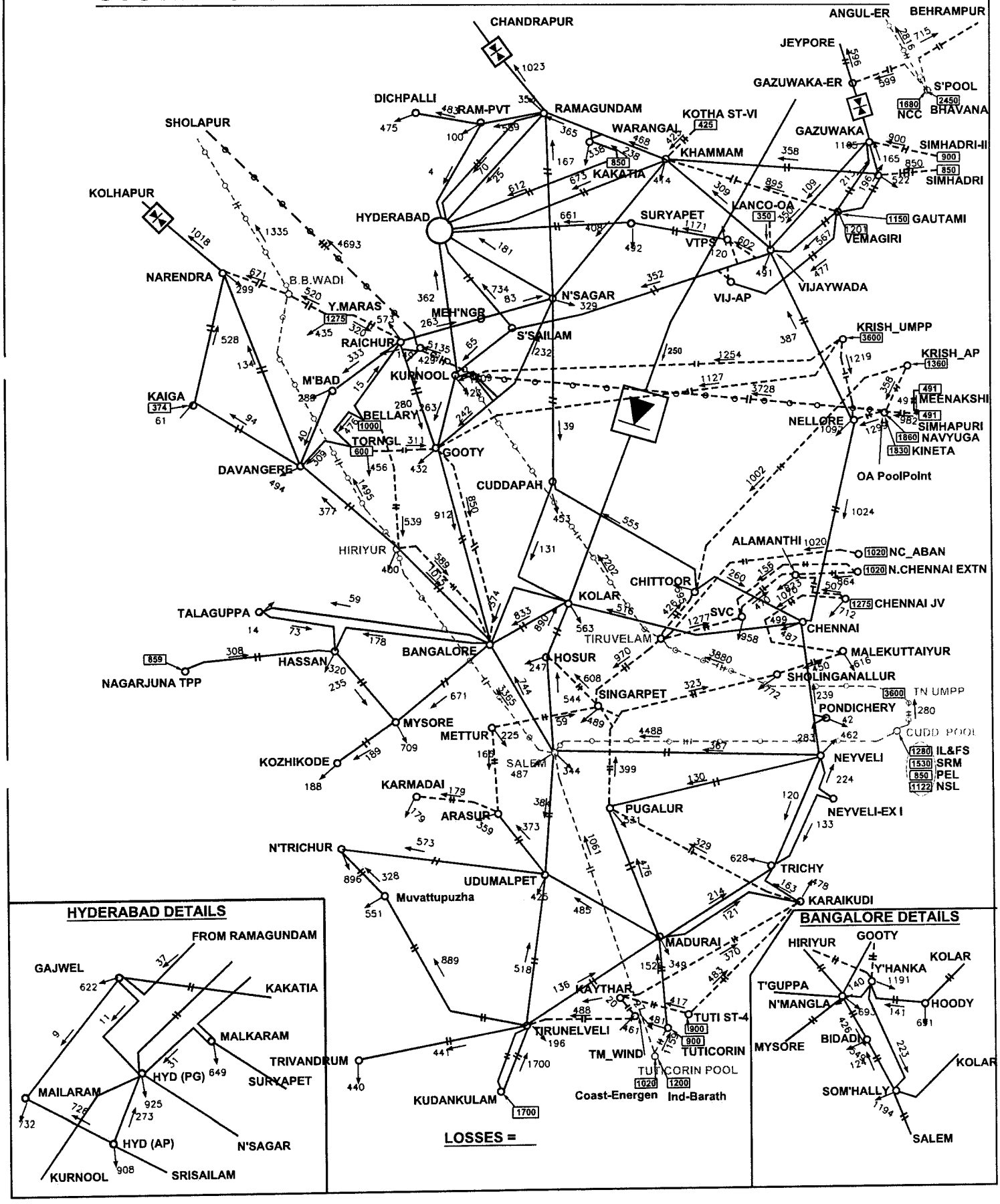
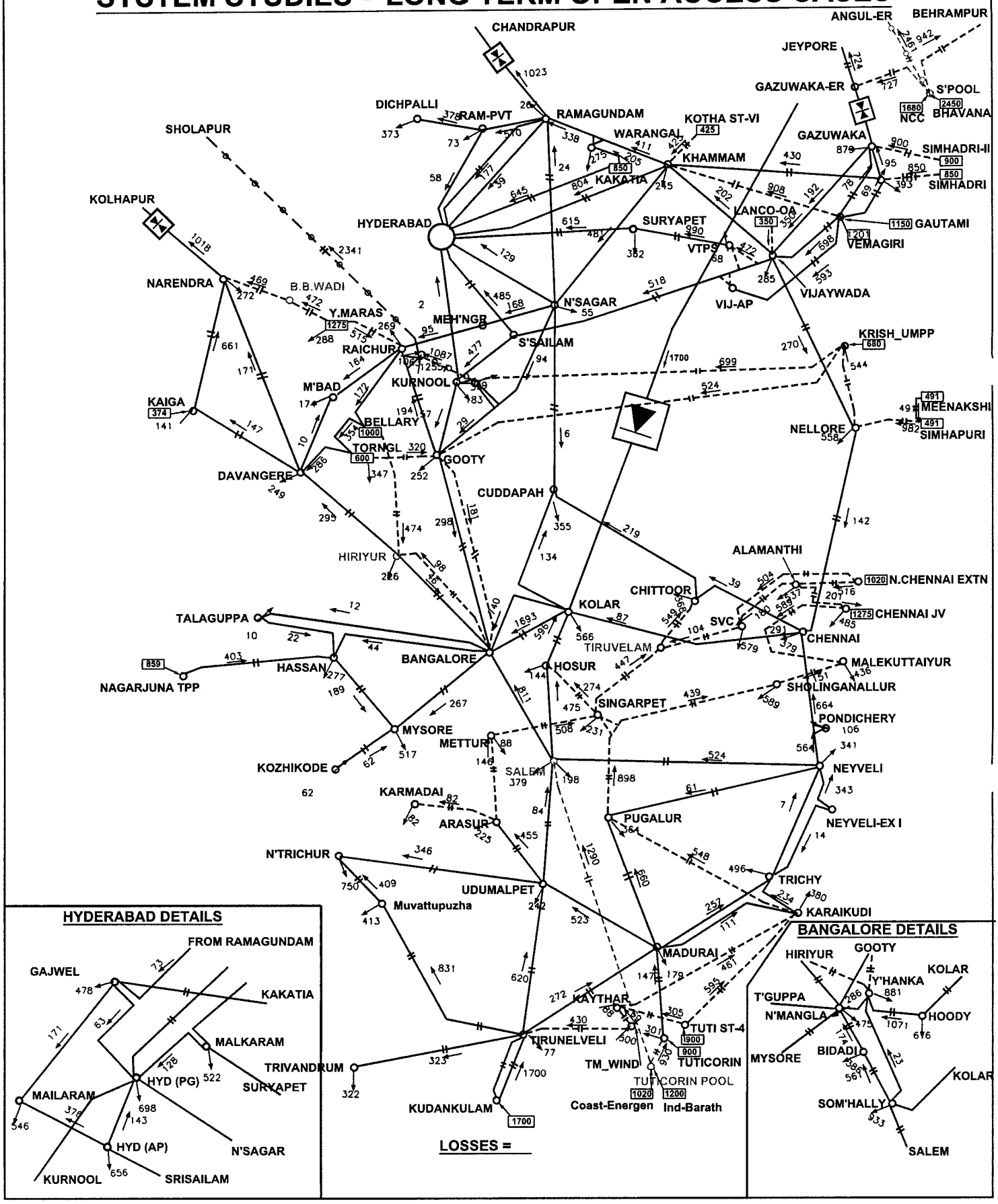
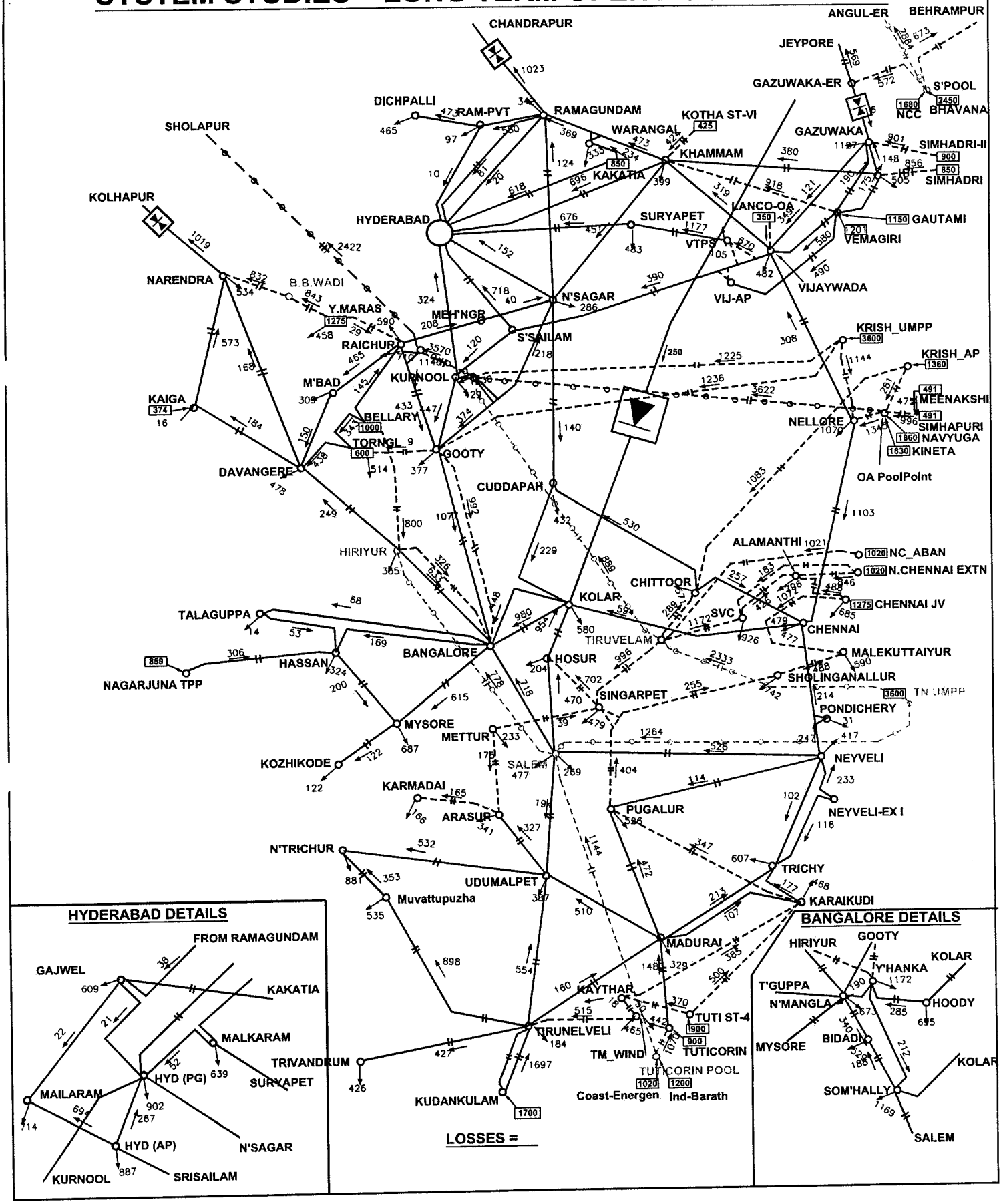


Exhibit – II

SYSTEM STUDIES - LONG TERM OPEN ACCESS CASES

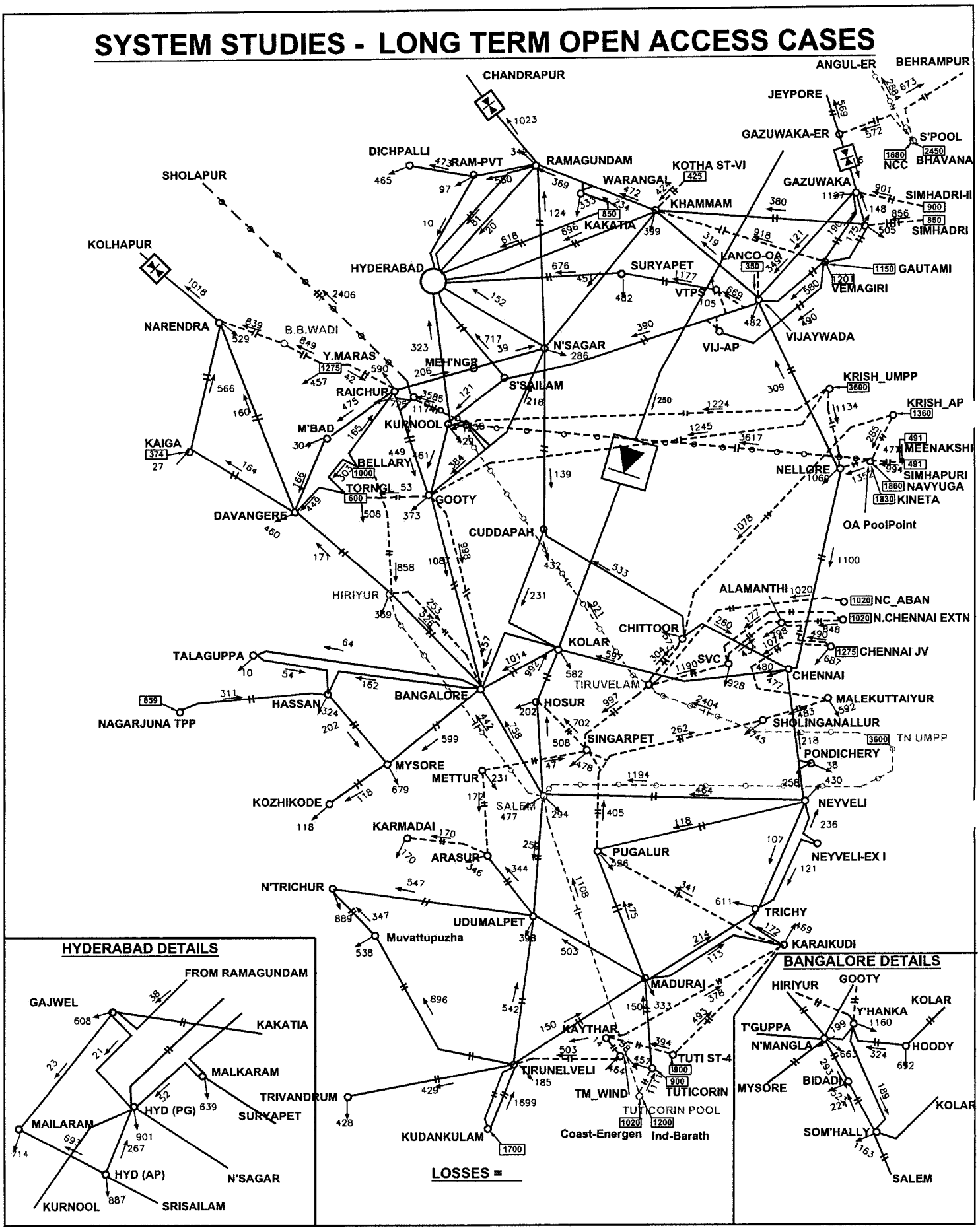


SYSTEM STUDIES - LONG TERM OPEN ACCESS CASES

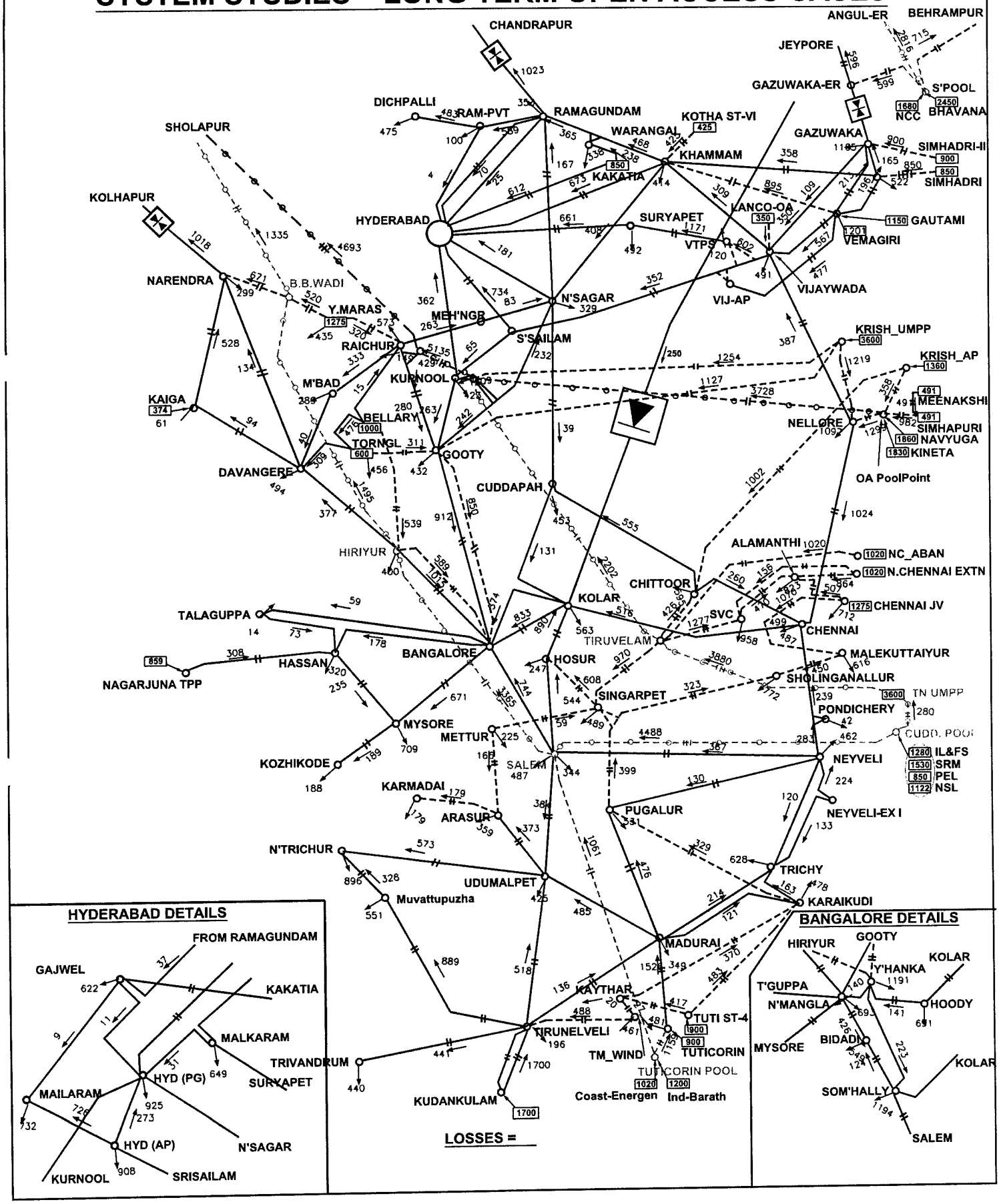


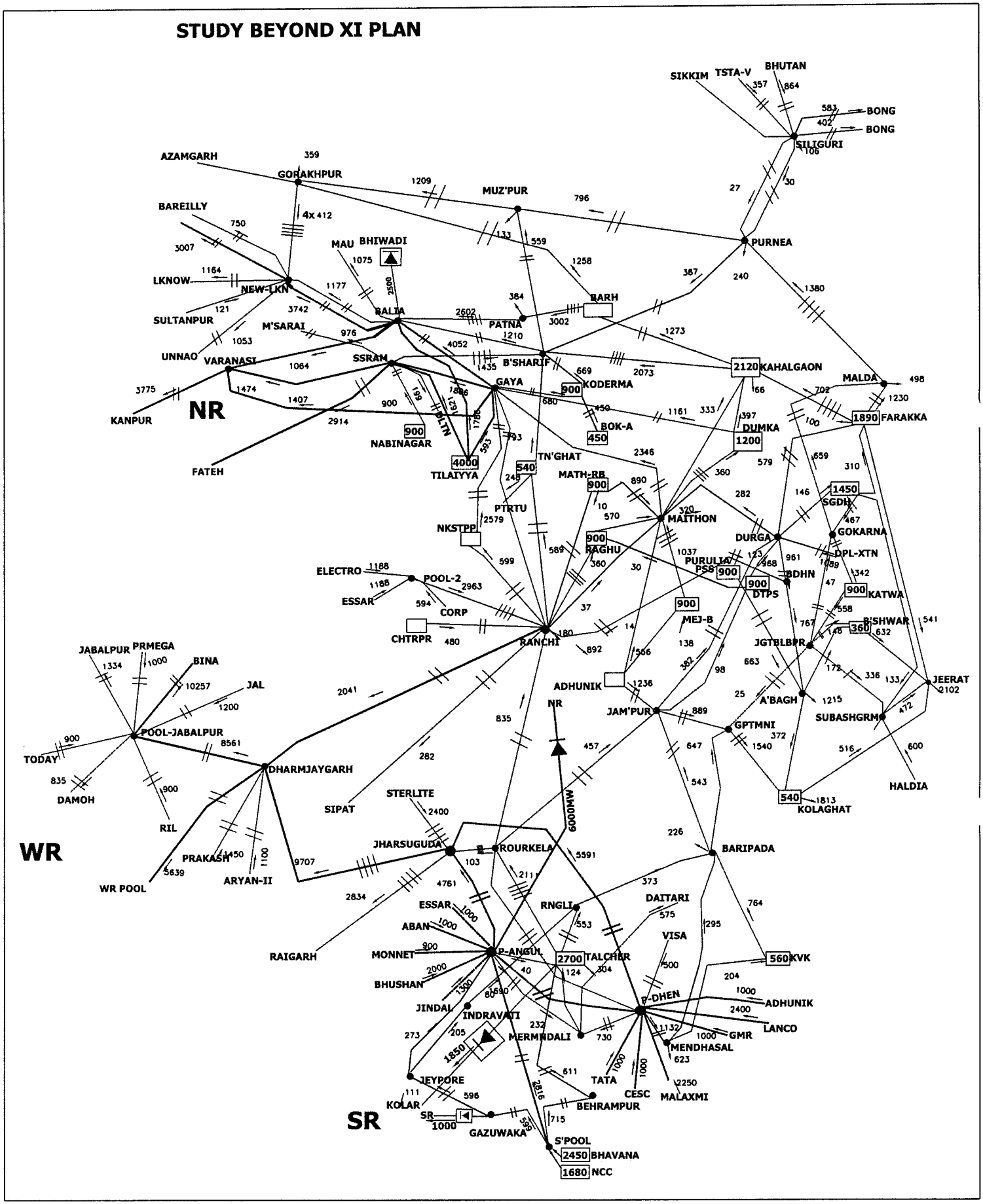
Outage of one circuit of Salem-Hiriyur line

Exhibit – IIIa



SYSTEM STUDIES - LONG TERM OPEN ACCESS CASES




STUDY BEYOND XI PLAN
NR
WR
SR
SIKKIM
TSTA-V
BHUTAN
BONG
BONG
SILIGURI
AZAMGARH
GORAKHPUR
MUZ'PUR
PURNEA
BAREILLY
MAU
BHIWADI
LKNOW
NEW-LKN
SULTANPUR
M'SARAI
BALIA
BARH
PATNA
UNNAO
VARANASI
SSRAM
B'SHARIF
GAYA
KAHALGAON
MALDA
KANPUR
FATEH
NABINAGAR
TILAIYYA
KODERMA
BOK-A
DUMKA
FARAKKA
TN'GHAT
MATH-RB
PTRTU
NKSTPP
MAITHON
SGDH
GOKARNA
DURGA
DPL-XTN
RAGHU
PURULIA PSS
BDHN
DTPS
KATWA
B'SHWAR
ELECTRO
POOL-2
ESSAR
CORP
CHTRPR
RANCHI
MEJ-B
JGTBLBPR
JEERAT
JABALPUR
PRMEGA
BINA
JAL
POOL-JABALPUR
TODAY
DAMOH
RIL
DHARMJAYGARH
ADHUNIK
JAM'PUR
A'BAGH
SUBASHGRM
GPTMNI
HALDIA
KOLAGHAT
SIPAT
STERLITE
JHARSUGUDA
ROURKELA
BARIPADA
WR POOL
PRAKASH
ARYAN-II
RAIGARH
ESSAR
ABAN
MONNET
P-ANGUL
TALCHER
KVK
BHUSHAN
JINDAL
INDRAVATI
P-DHEN
ADHUNIK
LANCO
MERMINDALI
GMR
MENDHASAL
RNGLI
DAITARI
VISA
JEYPORE
KOLAR
GAZUWAKA
TATA
CESC
MALAXMI
BEHRAMPUR
S'POOL
BHAVANA
NCC

Annex-III

पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

पावरग्रिड

केन्द्रीय कार्यालय : "सौदामिनी" प्लॉट सं. 2, सैक्टर-29, गुडगाँव-122 001, हरियाणा
फोन : 2571700 - 719, फैक्स : 2571760, 2571761 तार 'नेटग्रिड'
Corporate Office : "Saudamini" Plot No. 2, Sector-29, Gurgaon-122 001, Haryana
Tel. : 2571700 - 719, Fax : 2571760, 2571761 Gram : 'NATGRID'

संदर्भ संख्या/Ref. Number
Ref. No. : C/ENG/SEF/S/09/LTOA

Date : 25 June 2009

1. Sh.V.Ramakrishna Member (PS) Central Electricity Authority Sewa Bhawan, R.K.Puram, **New Delhi-66**	2.The Member Secretary, Southern Regional Power Committee, 29, Race Course Cross Road, **Bangalore 560 009.**
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: Long Term Open Access applications in Southern Region – Minutes of the Meeting

Dear Sir,

We write with reference to the Long Term Open Access meeting held on June 15, 2009 at Orange County, Siddapur, Coorg, Karnataka to discuss Long Term Open Access Applications in Southern Region. Minutes of the meeting are enclosed. Your comments and observations, if any, may be sent to us at the earliest.

Thanking You,

Yours faithfully

25/6/2009

(Pankaj Kumar)
General Manager (Engg.-SEF)

Encl: Minutes

Minutes of meeting of SR constituents regarding Long Term Open Access applications held on 15.06.2009 at Coorg, Karnataka

1. List of participants in is enclosed at **Annexure-I**.

2. Member (PS), CEA and ED (Engg-II), POWERGRID welcomed all the participants. The LTOA applicants were requested to update the generation project status. The updated status of different generation project seeking LTOA to ISTS and considered in the present agenda, as provided by different applicants is given at annexure-II.
3. Sh. Pankaj Kumar, GM(Engg-SEF) made presentation on the studies carried out for identifying transmission system required for evacuation of power from the new generation projects. He explained that as indicated in the agenda, circulated earlier, it IS seen that generation projects have been proposed in the identifiable areas like Tuticorin, Cuddalore/Nagapattinam, Kanchipuram, Srikakulam etc. Accordingly, transmission system strengthening has been evolved and segregated in two categories (1) which shall be required for identified one or more generations in particular area and (2) common strengthening which shall be benefitting group of generation in more than one area. The transmission system has been phased in such a fashion that there is least dependency of materialization of one generator over another with respect to their evacuation needs.
4. The area-wise transmission system evolved were taken up FOR discussions
    a. Srikakulam District – GM (Engg.-SEF), POWERGRID explained that in this area POWERGRID have received application for LTOA from East-Coast (2640 MW) and NCC Vamshadhara (originally 1980 MW subsequently revised to 2640 MW). He informed that M/s NCC have not indicated about the target beneficiaries from the generation project, in absence of this studies had been carried out assuming allocation of 1320 MW each to WR & NR constituents. Representative of M/s NCC committed to give the information about the target beneficiaries within one week. As regards, East-coast the studies in the agenda had been carried out on the basis of 750 MW to SR, 600 MW to WR and 1100 MW to NR constituents. M/s East-coast representative informed that subsequent to information provided in the application they had subsequently revised the target beneficiaries and it now stands as 1940 MW (AP-940 MW, Karnataka – 500 MW, Kerala – 500 MW) to SR constituents and 500 MW to WR , (Maharashtra – 500 MW) constituents.

POWERGRID stated that with the changed target beneficiaries revised studies would be carried out, however, prima-facie it would not make much material difference as the power allocated to SR constituents shall be displaced by the power allocated to NR/WR constituents in other generation projects in Tamil Nadu through principle of displacement. Member(PS), CEA stated that studies should also consider option of reversal of power on Talcher-Kolar HVDC bipole. Further, LILO of Talcher-Kolar HVDC line with Multi-terminal DC station at pooling station shall also required to be explored. After discussions, it emerged that even with these changes the connectivity requirement would essentially remain same inter-alia comprising of establishment of 765 kV pooling station in the area and integration of pooling station through LILO of Behrampur – Gazuwaka 400 kV D/c line. The East coast and NCC shall have to construct dedicated lines for bringing power upto pooling station through 400kV or 765 kV voltage level transmission lines. Here, it was mentioned that due to large size of projects the stepping of generation at 765 kV level shall be preferred to control short circuit levels. After deliberations Member(PS), CEA finalized that the stepping of generation for East-coast shall be at 400 kV level and that for the NCC shall be at the 765 kV level.

Power from pooling station shall be transmitted to Angul pooling station being planned with the other LTOA generations in Orissa. As regards, location of pooling station in the area, it was indicated both by M/s East Coast and NCC that surplus land of adequate size available with them which can be offered for establishment of pooling station. It was decided that decision on this shall be taken separately after carrying analysis with respect to location of the two projects vis-à-vis the location of Angul pooling station where power shall ultimately be transferred for onward transmittal.

b. Tuticorin area – GM (Engg.-SEF) informed that two nos of generation projects viz. Coastal Energen (1200 MW) and IND-Barath (1400 MW) have applied for LTOA. It was informed that IND-Barath have applied for open access for 945 MW against its installed capacity of 1400 MW. Member (PS), CEA enquired about the balance power from the project to which representative of IND-Barath stated they would like to trade it on short term. It was explained that unless

generation project authorities get adequate transmission capacity built they would not be able to transmit the power in short term, as transmission capacity shall be created for the LTOA capacity that has been sought. There had been no specific comments from the members present on the transmission system proposed for generation project proposed in the agenda that inter-alia included establishment of 765/400 kV pooling station in the area initially charged at 400 kV. The pooling station is to be integrated to the SR grid through Tuticorin – Salem 765 kV D/c line (initially charged at 400 kV) and Tuticorin – Tuticorin JV 400 kV Quad D/c line. The Coastal Energen and IND-Barath shall bring power to the pooling station through dedicated transmission lines as indicated in the agenda. Therefore, the system as mentioned above was agreed.

Representative of Coastal Energen requested for LILO of one circuit of Tuticorin JV TPS – Madurai 400kV Quad D/c line at their switchyard to draw start-up power. In this regard it was decided that such LILO may be agreed to as a temporary measure subject to entering into suitable commercial arrangement and Coastal Energen shall have restore the line once the Tuticorin Pooling Station is established.

c. Cuddlore/Nagapattinam area – The generation projects proposed in the area include PEL Power (1000 MW), IL&FS (1500 MW), SRM Energy (1800 MW) and NSL Power (1320 MW). The transmission system for these projects has been evolved taking into consideration proposed 4000 MW TN UMPP project in the nearby Kanchipuram District transmission system for which was discussed and finalized in the 28th meeting of Standing Committee held prior to LTOA meeting. The transmission system as included in the agenda was earlier discussed and agreed to while finalizing transmission system for TN UMPP and theer as such no comments on the proposed system.

d. North Chennai – There is one application viz. North Chennai Power Co. (1200 MW). The transmission system for this project was evolved keeping into consideration other generation projects in the vicinity like Vallur TPS (1500 MW), NCTPS-II (1200 MW), Ennore TPS (500 MW) etc. The transmission evolved for the project included pooling of power from the project at 400 kV level at Tiruvalem 765/400 kV pooling station that shall be established alongwith the

other LTOA projects proposed to be setup in Tamil Nadu. There was no specific comment on the system proposed in the agenda and the system was agreed by all the members.

5. Member (PS), CEA explained that transmission system development is taken up only when the investment on new transmission system is under written by its users for its recovery. Further, as the present LTOA applicants have not firmed up beneficiaries so till the time the beneficiaries from the project are firmed the generation developers shall have to give commitment for bearing proportionate transmission charges for new system as well as extend requisite security for making the investment.

6. It was decided that POWERGRID shall workout with individual/group of generators coming in same vicinity to finalise the transmission system and its sharing mechanism. The meeting ended with vote of thanks to the participants.

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List of participants during the meeting of SR constituents regarding Long Term Open Access applications held on 15.06.2009 at Coorg, Karnataka

Sl. No.	Name & Organisation	Designation	
	CEA		
1.	V. Ramakrishna	Member (PS)	
2.	Pardeep Jindal	Director (SP&PA)	
	SRPC		
3.	M.L. Batra	Member Secretary	
4.	S.R. Bhat	SE	
	POWERGRID		
5.	I.S. Jha	ED (Engg.-II)	
6.	Pankaj Kumar	GM (Engg.-SEF), CC	
7.	M. Krishna Kumar	GM (Projects), Bangalore	
8.	M.R.V Holla	AGM (Engg.), SRTS-II	
9.	Dilip Rozekar	CDE (Engg.), CC	
10.	A. Naga Raju	CM (Commercial), SR-II	
11.	K.P. Balanarayan	CM, Mysore	
	NTPC		
12.	Abhijit Sen	DGM (PE-E)	
	NPCIL		
13.	Sandeep Sarwate	Dy. C.E	
	Neyveli Lignite Corp.		
14.	V. Seturaman	Dir (Electrical)	
15.	S. Muthu	GM	
	APTRANSCO		
16.	M. Balasubramanyam	DE/System Studies	
	KSEB		
17.	K. S. Antony Thomas	DE	
	KPTCL		
18.	Pratap Kumar	Dir (Trans.)	
19.	Suresh Babu	SEE	
20.	K. Paramesha	AEE, Electrical	
	Long Term Open Access Applicants		
21.	J. Balasubramanyam	Director	East Coast Energy Pvt. Ltd.
22.	Sharat Mahajan	Advisor	NCC Infrastructure Holding
23.	Sidharth Das	GM	NCC Infrastructure Holding
24.	K. Rajesh	DGM	NCC Infrastructure Holding
25.	R. Satishan	Advisor	TATA Power
26.	Kundan Kumar	Asst. Mgr	TATA Power
27.	K. Thiruppathi	Dir. (Proj.)	Coastal Energen
28.	S. M. Zafrulla	MD	Coastal Energen
29.	T.S. Das	VP	Ind-Barath Power
30.	R. Mani Mathavan	GM	SRM Energy
31.	G. Vijaya Kumar	COO	PEL Power
32.	N. Ramesh	AVP	IL&FS Tamil Nadu Power
33.	B. S. Rao	GM	NSL Power
34.	S. Suryaprakasa Rao	Advisor	