

भारत सरकार
केन्द्रीय विद्युत प्राधिकरण
प्रणाली योजना एवं परियोजना मूल्यांकन प्रभाग
सेवा भवन, रामकृष्णपुरम्, नई दिल्ली 110066

क्र. सं.: 26/10/2002/प्रयोपम्/

दिनांक: 12.02.2007

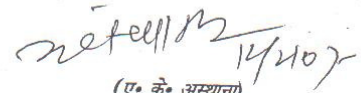
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|---|---|----|---|
| 1 | सदस्य सचिव,
पश्चिमी क्षेत्रीय विद्युत समिति, एम. आई. डी. सी क्षेत्र,
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मुम्बई-400094 फैक्स सं. 022-25563350 | 11 | प्रबन्ध निदेशक,
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फैक्स सं. 0265 2338221, 2337918/2338164 |
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| 6 | सदस्य (पारेषण),
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फोन नं. 0260-2250889, 2254745 |

विषय : पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 26वीं बैठक ।

पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 26 वीं बैठक दिनांक 23-02-2007 को पश्चिमी क्षेत्रीय विद्युत समिति, एफ-3, एम. आई. डी. सी क्षेत्र, मेरोल, अंधेरी (पूर्व), मुम्बई-400094 में होगी. कृपया अपनी उपस्थिति सुनिश्चित करें.

संलग्न - उपरोक्त

Sh. SP. AD-II for Na.
skumar
05/01/06


(ए. के. अस्थाना)
मुख्य अभियंता

Government of India
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System Planning & Project Appraisal Division
Sewa Bhawan: R.K.Puram
New Delhi-110066

No.26/10/2002-SP&PA/

Dated 12th Feb. 2007

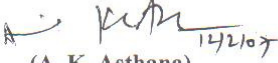
- | | | | |
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Subject: 26th meeting of Standing Committee on Power System Planning in Western region

Sir,

In continuation to our earlier letter of even no. dated 17-11-2006 on the above subject enclosing agenda for the meeting. The 26th meeting of Standing Committee on power system planning in Western Region would be held on 23-02-2007 at WRPC, F-3, MIDC Area, Marol, Andheri (East), Mumbai-400093. Supplementary agenda item is also enclosed.

Encl. As above


(A. K. Asthana)
Chief Engineer

Standing Committee on Power System Planning in Western Region

Supplementary Agenda for 26th Meeting

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

- 1.1 Coastal ultra mega project 4000 MW (5x800 MW) at Krishnapattnam in Andhra Pradesh has been proposed. The first unit of which could now be expected in the last year of 11th Plan or early 12th Plan. Tentative power allocation from Krishnapattnam UMPP is as following:

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

- 1.2 Transmission system planning studies have been carried out considering Krishnapattnam UMPP and other projects that are being envisaged by 2013-14, so as to evolve the evacuation system as well as the inter-regional system needed to **deliver the share of Western Region beneficiaries** from the project and the surplus power in SR to WR that could be available by that time-frame. The Tamil Nadu UMPP which is being planned to be built at a coastal site near Chennai / Nagpattnam in Tamil Nadu and is expected in early 12th Plan, has also been considered in the system studies. Also in Western Region, the generation projects in which no or little progress has been made had not been considered while revising the generation programme considered in the study. Accordingly, the revised projected availability and demand scenarios for Summer, Monsoon and Winter seasons for 2013-14 for Peak and Off-peak operating conditions are given in Table-I and Table-II, respectively.

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

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

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

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

1.3 Based on the above projections, for carrying out studies, two dispatch scenarios, one for Summer peak in which WR imports more than 11500 MW of power out of which 600 MW is imported from SR and one for Winter Peak in which WR imports about 9000 MW, in which more than **4400 MW** is imported from SR have been considered:

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

Of the above, the maximum import by WR is in Summer Peak during which it receives power through ER-WR corridor (Exhibit-VII). However for evolving transmission system for Krishnapattnam UMPP, for which the focus would be to maximize SR-WR transmission, Winter Peak Condition in which SR export is 6000 MW, has been studied for various alternatives.

1.4 Transmission Alternatives

System studies have been carried out for various alternatives for achieving the following objective.

- (i) Evacuation of power from Krishnapattnam UMPP (4000 MW) and other generations that are expected in the same time-frame in SR
- (ii) Evolving maximum inter-regional transmission requirement between SR-WR corresponding to Winter Peak scenario of 2013-14. The system evolved has gross 6600 MW transmission capacity between SR-WR on which import by WR for studied scenario is 4400 MW.

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

Alternative-I.

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

Alternative-II.

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

In both the alternatives basic evacuation system from Krishnapattnam UMPP remains the same. The only difference between the two alternatives is that in alternative-II, an asynchronous link between WR and SR at Narendra i.e. 1000 MW HVDC back to back has been considered, while in alternative-I WR and SR are synchronously connected at Narendra.

1.5 Study cases: The following cases are enclosed:

S.No.	Scenario	Alt.	Case	Exhibit
1	Winter peak	I	Base Case	1
2	Winter peak	I	Outage of Raichur-Sholapur 765kV S/C	2
3	Winter peak	I	Outage of Raichur-Sholapur 765kV 2xS/C	3
4	Winter peak	II	Base case	4
5	Winter peak	II	Outage of Raichur-Sholapur 765kV S/C	5
6	Winter peak	II	Outage of Sholapur-Pune 765kV S/C	6
7	Summer peak	I	Base Case	7

1.6 Discussion of Studies Results

It is observed that maximum inter-regional transmission requirement from Southern Region to Western region corresponds to winter peak scenario. In this scenario, Western Region imports about 4400 MW of power from SR and Total exports from SR is about 6000 MW. In this scenario, the Talcher-Kolar HVDC Bipole and

Gazuwaka back-to-back is kept off and the Ramagundam-Chandrapur back to back is carrying 500 MW towards WR and Talcher II generation is taken as 1600 MW, which get exported directly from Talcher bus to ER grid. For the balance 3900MW export from SR to WR, two number 765 kV S/C lines from Raichur to Sholapur and one 400 kV D/C line from Narendra to Kolhapur had been proposed.

Case 1, which is the base case for alternative-I, meets the above objectives. It also meets outage of one ckt of 765 kV inter-regional lines at Raichur-Sholapur (Case-2). However, in the event of outage of both the 765 kV inter-regional circuits load flow case does not converge. It is further observed that under this outage case, the quantum of export from SR is to be reduced to 4000 MW in order to achieve convergence of the load flow solution and with permissible line loading (Case-3). It may thus be concluded that alternative-I would provide net export capacity of the level of 4000 MW.

In alternative-II, a HVDC back-to back of 1000 MW at Narendra has been considered. The power flows in this case has been shown at Exhibit-IV which are similar to Alternative-I (case-1) shown at Exhibit-I. Also, in this alternative-II, in the event of outage of one 765 kV S/C between Raichur and Sholapur (Case-7) total power of the both the circuits gets transferred to the other healthy 765 kV circuit, where as in alt-I, it is shared by Narendra-Kolhapur 400 kV D/C line, causing overloading on this line. In this situation, total inter-regional transmission export capacity from SR has to be restricted to about 5500 MW that is 1600 MW of Talcher, 1000MW of Chandrapura, 1000MW of Narendra and 2000 MW at the 765 kV S/C Raichur-Sholapur line. However, in Alt-II, when one of 765 kV S/C between Raichur-Sholapur is under planned maintenance and in the event of outage of other 765 kV S/C line; Southern region would not be synchronously connected with rest of the grid and operational measures resulting in load shedding to the tune of 2000 MW in WR and backing down of about 2000 MW of generation in SR need to be taken.

In view of the above, and the advantage of better reliability in Alt-II to check disturbance from spreading to whole of the grid, alternative-II is recommended.

1.7 Recommended Scheme

Based on the above, the following transmission scheme is recommended.

- (i) Step-up voltage for Krishnapattnam UMPP would be 400kV.
- (ii) There would be six outgoing circuits from generation switchyard, i.e. -
 - Krishnapattnam UMPP – Nellore 400 kV, Quad D/C line
 - Krishnapattnam UMPP – Kurnool 400 kV, Quad D/C line, and
 - Krishnapattnam UMPP – Gooty, 400 kV, Quad D/C line
- (iii) Kurnool – Raichur 400kV Quad D/C line,
- (iv) 765/400 kV S/S at Raichur, 3000 MVA,
- (v) 765/400 kV S/S at Sholapur 3000 MVA,
- (vi) 765/400 kV S/S at Pune, 3000 MVA
- (vii) Depending upon share of various states, including Kerala, from Tamil Nadu UMPP and also considering feedback from state utilities regarding new 400kV S/Ss or transformer capacity augmentations in their states, the above transmission system may be updated.

(viii) Following two inter-regional links between SR and WR would be established for – (i) transmission of share of Maharashtra from Krishnapattnam UMPP (ii) transmission of share of other regions from Tamil Nadu UMPP (iii) free flow of power to all beneficiaries of Krishnapattnam UMPP,

- Raichur (SR) – Sholapur (WR) 765 kV 2xS/C lines
- Narendra (SR) – Kolhapur (WR) 400 kV D/C line with a 1000 MW HVDC back-to-back at Narendra
- Sholapur (WR) – Pune (WR) 765 kV S/C line

1.8 Discussion in SR :

The above transmission system associated with Krishnapattnam UMPP has been discussed in the 23rd meeting of the Standing Committee on Power System Planning of Southern Region held on 10th Jan. 2007 at Chennai and Alternative-II was concurred by the SR constituents. Estimated cost of the above transmission system would be of the order of Rs. 5500 crores. In regard to sharing of transmission charges the following emerged during the discussion.

- i) Sharing of transmission charges could be based on combined beneficiaries of Krishnapattnam and Tamil Nadu UMPPs.
- ii) SR and WR beneficiaries, (and also NR beneficiaries, if they opt from Tamil Nadu UMPP) based on their share from generation, could share transmission charges of inter-regional links of Narendra-Kolhapur and Raichur-Sholapur and also the Sholapur-Pune 765kV line.
- iii) It was also acknowledged that complete account of sharing of charges would emerge after constituents of other regions had also discussed these issues.
- iv) It was decided that the issues regarding sharing of transmission charges would be taken up in the forthcoming SRPC meeting.

1.9 Member of WR may discuss and concur.

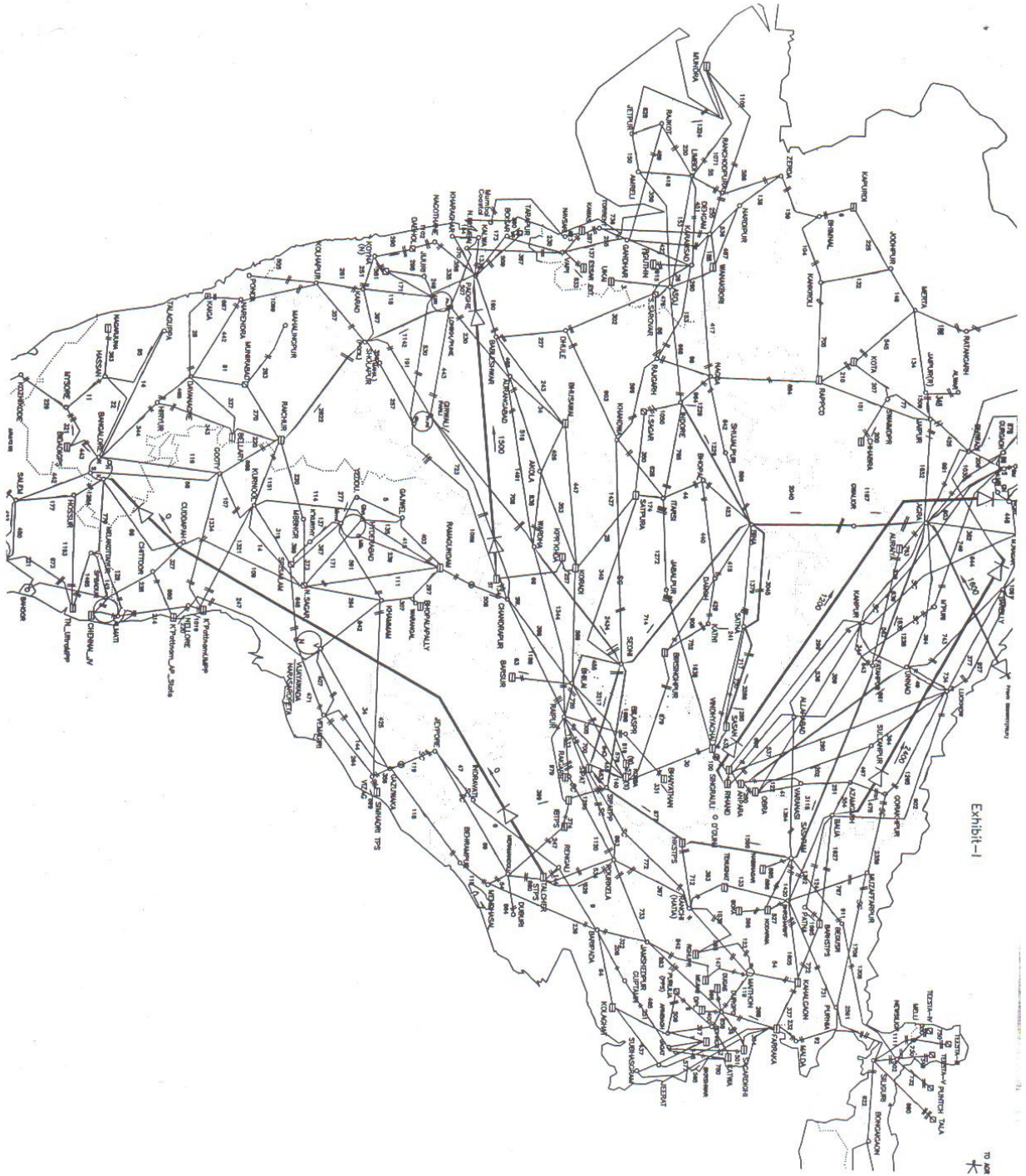


Exhibit-1

10 AM



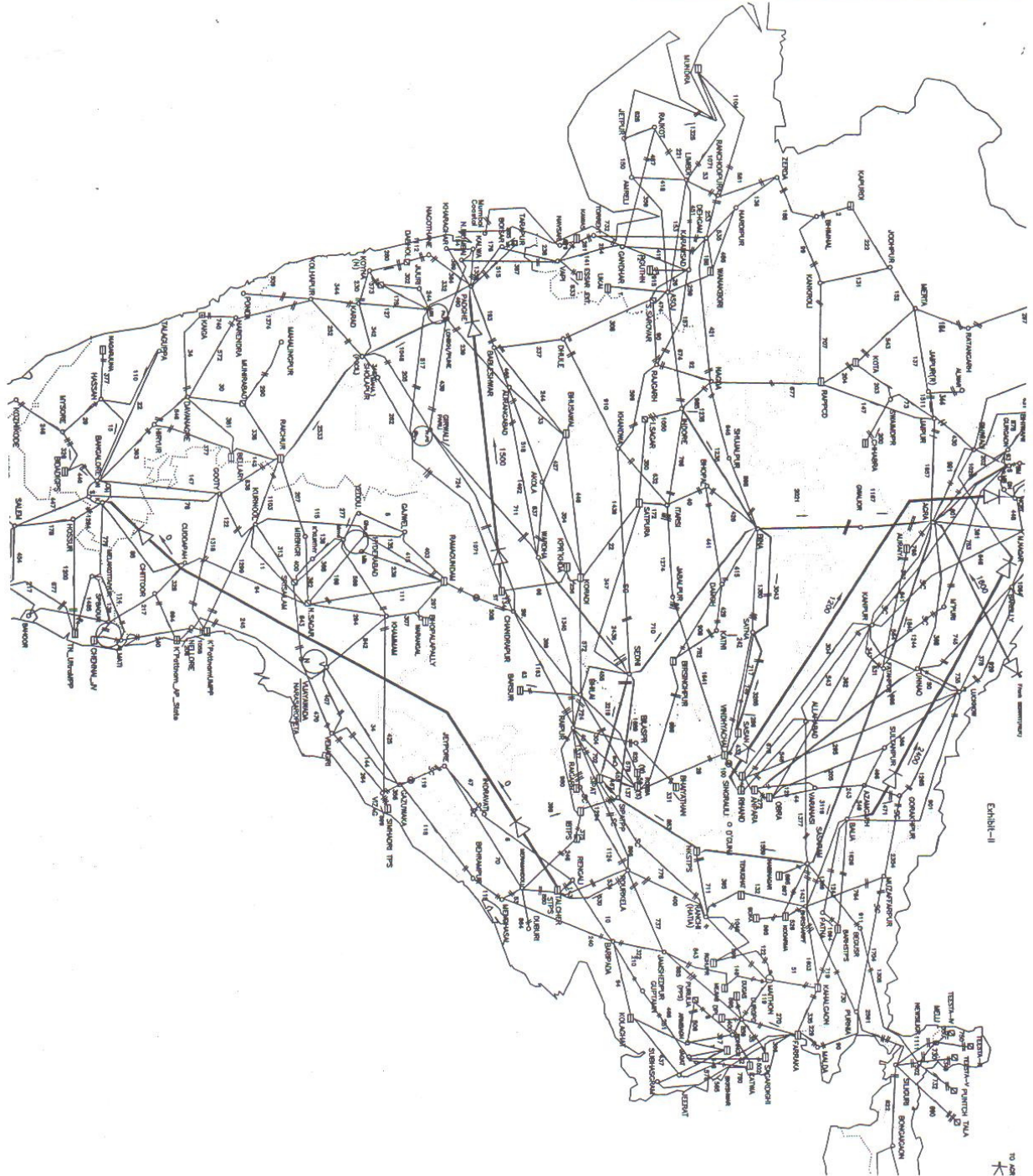


Exhibit-11

TO JAF



Exhibit-III



Exhibit-IV



Exhibit-V

TO
LAW



Exhibit-VI



Exhibit-VII