भारत सरकार Government of India
विद्युत मंत्रालय Ministry of Power
उत्तर पूर्वी क्षेत्रीय विद्युत समिति
North Eastern Regional Power Committee
एन ई आर पी सी कॉम्प्लेक्स, डोंग पारमाओ, लापालाङ, शिल्लोंग-७९३००६, मेघालय
NERPC Complex, Dong Parmaw, Lapalang, Shillong - 793006, Meghalaya

Ph. No: 0364 - 2534039
Fax No: 0364 - 2534040
Website: www.nerpc.nic.in

No. NERPC/SE (O)/OCC/2018/***33-70*** Dated: April 27, 2018

To,

1. Managing Director, AEGCL, Bijuli Bhawan, Guwahati – 781 001
2. Managing Director, APDCL, Bijuli Bhawan, Guwahati – 781 001
3. Managing Director, APGCL, Bijuli Bhawan, Guwahati – 781 001
4. Director (Generation), Me. PGCL, Lumjingshai, Short Round Road, Shillong – 793 001
5. Director (Distribution), Me. ECL, Lumjingshai, Short Round Road, Shillong – 793 001
6. Director(Transmission), Me. PTCL, Lumjingshai, Short Round Road, Shillong – 793 001
7. Managing Director, MSPDCL, Secure Office Bldg. Complex, South Block, Imphal – 795 001
8. Managing Director, MSPCL, Electricity Complex, Keishampat, Imphal – 795 001
9. Director (Tech.), TSECL, Banamalipur, Agartala -799 001.
10. Director (Generation), TPGCL, Banamalipur, Agartala -799 001.
11. Chief Engineer (WE Zone),Department of Power ,Govt. of Arunachal Pradesh, Itanagar- 791111
12. Chief Engineer (EE Zone),Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791111
13. Chief Engineer (TP&MZ),Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791111
14. Engineer-in-Chief (P&E), Department of Power, Govt. of Mizoram, Aizawl – 796 001
15. Chief Engineer (P), Department of Power, Govt. of Nagaland, Kohima – 797 001
16. CGM, (LDC), SLDC Complex, AEGCL, Kahilipara, Guwahati-781 019
17. Group General Manager, NTPC, Bongaigoan Thermal Power Project, P.O. Salakati, Kokrajhar- 783369
18. ED, NERTS, PGCIL, Dongtieh-Lower Nongrah, Lapalang, Shillong -793 006
19. ED (O&M), NEEPCO Ltd., Brookland Compound, Lower New Colony, Shillong-793003
20. ED (Commercial), NEEPCO Ltd., Brookland Compound, Lower New Colony, Shillong-793003
21. ED (O&M), NHPC, NHPC Office Complex, Sector-33, Faridabad,Haryana-121003
22. Vice President (Plant), OTPC, Badarghat Complex, Agartala, Tripura - 799014
23. GM, NERLDC, Dongtieh, Lower Nongrah, Lapalang, Shillong -793 006
24. Member Secretary, ERPC, 14 Golf Club Road, Tollygunge, Kolkata-700033
25. Chief Engineer, GM Division, Central Electricity Authority, New Delhi – 110066
26. Chief Engineer (NPC), NRPC Complex, Katwaria Sarai, SJSS Marg., New Delhi - 110016

Sub: Minutes of 143rd OCC Meeting.

Sir/Madam,

Please find enclosed herewith the minutes of 143rd OCC Meeting held at Guwahati on the **12th April, 2018** for your kind information and necessary action. The minute is also available on the website of NERPC, **www.nerpc.nic.in**.

Any comments/observations may kindly be communicated to NERPC Secretariat at the earliest.

Encl: As above

भवदीय/Yours faithfully,

बि. लिंगखोइ / B. Lyngkhoi
निदेशक / **Director/ SE**

Copy to:

1. CGM, AEGCL, Bijuli Bhavan, Guwahati - 781001
2. CGM, APGCL, Bijuli Bhavan, Guwahati - 781001
3. CGM, DISCOM, Bijuli Bhavan, Guwahati - 781001
4. Head of SLDC, Me.ECL, Lumjingshai, Short Round Road, Umjarain, Shillong – 793 022
5. Head of SLDC, Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791 111
6. Head of SLDC, Department of Power, Dimapur, Nagaland
7. Head of SLDC, Electricity Department, Govt. of Manipur, Keishampat, Imphal – 795 001
8. Head of SLDC, Department of Power, Govt. of Mizoram, Aizawl – 796 001
9. Head of SLDC, TSECL, Agartala – 799 001
10. Chief Engineer(Elect), Loktak HEP,Vidyut Vihar, Kom Keirap, Manipur- 795124
11. Addl. GM (EED), NTPC Ltd., Bongaigoan Thermal Power Project, P.O. Salakati, Kokrajhar- 783369
12. DGM (C&M), OTPC, 6th Floor, A-Wing, IFCI Tower -61, Nehru Place, New Delhi – 110019.

निदेशक / **Director/ SE**

North Eastern Regional Power Committee

MINUTES OF THE 143rd OPERATION COORDINATION SUB-COMMITTEE MEETING OF NERPC

Date : 12/04/2018 (Thursday)

Time : 10:00 hrs

Venue : "Hotel Nandan", Guwahati.

The List of Participants in the 143rd OCC Meeting is attached at **Annexure – I**

Shri P.K. Mishra, Member Secretary, NERPC welcomed all the participants to the 143rd OCC meeting. He noted the presence of participants from all the utilities except Mizoram, Nagaland and NTPC. He expressed strong displeasure regarding absence of NTPC, which is not acceptable by an organization of such stature. He informed the house that Shri P. Jindal, CE, NPC and Shri R.K. Bansal, Consultant NLDC has kindly agreed to attend the meeting. He requested all the constituents to raise their queries regarding issues of PSDF funded projects, ADMS etc., so that the projects in NER can be completed in time.

Thereafter, Member Secretary requested Shri B. Lyngkhoi, Director/SE(O&P) to take up the agenda for discussion. SE(O&P), NERPC welcomed delegates from M/s SCOPE and M/s PWC for their sessions on ADMS and SAMAST respectively. He mentioned that SCOPES would give detailed presentations in respect of ADMS so that the pros and cons of this project should be complied with CERC's Regulations. He also mentioned that PWC would also give presentation on SAMAST for the benefit of NER Utilities.

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 142nd MEETING OF OPERATION SUB-COMMITTEE OF NERPC.

The minutes of 142nd meeting of Operation Sub-committee held on 14th March, 2018 at Guwahati were circulated vide letter No. NERPC/SE (O)/OCC/2016/4556-4591 dated 22nd March, 2018.

The Sub-committee confirmed the minutes of 142nd OCCM of NERPC as no comments/observations were received from the constituents.

ITEMS FOR DISCUSSION

B.1. ACTION TAKEN:

1. IMPLEMENTATION OF PROJECTS FUNDED FROM PSDF:

The status as informed in 143rd OCC:

State	Protection System	ADMS	Capacitor Installation	SAMAST**
Arunachal Pradesh	Requisition of funds by May-June 2018.	Clarification submitted to Techno-Economic Sub-group.	-	SLDC to apprise SERC of the project.
Nagaland	Pack-A: May'18 Pack-B: Aug'18 Pack-C: Aug'18 Pack-D: Completed.	Clarification submitted to Techno-Economic Sub-group.	To re-submit proposal to NERPC for Study.	Meter Requirement submitted to SAMAST group for DPR preparation.
Mizoram	Could not be updated- due to absence of officials	Clarification submitted to Techno-Economic Sub-group.	Appraisal Committee is yet to approve	DPR to be completed by Mar'18.
Manipur	All LOAs by Apr'18	Clarification submitted to Techno-Economic Sub-group.	Submitted to NERPC for Study before sending to NPC/NLDC.	DPR to be completed by Mar'18.
Tripura	UC by 31.03.18.	Clarification submitted to Techno-Economic Sub-group.	To submit proposal to NERPC for Study.	DPR to be completed by Mar'18.
Assam	R&U Remaining 40% LOAs April'18 Retendering Diagnostic Tools, DG set and PLCC By Jun'18 all LOAs BCU Rem 40% LOAs by Apr'18	Clarification submitted to Techno-Economic Sub-group.	-	DPR finalized.

Meghalaya	MePTCL-PLCC equipment LOA by Mar'18. Earthing Pkg Tender May'18 Rem. LOAs by Mar'18 MePGCL –By April'18 erection is likely to be completed.	Clarification submitted to Techno-Economic Sub-group.	-	DPR awaiting board approval.

Deliberation of the sub-Committee:

Consultant, NLDC gave a presentation(attached at **Annex. B.1(1)**) on ADMS scheme. He informed that ADMS is in the final stages of implementation in Kerala. The broad outline of the presentation is given below:-

- ADMS project was conceived to fulfil regulatory provisions viz. IEGC 5.2 & IEGC 5.4.2. CERC in suo motu petition No. 208/2011 dated. 01.12.2011 initiated the process of ADMS implementation.
- Loads to be divided into four groups: i) for scheduled power cuts/load shedding, ii)loads for unscheduled load shedding, iii)loads to be shed through under frequency relays/ df/dt relays and iv)loads to be shed under any System Protection Scheme identified at the RPC level.
- SCADA system carries out the logic check and issue a command in IEC 60870 – 5-104 standards.
- ADMS will have two components viz. i)ADMS server PC at SLDC control centre, ii) Automatic Feeder Tripping System(AFTS) at substations
- After receipt of command the ADMS Server PC generates the trip command based on the software implemented logic. The logic for the trip command is to be based on the relief to be obtained in the distribution network.
- Microcontroller based AFTS at substations to intelligently trip the feeders through DO.

M/s SCOPE presented briefly their devised scheme for ADMS. Members noticed that an elaborate SCADA for Distribution System has been envisaged in the estimate.

CE, NPC noted that estimate for some items viz. SDH, server etc. were exceedingly high. It was decided that modifications in tune with the suggestions given by NLDC/NPC would be done, particularly excluding any elaborate SCADA for distribution system, 33kV RTU, Communication upto 33/11kV Substation etc.

CE, NPC informed that as per DPR submitted by NER states it was found that the per station cost was very high compared to other regions. He further opined the following:-

1. For Ar. Pradesh, Manipur, Mizoram and Nagaland the pilot ADMS project scope with one substation is enough, as a deviation greater than 48MW for these states is very rare at present.
2. For Assam at least 5 stations and for Meghalaya, Tripura at least 3 stations should be selected for ADMS project as that would fulfil all regulatory obligations.
3. He requested all states to submit corrigendum to DPR as soon as possible.

The forum felt that the existing SCADA system with RTUs at 132kV level should be utilised to the maximum, for e.g. DMS application of SCADA, spare DO cards of 132kV RTU etc. M/s SCOPE was requested to incorporate the same.

CE,NPC expressed great concerned about the delay in implementation of R&U works in Ar. Pradesh. He informed that in case of non-utilisation of requisite funds ASAP the same would be diverted by the Monitoring Committee to some other project.

EE, SLDC, DoP Ar. Pradesh informed that the same would be communicated to concerned senior officials of DoP Ar. Pradesh.

EE(SP), MeECL stated the following difficulties w.r.t. R&U works:-

i. Non- release of funds in time bound manner - This is resulting in delayed payment to vendors whereas in LOAs a particular deadline for payment has been given. He stated that time extension has been communicated to NLDC/NPC and requested to consider the same.

ii. Procurement of balance items of equipments - After having carried out the tendering process for 132 KV Capacitor Voltage Transformers, out of the total amount of 137 as approved in the DPR under the PSDF scheme ,the LOA was place for 107 numbers only. This was done so as the price bid of the successful bidder exceed the estimated amount in the DPR for this particular item.

However, after having carried out the tendering process for the other items and award of LOAs, it has been observed that there is adequate provision within the sanctioned amount the DPR, to procure the balance quantity of 30 nos. of CVTs. Hence, MePTCL intend to procure the complete quantity of CVTs as approved in the DPR.

He requested NLDC to clarify as to whether any formal approval of NLDC is required for this procurement as there will not be any cost escalation of the scheme over the sanctioned amount of the DPR.

iii. The revised DPR for Numerical Line Differential Protection has been sent to NLDC after incorporating comments/changes in the DPR as desired during the Techno Economic meeting held on the 19.01.2018 at New Delhi.

Consultant, NLDC clarified the above as follows:-

i. The request for time extension from MeECL has been received on 09.02.2018. The same would be put up to the monitoring committee for approval of the time extension. On obtaining approval from monitoring committee, which will sit on the 02.05.2018, It is expected that the funds requisition for tranche 2 and tranche 3 respectively for MePTCL would be released by 15.05.18. He requested all utilities that in case of time overrun, the request for time extension with detailed reasons and revised time schedule be submitted forthwith.

ii. Since there is no additional cost to be incurred for procuring the balance items, repeat order may be placed with intimation to NLDC Secretariat.

EE (System Protection), MePTCL, requested NLDC for a confirmatory mail in this regard to expedite the scheme.

iii. The revised Numerical Line Differential Protection DPR will be scrutinised by the monitoring and appraisal committee and approval will be accorded.

CE, NPC mentioned that the term pilot should be removed from ADMS as mentioned earlier as the scheme will now be complied as per CERC's Order. SCOPES noted.

Regarding SAMAST, DGM(MO),NERLDC expressed apprehension in delay of the project if tendering is done by individual states. Consultant, NLDC informed that as per current procedure funds can be disbursed only to the states. He suggested that common tender can be done by a central agency and during the process of tendering, it may be divided into separate packages, wherein each package would be awarded by a different state. However the logistical issues regarding hardware and software delivery have to be worked out in the tendering stage itself. CE, NPC stated that any changes required for PSDF guidelines in this regard may be sent by NERPC, which would then be taken up in the Monitoring Committee.

CE, NPC & Consultant, NLDC appreciated the efforts of NERPC for common DPRs and stated that NER States would be greatly benefited as project cost will come down drastically and moreover many reputed firms would be also participated if tender value is more.

The Sub-Committee noted as above.

Action: All state utilities/NERPC.

2. Outage of Important Grid Elements:

Name of the Element	Name of Utility	Status as informed in 143rd OCC
63MVAR Reactor at Byrnihat to replace with 80MVAR Reactor	MePTCL	To be referred to SCM of NER.
400KV 80MVAR Bus Reactor at Palatana	OTPC	Unavailability of critical spare. By 30.04.2018 - CoD.
132 kV P K Bari – Silchar I & II	NERTS	Ckt#II – restored. Ckt#I - by 30.04.18
DHEP Unit 2	NEEPCO	By Apr'18
400/220 kV, 315 MVA ICT-II at BgTPP	NTPC	By Apr'18
Replacement of R-ph bushing of 63MVAR L/R at Balipara for 400kV Balipara-Bongaigaon -II (*out since 17.02.18)*	NERTS	By Nov'18

The Sub-Committee noted as above.

Action: All concerned utilities.

3. Furnishing of various data for reliable grid operation:

<table>
<tr><td>Data regarding</td><td>Status as of 143rd OCC</td></tr>
<tr><td>DAS output for FRC calculation</td><td>Event Date: 30.01.18; Doyang & RHEP provided information.
Event Date: 20.02.18; Doyang, & OTPC provided information.
Event Date: 07.03.18; RHEP provided information
NERLDC once again requested all generators to provide DAS data at the earliest for FRC calculation.</td></tr>
<tr><td>Operating Procedures.</td><td><table><tr><th>Items</th><th>Data submitted by</th></tr><tr><td>OP of States</td><td>Submitted only by AEGCL and MePTCL</td></tr></table></td></tr>
</table>

	OP of HVDC	Submitted. **Item to be dropped**
	OP of Transmission System	Not submitted by any constituents
	OP of Generating Stations	Not submitted by any generators
	OP of GIS	Not submitted by any constituents
Data related to Power Map.	**Items**	**Data submitted by**
	Communication (PLCC/OPGW/ GPRSVSAT/ Satellite	List of lines mailed by NERLDC on 9th January'18 Assam & Mizoram provided the data.
Data related to Single Line Diagram.	State SEM Location	Only Meghalaya submitted Other states confirmed that SEM is not installed in their system. **Item to be dropped.**
Patrolling report(s) for T/L.	-	

The Sub-committee noted as above.

Action: All utilities as above.

4. Monitoring of Corrective actions as decided in PCC forum:

Name of the Element	Action to be taken	Name of Utility	Status as of 143rd OCC
132 kV Dimapur - Doyang 1 & 2 Lines	Installation of Numerical Relay at Doyang	NEEPCO	By Dec'18
132kVPK Bari-Kumarghat	Installation of Line differential relay	NERTS	By Dec'18
132kV PKBari	Installation of Numerical Relay under R&M (*high priority).* TSECL to divert NR to AGTCCPP.	TSECL	By Apr'18
AGTCCPP-LFO	AVR replacement	NEEPCO	By Oct'18

The Sub-committee noted as above.

Action: All utilities as above.

B.2. OPERATIONAL PERFORMANCE AND GRID DISCIPLINE DURING MARCH, 2018

As per the data made available by NERLDC, the grid performance parameters for March, 2018 are given below:

NER PERFORMANCE DURING MARCH, 2018

States	Energy Met (MU)		w.r.t. Feb,18 % inc (+) /dec (-)	Energy Reqr. (MU)		w.r.t. Feb,18 % inc (+) /dec (-)	% inc (+) /dec (-) of energy reqr vs met. In Mar,18
	March-18	**February-18**		**March-18**	**February-18**		
Ar. Pradesh	63.73	62.22	2.43	64.85	63.02	2.90	-1.73
Assam	655.39	641.17	2.22	682.41	652.58	4.57	-3.96
Manipur	68.54	70.65	-2.99	69.63	71.33	-2.38	-1.57
Meghalaya	149.39	187.08	-20.15	149.39	187.08	-20.15	0.00
Mizoram	47.75	51.36	-7.03	48.50	51.93	-6.61	-1.55
Nagaland	61.80	57.91	6.72	70.14	66.25	5.87	-11.89
Tripura	114.09	100.59	13.42	115.76	101.17	14.42	-1.44
Region	**1160.69**	**1170.98**	-0.88	**1200.66**	**1193.37**	0.61	-3.33

States	Demand Met (MW)		w.r.t. Feb,18 % inc (+) /dec (-)	Demand in (MW)		w.r.t. Feb,18 % inc (+) /dec (-)	% inc (+) /dec (-) of Demand vs met. In Mar,18
	Mar-18	**Feb-18**		**Mar-18**	**Feb-18**		
Ar. Pradesh	124	128	-3.13	138	138	0.00	-10.14
Assam	1446	1481	-2.36	1472	1501	-1.93	-1.77
Manipur	178	191	-6.81	185	197	-6.09	-3.78
Meghalaya	307	311	-1.29	307	312	-1.60	0.00
Mizoram	91	94	-3.19	100	103	-2.91	-9.00
Nagaland	120	122	-1.64	148	150	-1.33	-18.92
Tripura	256	237	8.02	257	238	7.98	-0.39
Region	**2250**	**2333**	-3.56	**2283**	**2387**	-4.36	-1.45

REGIONAL GENERATION & INTER-REGIONAL EXCHANGE IN MU

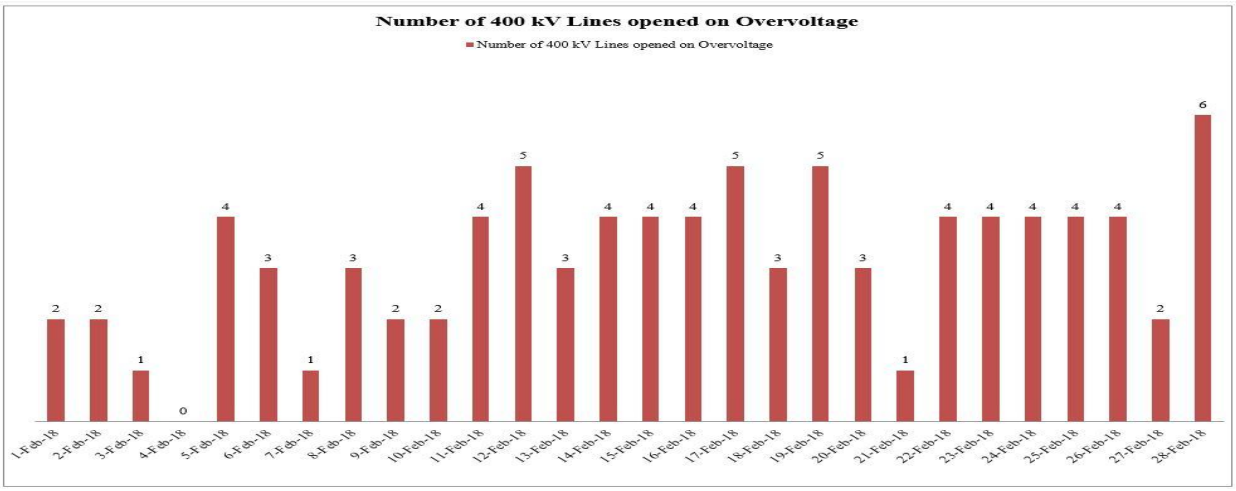
Month---->	**Mar-18**	**Feb-18**
Total Generation in NER (Gross)	1222.310	1180.627
Total Central Sector Generation (Gross)	974.427	884.266
Total State Sector Generation (Gross)	247.883	296.360
Inter-Regional Energy Exchange		
(a) NER-ER	**126.9**	**94.64**
(b) ER-NER	**133.22**	**242.16**
(c)NER-NR	**40.99**	**175.52**
(d)NR-NER	**135.96**	**111.18**
© Net Import	101.29	83.18

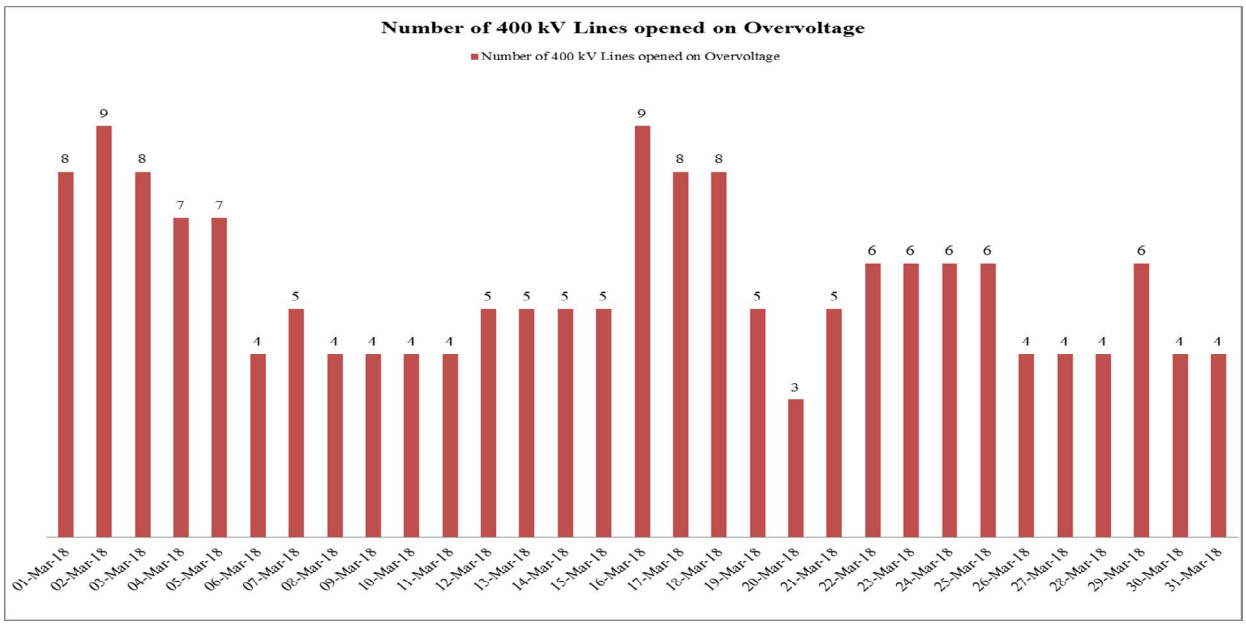
AVERAGE FREQUENCY (Hz)

Month---->	**Mar-18**	**Feb-18**
	% of Time	% of Time
Below 49.9 Hz	12.99	9.69
Between 49.9 to 50.05 Hz	79.29	80.25
Above 50.05 Hz	7.72	10.06
Average	49.97	49.98
Maximum	50.25	50.21
Minimum	49.68	49.70

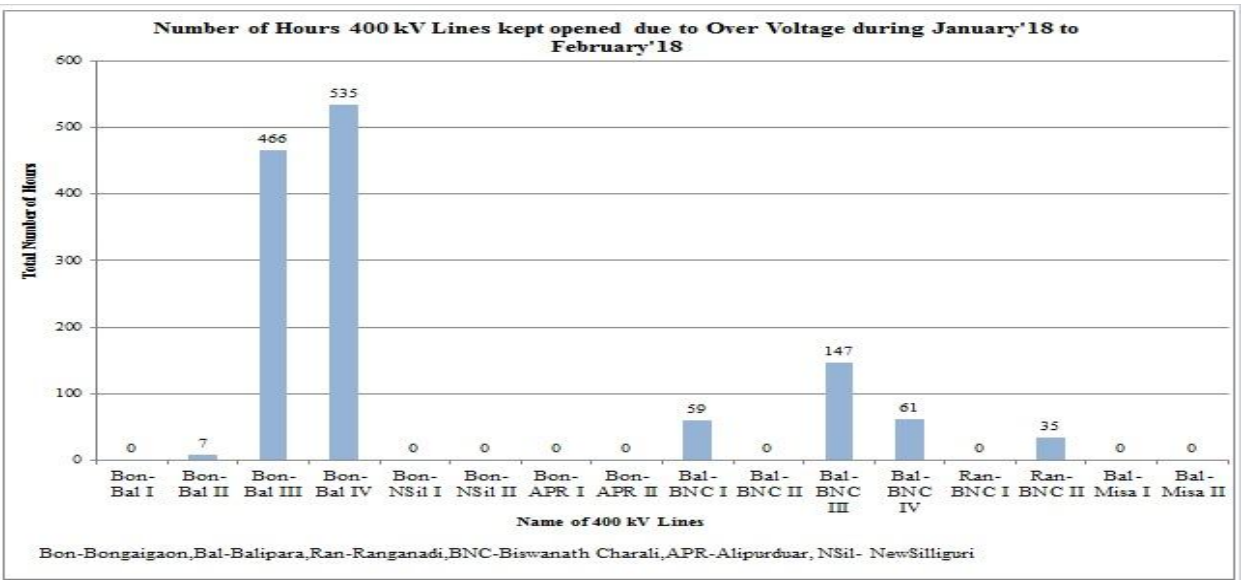
Deliberation of the sub-Committee:

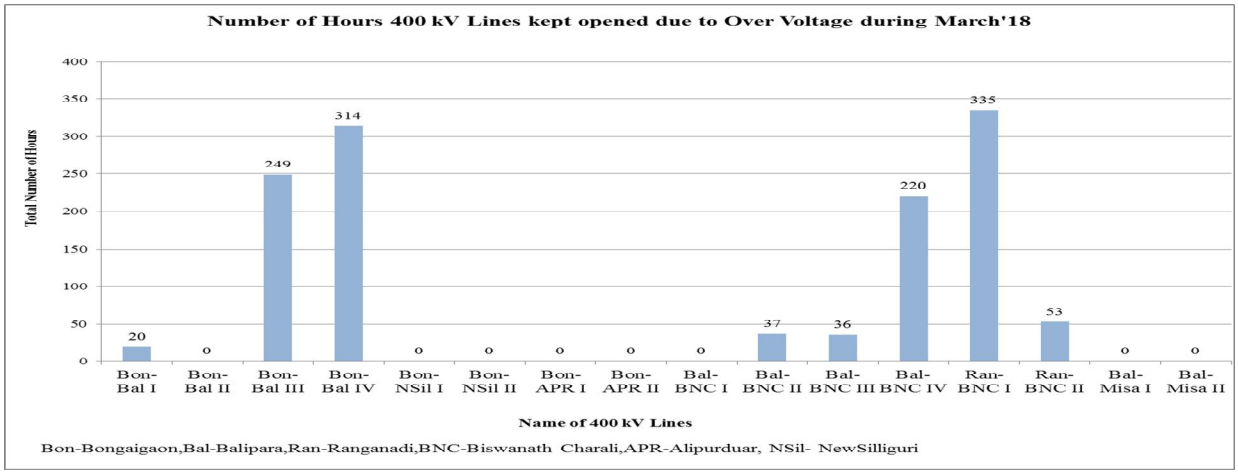
NERLDC gave a presentation on the grid performance for the month of March'18. NERLDC also highlighted that Daily, Weekly and Monthly Voltage Deviation Report, Frequency Deviation Report and System Reliability Report for March'18 are already mailed to all the constituents for necessary actions. Further it was informed that members may access these reports from NERLDC website under the tab CERC KPI Reports. NERLDC informed the forum about the number of lines kept open on high voltage. Forum express concern about the same and requested the generators to absorb MVAR. NERLDC again requested for early restoration of reactors which are under long outage and commissioning of new reactors at the earliest as mentioned in Sl. No. B.1.2 and C.1 so that it does not require toopen lines for maintaining voltage profile within IEGC band. The plots of 400 kV lines opened for maintaining voltage profile within IEGC band during March'18 is mentioned below





Outage Hours: For 400 kV Lines





The Sub-Committee noted as above.

ITEMS FOR DISCUSSION

C. OLD ITEMS

1. <u>Status of Generating Units, Transmission Lines in NER:</u>

During 143rd OCC meeting, the status as informed by different beneficiaries is as follows:

SN	Items	Status as given in 142nd OCC Meeting	Status as given in 143rd OCC Meeting
a. New Elements			

1	400/220kV, 315 MVA ICT-1 of NTPC at Bongaigaon	ICT-1 - Apr'18	-
2	Kameng HEP of NEEPCO two units (2 x 150 MW) Next two units (2x150 MW)	Leakage in underground portion of pen stock. After inspection final date would be intimated.	Sep'18
3	Pare HEP of NEEPCO (2 x 55 MW)	Unit #I - Mar'18	Unit #I - By 25.04.18
4	400 kV D/C Silchar - Melriat line of PGCIL	June, 2018.	June, 2018.
5	220kV Rangia - Salakati of AEGCL	May, 2018.	Indefinitely delayed. **To be dropped.**
6	132kV Monarchak – Surjamaninagar D/C of TSECL	Apr'2018	Severe RoW issues. To be referred to next SCM for resolution of bay issue at Palatana.
7	400kV D/C Balipara – Kameng	ROW issues. 1st week of Apr'18.	Completed.
8	SLDCs (Ar. Pradesh, Manipur, Mizoram, Nagaland)	Ar. Pradesh - Mar'18 Manipur, Nagaland – CoD Mizoram-ToC date to be confirmed.	Nagaland-DoCO to be finalized Ar. Pradesh, Manipur - CoD Mizoram-ToC date to be confirmed.
9	400/220 kV 315 MVA ICT-II at Bongaigaon	Tied up with GIS. By June'18.	Tied up with GIS. By June'18.
10	220/132 kV, 160MVA ICT-II at Balipara	ICT#II - delayed, Sept''18	ICT#II - delayed, Sept''18
11	220/132 kV, 1x160 MVA ICT with GIS Bay at Kopili	Sept, 2018.	Sept, 2018.
12	400/132 kV, 1x315 MVA ICT-III at Silchar	May, 2018.	May, 2018.
13	Replacement of 2x315 MVA ICTs with 2x500 MVA ICTs at Misa (PG)	ICT-I : May'18 ICT-II : Aug'18	ICT-I : May'18 ICT-II : Aug'18
14	400 kV Silchar – Misa D/C	2019	2019
15	1x125 MVAR Bus Reactor at 400 kV at Balipara	March, 2018(LOA date).	March, 2018(LOA date).

16	1x125 MVAR Bus Reactor at 400 kV Bongaigoan	March, 2018(LOA date).	March, 2018(LOA date).
17	Tuirial HEP of NEEPCO	Unit #I -CoD pending Communication and Connection Agreement. Unit #II - Feb'18	Unit #I -CoD pending Communication and Connection Agreement. Unit #II - Feb'18
18	33kV bay at 220kV Mariani(AS) S/Sn	Take up with APDCL. Load security payment is under process. APDCL will install meter.	Take up with APDCL. Load security payment is under process. APDCL will install meter.
19	33kV Tezu-Tezu(AP)	-	-
20	33kV bay for 132kV Badarpur(PG) S/Sn	APDCL submitted estimate to PG_Badarpur recently.	APDCL submitted estimate to PG_Badarpur recently.
21	Dedicated 33kV feeder at Khliehriat Substation from Lumshnong.	To be taken up by NERTS with MePDCL.	To be taken up by NERTS with MePDCL.***
22	Construction of 132 kV Imphal (PG) - Yurembam III & IV lines with high capacity conductor by MSPCL	By last week of Apr'18	By last week of Apr'18
23	LILO of 132kV Aizawl-Jiribam at Tipaimukh by MSPCL	April'18	April'18
b. Elements under breakdown/ up-gradation			
24	Up-gradation of 132 kV Lumshnong-Panchgram line	To be approved by Techno-Economic sub-group for funding from PSDF.	To be approved by Techno-Economic sub-group for funding from PSDF.
25	Switchable line Reactors at 400kV Balipara & Bongaigoan	April'18	June'18
26	PLCC Panels at Loktak end of Loktak – Ningthoukhong 132 kV feeder and Loktak - Rengpang 132 kV feeder	Oct'2018	Oct'2018
27	LILO of 132kV Ranganadi – Itanagar (Chimpu) at Pare of Ar. Pradesh	Bay 1 at RHEP for Pare: Delayed Bay 2 at Pare for Itanagar: Delayed	Bay 1 at RHEP for Pare: Delayed Bay 2 at Pare for Itanagar: Delayed

28	Re-conductoring of 132kV Umiam Stg#I - Umiam Stg-III	DPR prepared and submitted for approval	DPR prepared and submitted for approval
29	Upgradation of ULDC FO node	Target completion : June 2018	Target completion : June 2018
30	HTLS re-conductoring of 132kV Agartala – RC Nagar – II	Ckt#II- Mar'18	Ckt #I&II- completed
31	Re-conductoring of Imphal (PG)-Yurembam 132 kV S/C POWERGRID line with high capacity conductor by NERTS	Apr'18	Apr'18
32	Up gradation / modification of bay equipment at Imphal (PG) by POWERGRID and at Yurembam by MSPCL	Apr'18	Apr'18
33	Up gradation of bay equipment at AGTCCPP by POWERGRID for 132kV AGTCCPP-Agartala D/C	-	Existing rating of isolator is sufficient and hence, replacement is not required. **Item to be dropped.**

Deliberation of the sub-Committee:

CE,NPC suggested that lines of strategic importance which are facing severe RoW issues may be included in list of MoP to be monitored under special PM's scheme. This would enable speedy resolution of the issues. The forum requested NERPC to write to MoP in this regard.

***DGM(AM), NERTS informed that as per communication received from MePDCL, NERTS has been requested to resolve RoW issues for 33kV, which was never a practiced anywhere. The forum requested MePDCL to intervene and kindly resolve the issue.

EE, System Protection MePTCL, requested DGM (AM) NERTS to discuss the matter directly with counterpart of MePDCL Khliehriat for resolving the issue.

The Sub-Committee noted as above.

Action: All state utilities/central utilities/NERPC.

D. NEW ITEMS

D.1 Generation Planning (ongoing and planned outages)

NEEPCO/NHPC may kindly intimate the availability for hydro stations:

Generating Station	Units running	MW	MU	Reservoir
Khandong	2		3.13	707.17
Kopili-II	1			
Kopili	4		36.75	520.45
Ranganadi	2		Subject to inflow	
Doyang	2		11.8	311.22
Loktak	3		63.50	766.45
AGBPP	-	-	-	-
AGTPP	-	-	-	-

Hydro planning

The outage of other generating stations may be approved considering the present level water level in reservoirs.

Deliberation of the sub-Committee:

The Committee discussed and approved the proposed shutdown by Generating Stations and the same has already been uploaded in the website of NERPC.

The Sub-Committee noted as above.

D.2 Outage Planning Transmission elements

It was agreed in the 99th OCC meeting that shutdown will be availed only after approval is given by the OCC forum. It was also agreed that deferment/revision of outages elements other than already approved in OCC will be henceforth put/displayed in the website of NERPC (**under Operational Activities/OCC Approved shutdown**) as per CERC regulations/ CEA guidelines etc for ensuring smooth & secure grid operation.

Furnishing request of shut down of the element, which was approved by NERPC, by Indenting Agency (ISTS licensees/STUs/Generating Companies) to NERLDC: Planned shutdown approved by NERPC shall be considered for implementation by NERLDC on D-3 basis. If an outage is to be availed on say 10th of the month, the shutdown availing agency would reconfirm to NERLDC on 7th of the month by 10:00

Hr. This practice is necessary to ensure optimal capacity utilization and the time required for associated system study/coordination by/amongst RLDC/NLDC.

In 134th OCCM, it was decided that all communication related shutdown be approved in OCC forum only.

In 142nd OCCM, SE (O&P), NERPC suggested that henceforth shutdown list may be prepared under following categories:

(i) New Construction Related Shut Down
(ii) Existing System Improvement Related Shut Down.
(iii) Existing System Normal Maintenance Related Shut Down
(iv) Communication Related Shutdown
(v) R&U works Related Shut Down under PSDF

The forum further decided that the modalities of communication related shutdown should be finalized. Members requested NERPC to invite POWERGRID telecom in next OCCM alongwith with officials (handling communication issues) from all utilities for this purpose.

Deliberation in the Meeting:

SE(O&P), NERPC once again reiterated that shutdowns which are not being availed will not be entertained in the following month and would only be accorded in the next to next month. He hoped that in view of greater complexity in grid operation due to communication issues, the list of important links would be finalised by NERLDC very soon. He also requested NERTS to impress upon POWERGRID Telecom to attend the next OCCM positively.

NERLDC highlighted that OCC forum approves the S/D after lots of discussion but it is observed that some of the shutdowns are not being availed. Details of Shutdown not availed and shutdowns applied on D-3 basis is as below:

Total S/D approved	Total S/D availed	Total S/D not availed	Total S/D deferred	Total S/D availed on D-3 basis	Total S/D not applied on D-3 basis
159	110	49	102	49	8

NERLDC highlighted that the inordinate delay in revival of elements under S/D for ISTS licensees is coming very high which is affecting the secure operation of the grid. Details for the month of Mar'18 are as below:

Transmission Licensee	Total Delay	Avg. Delay	Max. Delay	Min Delay
POWERGRID	261 Hrs 46 Min.	3 Hrs 36 Min.	18 Hrs on 4th March'18 for 132 kV Jiribam – Loktak line	1 min on 28th Mar'18 for 220 kV Misa – Samaguri
NETC	9 Hrs 1 Min	1 Hrs 7 Min	2 Hrs 42 Min. on 8th Mar'18 for 400 kV Silchar-Byrnihat line	21 min on 1st Mar'18 for 400 kV Bongaigaon-Byrnihat
ENICL	10 Min	10 Min	10 Min. on 21st Mar'18 for 400 kV APD-Bongaigaon I line.	-

NERLDC requested ISTS licensees to return the element under shutdown as per approved schedule.

Shut Down of 132kV Aizawl-Jiribam for Temporary connection of Tipaimukh SS

During deliberation, DGM, MSPCL requested temporary connection of Tipaimukh Sub Station from 132kV Aizawl-Jiribam Line for Test Charging 132/33kV Transformer at 132kV Tipaimukh. Accordingly, the forum along with POWERGRID agreed to the proposal of MSPCL as below:

Step-1:

MSPCL will take Shut down of 132kV Jiribam – Aizawl Line on 14.04.2018 for connection of Loop In Circuit in 132kV Jiribam – Aizawl Line and keep the section charged upto Line Isolator.

Step-2:

Thereafter, once the transformer at Tipaimukh is made ready for charging within another 10 / 12 days, MSPCL will take Shut down of 132kV Jiribam – Aizawl Line to disconnect the Aizawl Section and test charge the transformer from POWERGRID Jiribam Sub Station for 3 / 4 Hours. During the test charging of Transformer, POWERGRID will make necessary changes of protection setting at Jiribam Sub Station to take care of fault in Line Section and Tipaimukh Sub Station as well.

Step-3:

After completion of Test Charging of Transformer, MSPCL will take Shut down of 132kV Jiribam – Aizawl Line to re-connect the Aizawl Section and disconnect the temporary take-off connection of Tipaimukh Sub Station from 132kV Jiribam – Aizawl Line. POWERGRID will normalize the relay setting before putting 132kV Jiribam – Aizawl Line in service without Tipaimukh Sub Station connectivity.

Step-4:

Finally, once the all installations and formalities are completed, MSPCL will make the permanent LILO connection of Tipaimukh Sub Station in 132kV Jiribam – Aizawl Line in line with approval of 6th SCM and 17th NERPC Meeting.

The sub-Committee discussed and approved the proposals received from the constituents regarding transmission elements and generating units for April,2018 - May, 2018 and the same has already been uploaded in website of NERPC.

D.3 Estimated Transmission Availability Certificate (TAC) for the month of November, 2017 to January, 2018:

NETC and POWERGRID have submitted the outage data for the month of November, 2017 to January, 2018. So the attributability of outage of the said elements may please be finalized.

In 141st OCCM, DGM (MO), NERLDC stated that outages would be made attributed to respective transmission licensees due to absence of documentary evidence during verification stage. NERPC secretariat would take due care accordingly. After detailed deliberation it was decided that Transmission Licensees (POWERGRID, NETC etc) would provide the relevant documents during verification process itself and no plea would be honored after that.

For streamlining the process of Verification of Transmission Element Availability, a draft Procedure is prepared by NERLDC and NERPC.

Constituents of NER are requested to send comment and suggestion for this document by 28th Mar'18. This document will be finalized by 31st Mar'18.

In 142nd OCCM, NERLDC informed the forum that the draft procedure has been prepared and the same shall be circulated shortly. NERPC and NETC were requested to provide their comments on the draft Procedure by 31st March'18. The forum once again advised NETC & POWERGRID to submit data in a time bound manner as decided previously.

Deliberation in the Meeting:

SE(O&P),NERPC informed that in CERC Tariff Regulations, 2014 under Ch-8 Reg.38 " *Provided also that for AC system, two trippings per year shall be allowed. After two trippings in a year, additional 12 hours outage shall be considered in addition to the*

actual outage". He stated that as per current procedure followed in NER this has not been implemented in toto. However it will be practiced w.e.f. current financial year.

DGM(MO),NERLDC suggested that from now onwards an element-wise cumulative tripping details attributable to the licensees for the current FY has to be submitted by the respective transmission utilities on monthly basis along with outage data. Then after all prudence checks by NERLDC/NERPC, once the outage is certified by NERPC, final cumulative tripping details attributable to the transmission licensee would be published by NERPC.

The Sub-Committee noted as above.

Action: Concerned transmission utilities/NERLDC/NERPC

D.4 Assessment of Total Transfer Capability (TTC), Transmission Reliability Margin (TRM) and Available Transfer Capability (ATC) by SLDC on respective Inter-State Transmission Corridor

Updated PSS/E Base Cases have been mailed to all the SLDCs on 02.04.18. All SLDCs are requested to assess the Total Transfer Capability (TTC), Transmission Reliability Margin (TRM) and Available Transfer Capability (ATC) for the month of Apr'18 using these cases, and submit the study cases and results to NERLDC by 20.04.18.

NERLDC has assessed the state control area wise, state subsystem wise and group of control-area wise TTCs for NER Grid, on behalf of SLDCs of NER. The study results will be presented in the meeting. SLDCs are requested to check the TTC of their control areas as computed by NERLDC and give comments, if any, by 20.04.18.

If no comments received from any SLDCs of NER, TTC, ATC & TRM figures of State control area and group of control areas as assessed by NERLDC will be considered as final and may be uploaded on website.

As per discussions in 122nd OCC meeting of NERPC, all SLDCs of NER may host the assessed TTC / ATC / TRM figures on their website for information dissemination.

Deliberation in the meeting

EE,SLDC, DoP Ar. Pradesh informed that SLDC, Ar. Pradesh would give presentation on ATC/TTC Calculation for Ar. Pradesh grid in the 144th OCC.

CE,NPC stated that ATC/TTC figures are calculated based on the N-1 condition only. He opined that presenting N-0 figures would create unnecessary confusion.

NERLDC has assessed TTC of each state control area of NER, each state subsystem on behalf of SLDCs of NER and group of control-area wise TTCs for NER Grid for the month of May'18:

States	Off-peak		Peak	
	N-0	N-1	N-0	N-1
Arunachal	184	182	184	182
Assam	1525	1526	1525	1526
Manipur	259	263	259	263
Meghalaya	170	150	170	150
Mizoram	118	118	118	118
Nagaland	88	74	88	74
Tripura (including Bangladesh)	112	77	112	77

The Sub-Committee noted as above.

Action: All SLDCs.

D.5. Implementation of SPS for transfer of 160 MW power to Bangladesh through Tripura-Bangladesh link and modifications suggested for other SPSs in NER:

In Special Meeting on SPS, UFR etc. held on 23.06.17, Chief Manager, NERTS, POWERGRID presented the draft scheme to implement the suggested SPS for transfer of 160 MW power to Bangladesh through Tripura-Bangladesh link. The Sub-Committee discussed the suggested schemes in detail and agreed in principle to implement the schemes.

The forum requested NERPC to take up the matter with CEA/CTU/NLDC for implementation at the earliest after vetting in OCC forum.

In 140th OCCM, S.E. (C&O), NERPC informed due to prior engagements of Member Secretary, NERPC the visit to Bangladesh could not be scheduled. Further, he mentioned that methodology of funding of the above tour has to be concurred by MoP. He mentioned that NERPC will discuss with MoP/CTU/NLDC for above visit and intimate in next OCC meeting.

The 141st OCC forum felt that all issues related to clearances and funding need to be cleared before the visit. Members requested NERPC to write to GM, NLDC for initiation of the process at central level.

In 142nd OCC, SE(O&P),NERPC informed that NERPC has already written letter to ED,NLDC in this regard and the reply is awaited.

Deliberation in the meeting

After detailed deliberation the matter was referred to the next TCC/RPC meeting.

The Sub-Committee noted as above.

Action: NERPC.

D.6. Modus-Operandi for SPS mock testing:

The 138th OCC forum requested NERTS to prepare a draft sequence of operation for each SPS and present in next OCC for ratification. The date for SPS 2 and SPS 3 mock testing will also be finalized in next OCC Meeting.

The 140th OCC forum opined that NERPC/NERLDC may find some experts from the region to solve this long pending issue and if not, the same may be called from other region. The forum requested OTPC to intimate the details of their action plan for addressing the issues at their end pertaining to the successful operation of SPS-2 & 3 at the earliest.

NERPC vide letter dated. NERPC/SE(O)/OCC/2018 dated 08.02.2018 has requested OTPC to implement the changes as early as possible.

OTPC vide mail dated. 26.02.18 has intimated that Modified SPS-2&3 has been taken into service w.e.f. 26.02.18(10:45hrs) with 15ms time delay at OTPC end.

Since both SPS-2& 3 are operational within the stipulated time delay the forum may approve that grant of any shutdown related to Palatana ATS would be unconditional of generation backing down at Palatana GBPP.

In 142nd OCC GM,NERLDC informed that though currently s/d of Palatana ATS is being allowed without generation backing down, a mock test would be very fruitful. The forum after detailed deliberation requested NERPC to schedule mock test with representatives from NERTS, TSECL, OTPC, NERLDC & NERPC at the earliest.

Deliberation in the meeting

SE(O&P),NERPC informed that testing would be carried out tentatively in the first week of May,2018. He requested AEGCL, MeECL, NERTS, OTPC and NERLDC to depute concerned personnel for the said purpose.

The Sub-Committee noted as above.

Action: OTPC/NERTS/AEGCL/MeECL/NERPC/NERLDC.

D.7. Update on Real Time Energy Assessment for Effective Grid Management:

In 139th OCCM, CDAC representative stated that they would require the proprietary protocol from the meter manufacturer(s) to proceed further with the Project. DGM(MO), NERLDC explained that as per practice followed in other Regions like NR, ER etc., AMR provider, Meter manufacturer and Powergrid sign a tripartite agreement to enable passing of the protocol to AMR provider. A sample of draft agreement in ER (TCS is AMR provider) was provided to CDAC and it was advised that CDAC should initiate process and circulate a draft agreement for the present case. CDAC agreed to do the needful and stated that they would develop protocol converter accordingly.

CDAC has furnished the draft tripartite agreement which is to be signed between CDAC, POWERGRID-NERTS and meter manufacturer(s).

In 140th OCCM, NERPC intimated that the process of signing tripartite agreement between CDAC, Powergrid and L&T was in progress. He requested NERTS to expedite the matter.

In 141st OCCM, all the SLDCs confirmed the receipt of server at their premises. DGM,SLDC,AEGCL informed that static IP and SIMs have been procured by them.

In 142nd OCCM, DGM (AM) NERTS requested NERPC to send the Tripartite Agreement for signature of GM, NERTS urgently.

Deliberation in the meeting

SE(O&P),NERPC informed that tripartite agreement has been signed and protocol would be handed over by 21.04.2018.

The Sub-Committee noted as above
Action: CDAC.

D.8. Recording of operational instructions over VOIP in RLDC:

As per 139th OCC discussion establishment of recording system for all real time instructions and conversations thro' VOIP network was supposed to be established within Feb'18. It is very important to establish the recording system at the earliest as all verbal communication/ conversations among RLDCs, SLDCs and stations are getting lost. Recording status at SLDC also may be discussed.

In 142nd OCCM, Manager, NERTS informed that re-tendering is in process and order would be placed by Mar'18/ April'18. Delivery would be by May'18/ June'18.

Deliberation in the meeting

NERTS informed that LOA would be done by May'18 and supply by June'18/July'18.

The Sub-Committee noted as above.

Action: NERTS

D.9. Telemetry & Voice Communication Problem:

Telemetry problem: Annexure-D.16 (*as on 09.04.2018***) attached in tabular format**.

Voice Communication problem: **Annexure-D.16(***as on 09.04.2018***) attached in tabular format**.

1. **RHEP, DOYANG all type of voice communication out:**

All type of voice communication (BSNL Land line/Mobile/VOIP) with RHEP and DOYANG is out since 25th March and 15th February'18 respectively. In view of the outage of voice communication system shutdown co-ordination, scheduling, reporting as well as realtime grid operation is very much affected.

2. **SLDC Kahilipara and AIZAWL dedicated voice communication out.**

Dedicated voice communication(VOIP) with SLDC Kahilipara is out since 21st march'18.Communication with SLDC Aizawl is also out since last week(28.03.18).Due to outage of these communication links system operation is severely affected.

3. DIMAPUR S/S telemetry as well as voice communication are out since fire incident.

Since the firing incident on 15th January,2018 the telemetry as well as dedicated voice communication (VOIP)of Dimapur POWERGRID station is under outage. Due to this, system operation is severely affected. So it is very important to restore telemetry as well as dedicated voice communication at the earliest.

Deliberation in the meeting

SE(O&P), NERPC informed that the telemetry and voice communication outage have been discussed in detail during 9th NETeST and requested NERTS to adhere to the timeline given for restoration.

The Sub-Committee noted as above.

Action: NERTS.

D.10. Low voltage issue in Tripura, Mizoram & Nagaland Power Systems

POWERGRID Dimapur S/S is restored by 24th February'18. Even after restoration of Dimapur S/S, system voltage Aizawl and MELRIAT during morning and evening peak

hours drops to 122 kV. NERLDC is taking all available corrective action by opening bus Reactors at Aizawl, Kumarghat, Imphal but still voltage remains low. Capacitive compensation at local level is necessary.

In 141st OCCM, it was decided that NERLDC/NERPC would conduct studies regarding Low voltage problem in Tripura, Mizoram in consonance with studies carried out by TSECL and P&ED Mizoram. Regarding funding for capacitor banks installation NERPC would take up the issue with IA/NLDC.

In 142nd OCCM, SE(O&P), NERPC informed that a software for capacitor bank installation has been developed by SRPC. This may be used for determining capacitor bank studies i.r.o. Tripura/Mizoram.

Deliberation in the meeting

SE(O&P),NERPC informed that study data has been received from Mizoram. He requested TSECL to expedite the process. CE,NPC stated that DPR for capacitor bank installation must be supported by justifying studies.

The Sub-Committee noted as above.
Action: TSECL, NERPC.

D.11. Integration of new RTUs at RHEP:

GE supplied RTU at RHEP will be provided for accommodating the two new 132 kV extension bays being constructed by us at RHEP in the first-second week of March 2018. Integration of new RTU with existing RTU at RHEP and NERLDC control centre shall be required. Hence special permission may be required through appropriate forum in this regard.

In 141st OCCM, Sr. Manager, NEEPCO informed that RTUs are under tendering process. In absence of DoP Ar. Pradesh the forum decided to take up the item in next OCC for clarification and resolution.

In 142nd OCCM, Sr. Manager, NEEPCO informed that RTU procurement is under tendering process and would be commissioned by Dec'18.

Deliberation in the meeting

Sr. Manager, NEEPCO informed that as per discussion in 9th NETeST forum for 132kV RHEP-NDTL line, a team from NERLDC, NERTS would visit RHEP on 24.04.18 to sort out the RTU problem. For 132kV RHEP-Chimpu line he informed that RTU is under procurement and same would be installed by Dec'18. However NERLDC requested to

install RTU at RHEP at the earliest possible time as current RTU is not reliable, hence creating grid monitoring problem.

The Sub-Committee noted as above.

Action: NEEPCO.

D.12. Balipara PMU voltage problem while switching 400 kV Balipara-Bong-3

To contain the high voltage everyday NERLDC open 400 kV lines. But whenever 400 kV Balipara Bongaigaon line-3 opens, it has been observed that the 400 kV voltage at Balipara PMU dips from 417 kV to 192 kV. This type of voltage dip occurs regularly during hand tripping of the above said line.(Attached mail dated 3/2/18).Corrective action is necessary at BALIPARA end.

In 142nd OCCM, NERLDC highlighted that whenever 400 kV Balipara Bongaigaon line-3 is opened to control Over Voltage, it has been observed that the 400 kV voltage at Balipara PMU dips from 417 kV to 192 kV. This type of voltage dip occurs regularly during hand tripping of the above said line and is creating a problem for real time operators. NERLDC also informed that the issue was taken up with NERTS previously but rectification is yet to be done.

DGM(AM), NERTS informed that OEM has been called to rectify the issue.

Deliberation in the meeting

NERLDC mentioned that as the PMU is misleading the Grid managers; it is prudent to resolve the issue at the earliest.

NERTS informed that OEM has already been informed and the PMU would be rectified by May'18

The Sub-Committee noted as above.

Action: NERTS

D.13. URTDSM Project in NER:

- The Notification of Award for URTDSM Project is placed on 15-01-2014.
- The Project dead line to complete is on 16-01-2016 (24 months from NOA)
- At present Control Centre Hardware System at NERLDC, SLDC-NEHU, SLDC-Kahilapara installed but not powered up.

Quick Implementation of URTDSM project will help the Grid Operator for better visibility of high accurate real time data with a high speed data sampling

(25samples/sec) and also Analytical software for linear state estimation, parameter estimation etc.,

Advance User Interface will help the Grid Operator for oscillation monitoring, Voltage, Frequency, Phase Angle, Active Power Contours on geo-special dynamic pictures.

URTDSM Project monthly progress is to be reviewed in OCC for smooth and speedy completion of the Project.

In 142nd OCCM, SE(O&P), NERPC stated that the URTDSM project has been discussed in various forum of NERPC and is still under implementation. NERLDC informed that the project has been delayed by almost two years which is hampering monitoring grid parameters. A presentation in this regard would be made by DGM (URTDSM), NERLDC in the next OCC & NETeST Meetings.

Deliberation in the meeting

DGM(SL), NERLDC gave a presentation(attached at **Annex.D.13**) on the different aspects of the URTDSM project. He stressed on the utility of PMUs in grid operation.

The Sub-Committee noted as above.

Action: NERTS

D.14. CT Ratio of Transmission Lines & Enhancement of Loadability of lines in NER:

As deliberated in 125th OCC meeting held on 14th September, 2016 at Guwahati double jumpering of bay and line before the CT upgradation work was to be completed, so that full capacity of CTs can be utilized for loading the lines.

Latest status as per 142nd OCC is given below:

Name of the line	CT Ratio at either end (current)		CT Ratio at either end (required)		No. Of CTs required		Latest status
	Stn A	Stn B	Stn A	Stn B	Stn A	Stn B	
132 kV AGTPP-Agartala-I	600/1	400/1	800/1	800/1	3 by PGCIL	4 by PGCIL	completed
132 kV AGTPP-Agartala-II	600/1	400/1	800/1	800/1	3 by PGCIL	4 by PGCIL	completed
132 kV Jiribam-Aizwal	400/1	400/1	600/1	600/1	3 by PGCIL	4 by PGCIL	June'18

132 kV Jiribam-Haflong	400/1	400/1	600/1	600/1	3 by PGCIL	4 by PGCIL	June'18
132 kV Khandong - Umrangso-Haflong	300/1	400/1	600/1	600/1	3 at Khandong by NEEPCO, 3 at Umrangso by AEGCL	3 at Umrangso by AEGCL, 3 at Haflong by PGCIL	NEEPCO, PGCIL-Complete AEGCL-To update
132 kV Loktak - Imphal-II	400/1	600/1	600/1	600/1	3 by NHPC		completed
132 kV D/C Doyang - Dimapur	300/1	600/1	600/1	600/1	3 by PGCIL & 6 by NEEPCO		PGCIL-Sep'18 NEEPCO-To update
132 kV Khandong - Khliehriat- I	300/1	300/1	600/1	600/1	3 by NEEPCO	3 by PGCIL	PGCIL-Sep'18 NEEPCO-done
132 kV Khandong – Kopili I & II	300/1	300/1	600/1	600/1			PGCIL-Sep'18 NEEPCO-done

DGM(MO), NERLDC informed that for 132kV Dimapur – Dimapur CT ratio at Dimapur (NAG) end has been adopted as 1200/1. This is causing tremendous error in reading. EE(Trans), DoP Nagaland assured that the matter would be looked into and he would revert back to the forum.

Deliberation in the meeting

DGM,SLDC, AEGCL informed that the time schedule for installation of 6nos CTs at Umrangso would be intimated to NERPC by 21.04.2018.

EE,SLDC, Nagaland has intimated by mail that the CT ratio adopted for 132kV Dimapur-Dimapur at 132kV Dimapur(NAG) is indeed 1200/1. These would be replaced by 600/1 CTs by July'18.

NERLDC once again requested NEEPCO to intimate the rating of wave trap in 132 kV AGTCCPP – 79 Tilla D/C at AGTCCPP.

The Sub-Committee noted as above.

Action: All concerned utilities.

D.15. Mapping of feeders:

In 7th NPC meeting held on 08.09.17 it was requested that RPCs may please give the details/ progress of feeder mapping to NPC.

In 142nd OCCM, Sr. Engineer, NERLDC clarified that feeders designated for UFR operation is to be mapped in SCADA. The forum requested all SLDCs to kindly give the status.

Name of State/area	No. of UFR locations	No. of locations RTU installed	No. of locations mapping done
Ar. Pradesh	1		
Assam	13		
Manipur	4		
Meghalaya	7		
Mizoram	5		
Nagaland	3		
Tripura	3		

Deliberation in the meeting

CE,NPC informed that as per deliberations in different meetings of NPC, no physical mapping of feeders are required for UFR operation. Only inspection is required to be executed by RPC. SE(O&P), NERPC thanked CE, NPC for the clarification. He informed that already a schedule has been devised for UFR inspection. The forum decided to drop the agenda item.

The Sub-Committee noted as above.

D.16. Ensuring proper functioning of Under Frequency Relays(UFR) & df/dt Relays:

In 7th NPC meeting held on 08.09.17 it was agreed that mock test is good enough to test the healthiness of the UFR & df/dt relays. The frequency of site inspection was proposed to be upto six months. RPC may carry out periodic inspection, in line with provisions of IEGC and furnish inspection reports to NPC.

In 142nd OCCM, SE(O&P),NERPC informed that as mandated periodical inspection of UFR needs to be carried out. In this regard he requested help of NERTS by providing suitable kits.

DGM(AM),NERTS stated that Frequency Injection Kit is available in PGCIL stations and any logistical help may be provided. He further requested that an action plan in this regard may be devised and handed over for future course of action.

A detailed action plan for UFR inspection is attached at Annexure **D.16**

Deliberation in the meeting

DGM(AM), NERTS requested that a detailed schedule be prepared and circulated to concerned constituents for nomination of members. SE(O&P), NERPC stated that the detailed schedule location wise would be prepared and circulated by NERPC forthwith.

The Sub-Committee noted as above.

Action: NERTS, NERLDC, NERPC.

D.17. Absorption of Reactive Power by generators:

Details of AVR installation for grid connected generating stations:

Name of generating station	Name of utility/State	Status of AVR installation	Whether reactive power absorption as per capability curve (Y/N)
Khandong HEP	NEEPCO	YES	To be confirmed
Kopili II HEP	NEEPCO	YES	To be confirmed
Kopili HEP	NEEPCO	YES	To be confirmed
Doyang HEP	NEEPCO	YES	To be confirmed
Ranganadi HEP	NEEPCO	YES	To be confirmed
AGBPP	NEEPCO	YES	To be confirmed
AGTCCPP	NEEPCO	YES	Y
TGBPP	NEEPCO	YES	Y
Turial HEP	NEEPCO	YES	To be confirmed
Loktak HEP	NHPC	NO	-
Palatana GBPP	OTPC	YES	Y
BgTPP	NTPC	YES	Y
Umiam HEP Stg I through IV	Meghalaya	YES	To be confirmed
Umtru HEP	Meghalaya	YES	To be confirmed

Leshka HEP	Meghalaya	YES	To be confirmed
Rokhia GBPP	Tripura	NO	-
Baramura GBPP	Tripura	NO	-
Likimro HEP	Nagaland	NO	-
Bairabi GBPP	Mizoram	NO	-
LTPS	Assam	YES	To be confirmed
NTPS	Assam	YES	To be confirmed
CTPS	Assam	YES	To be confirmed
Langpi HEP	Assam	YES	To be confirmed

For testing of reactive power absorption capabilities a draft procedure(**Annexure-D.17**) has been prepared by NERLDC with inputs from Southern Region where similar tests have been conducted. Members are requested to provide their valuable comments. Generators where AVR is not installed may please provide the time schedule for installation.

Deliberation in the meeting

The latest status as updated in the 143rd OCCM:

Name of generating station	**Name of utility/State**	**Status of AVR installation**	**Whether reactive power absorption as per capability curve (Y/N)**
Khandong HEP	NEEPCO	YES	Y
Kopili II HEP	NEEPCO	YES	Y
Kopili HEP	NEEPCO	YES	Y
Doyang HEP	NEEPCO	YES	Y
Ranganadi HEP	NEEPCO	YES	Y
AGBPP	NEEPCO	YES	Y
AGTCCPP	NEEPCO	YES	Y
TGBPP	NEEPCO	YES	Y
Turial HEP	NEEPCO	YES	Y
Loktak HEP	NHPC	YES	Y
Palatana GBPP	OTPC	YES	Y
BgTPP	NTPC	YES	Y
Umiam HEP Stg I through IV	Meghalaya	YES	Y(except Stg III)

Umtru HEP	Meghalaya	YES	Y
Leshka HEP	Meghalaya	YES	Y
Rokhia GBPP	Tripura	YES	Y
Baramura GBPP	Tripura	YES	Y
Likimro HEP	Nagaland	NO	-
Bairabi GBPP	Mizoram	NO	-
LTPS	Assam	YES	Y
NTPS	Assam	YES	Y
CTPS	Assam	Defunct plant. to be deleted	
Langpi HEP	Assam	YES	Y

Manager, OTPC opined that as per draft procedure, testing is difficult as most of the tests are done during time of commissioning. To test under restricted loading is not permissible when machine is connected to the grid. SE(O&P),NERPC requested all the members to kindly peruse the draft procedure and provide their valuable comments prior to next OCC.

CE,NPC suggested that the frequency of testing may be fixed as once in five years.

The Sub-Committee noted as above.

Action: NERLDC, NERPC.

D.18. Audit of PSS:

An action plan for PSS audit of generating stations is attached at **Annexure D.16.**

Deliberation in the meeting

Pls refer to discussion in item **D.16.**

The Sub-Committee noted as above.

Action: NERPC.

D.19. Possibility of Voltage Collapse Prediction:

This was covered in the workshop by M/s POWERTECH from 22.02.18 to 24.02.18. The recommendations submitted to MoP may be implemented in due course of time.

Deliberation in the meeting

CE, NPC informed that Voltage Collapse prediction study is pending for all the regions. As per consultancy carried out by M/s POWERTECH the voltage collapse is calculated through their software. He further informed that for accurate voltage collapse

prediction generator modeling needs to be accurate. SE(O&P), NERPC decided that the item may be dropped in the meantime and reviewed later on.

The Sub-Committee noted as above.

D.20. Furnishing Technical and Commercial data for computation of PoC Charges and Losses for Q2 of 2018-19 (Jul 2018 – Sep 2018):

In the 3rd Validation Committee meeting for PoC application period Oct'15-Dec'15, held on 30th September 2015, at NLDC conference Hall, CERC had proposed a methodology for ratification of projected data at RPC form.

All the power utilities are requested to furnish Technical and Commercial data for computation of PoC Charges and Losses for Q2 of 2018-19 (Jul 2018 – Sep 2018) by 30th Apr'18.

Deliberation in the meeting

NERLDC requested the members to submit relevant data by 30.04.18

The Sub-Committee noted as above.

Action: All concerned utilities.

D.21. Review of SPS 1 & 4 and Islanding Scheme 2:

SPS-1:

As per design, when both Modules of Palatana CCGT trip, a signal will be generated from trip relay of the Modules. This signal should then trip the CB of 132 kV Silchar – Srikona D/C, 132 kV Silchar – Panchgram S/C & 132 kV Silchar –Dullavcherra S/C lines at Silchar. Subsequent to tripping of 132 kV Silchar – Panchgram line, a signal will be generated from trip relay of 132 kV Silchar –Panchgram line. This signal should trip the CB of 132 kV Badarpur – Panchgram line at Badarpur.

SPS-4:

As per design, when 400 kV Silchar – Byrnihat line and 400 kV Silchar – Azara line trips (with no generation from Palatana), a signal will be generated from trip relays at Silchar. Also, in case of outage of either 400 kV Silchar – Byrnihat line or 400 kV Silchar – Azara line, if other line trips, signal will be generated from trip relays at Silchar. This signal should then trip the CB of 132 kV Silchar – Srikona D/C, 132 kV Silchar – Panchgram S/C & 132 kV Silchar –Dullavcherra S/C lines at Silchar. Subsequent to tripping of 132 kV Silchar – Panchgram line, a signal will be generated from trip relay of 132 kV Silchar –Panchgram line. This signal should trip the CB of 132 kV Badarpur – Panchgram line at Badarpur.

132 kV Silchar (PG)- Hailakandi (AEGCL) D/C was commissioned in 30th November'17. After commissioning of 132 kV Silchar (PG)- Hailakandi (AEGCL) D/C, the network configuration changed due to non-exisiting of 132 kV Silchar – Panchgram S/C & 132 kV Silchar –Dullavcherra S/C. Currently after operation of SPS 1 & 4, only 132 kV Silchar – Srikona D/C lines will trip which will lead to cascading tripping in Southern Part of NER.

In view of the above, it is requested to deactivate the SPS 1 and SPS 4 until review of the SPS with new network configuration.

Load-generation balance of Island no 2 consisting of Island comprising of generating units of AGTPP (Gas), generating units at Baramura (Gas), Rokhia (Gas) & Gumati (Hydro) and loads of Tripura system & Dullavcherra area (Assam) has changed since commissioning of 132 kV Surajmaninagar- Comilla D/C lines. In recent disturbances in Tripura system, Island no. 2 could not survive due to load-generation balance mismatch.

In view of the above, it is requested to review Island No. 2 at the earliest.

Deliberation in the meeting

GM, NERLDC informed that configuration of South Assam has changed and it is imperative to turn off SPS-1&4 before review is done. After detailed deliberation the forum decided that NERPC would write to NERTS in this regard.

The Sub-Committee noted as above.

Action: NERPC.

D.22. Status of Implementation of AGC Pilot Project in NER at BgTPP, NTPC:

As deliberated in 141st OCC Meeting of NEPC at Guwahati on 14th February 2018 BgTPP, NTPC was identified for implementation of AGC Pilot Project in NER. A meeting was held at NLDC on 27th March 2018 regarding AGC pilot project at Barh, Bongaigaon and Mauda Stg-II. Representative from NTPC Barh, NTPC Bongaigaon and NTPC Mauda Stg-II was also present. Minutes of the Meeting is attached in **Annexure -D.22.**

For implementation of AGC Pilot Project at BgTPP, NTPC, redundant communication is required from BgTPP, NTPC to NLDC. NERTS, POWERGRID is required to look in the matter

Deliberation in the meeting

Pls refer to discussion in 9th NETeST

The Sub-Committee noted as above.

Action: NERTS.

D.23. Mock exercise of Black Start procedure of ISGS:

As per report of enquiry committee on Grid Disturbance in NR on 30th Jul'12 & in NR, ER & NER on 31st Jul'18, there is requirement of more periodic mock exercises to ensure preparedness of all stakeholders involved.

So it is very important to do the mock testing of black start of KHEP (Kopili/ Khandong), AGTCCPP (RCNagar) and DOYANG, RHEP and LOKTAK HEP. It is proposed to do the testing in the 2nd half of April'18 and 1st half of May'18

Deliberation in the meeting

GM, NERLDC informed that the mock exercise would be carried out by NERLDC within 15.04.18 to 31.05.18. Manager, NHPC, Loktak requested that for Loktak HEP the test be carried out on April'2018. However actual date of mock test will be decided in consultation with LOKTAK and NERLDC.

The Sub-Committee noted as above.

Action: NERLDC.

METERING RELATED ITEMS:

D.24. Replacement of meters:

In 7th NPC meeting held on 08.09.17 it was decided that NPC Secretariat may develop a framework for replacement of meters after taking inputs from RPCs on the practice being followed by the utilities. In this regard, a concept/note was given at Annexure-D.22 of Agenda of 142nd. OCC meeting.

It was agreed in 142nd. OCC meeting that reply to the queries would be furnished by NERLDC.

The reply has been prepared and is attached (Annex-**D.24**)

Deliberation in the meeting

DGM(MO), NERLDC presented the comments on the procedure for replacement of meters. The forum thanked him and approved the same for onward transmission to NPC.

The Sub-Committee noted as above.

Action: NERPC.

D.25. Procurement of additional 70 Laptops:

Revised Target as intimated by NERTS in 142nd. OCC:

- e-RA: 17.03.18
- LOA: by 1st. week of April'18
- Supply: May'18

NERLDC would provide break-up of physical locations where 70 Laptops are to be supplied to take care of GST issues.

The physical locations for 70 Laptops is attached (Annex-**D.25**)

Deliberation in the meeting

NERTS provided the latest status as under:

- e-RA: by 1st. week of April'18.
- LOA: June'18
- Supply: August'18

The Sub-Committee noted as above.

Action: NERTS.

D.26. Installation of new L&T SEMs in NER:

As per 142nd. OCC, the status was as under:

- Pare HEP: by 18.03.18
- Kameng HEP: NERTS to install within 2 days, NEEPCO to ensure availability of site personnel for necessary coordination.

Deliberation in the meeting

NERTS intimated that meter installation at Pare HEP & Kameng HEP are complete in all respects and other installations are in progress.

The Sub-Committee noted as above.

D.27. AMR in NER:

NERTS stated the target as below in 142nd. OCC meeting:

- Tender: 20.03.18
- Bid sale: till 20.04.18
- OBD: 27.04.18
- LOA: 15.06.18

Deliberation in the meeting

NERTS informed that the qualifying requirement is to be updated &provided the latest status as under:

- QR: by 30.04.18
- Bid sale: till 08.06.18
- OBD: 15.06.18
- LOA: 30.06.18

The Sub-Committee noted as above.

Action: NERTS.

D.28. Testing of SEMs at accredited laboratory:

In the 142nd. OCC meeting, Manager, NERTS informed that current estimate is based on all 234 SEMs in NER with appx. Cost being INR 22lakhs(@8140/meter). DGM(MO),NERLDC clarified that testing is required only for meters which have been in service for more than 5yrs but less than 10yrs. NERTS was requested to obtain fresh estimate on finalization of number of Meters to be tested.

Accordingly, no. of meters to be tested has been worked out and is attached (Annex-**D.28**)

Deliberation in the meeting

Manager, NERTS informed that the revised estimate has worked out to be appx. Rs.15.96 lakhs.

The Sub-Committee noted as above.

Action: NERTS.

D.29. Procurement of DCD:

In the 142nd. OCC meeting, NERTS representative intimated that LOA for the DCDs would be issued by May'18.

Deliberation in the meeting

NERTS informed that the DCDs recently supplied by the agency M/s L&T are presently not available in view of enhancement of memory capacity subsequent to introduction of new version. POWERGRID taken up with the DCD supplier to provide the new versions at the same rate and terms and conditions so that procurement action can be taken up on repeat order basis vis-à-vis the contract recently awarded to M/s L&T for supply of SEM, DCD and Laptops.On confirmation from M/s L&T necessary action would be taken up by POWERGRID for procurement of DCD.

The Sub-Committee noted as above.

Action: NERTS.

D.30. Erratic reading of SEM:

1. Dullavcherra end of 132 KV Dullavcherra-Dharmanagar feeder

2. Jiribam(PG) end of 132 kV Jiribam(PG)-Jiribam(Manipur)

In the 142nd. OCC meeting, it was agreed that NERLDC would provide both end readings to NERTS for analysis. The readings were mailed to NERTS accordingly.

Deliberation in the meeting

Manager, NERTS informed that the SEMs would be replaced by Apr'18

The Sub-Committee noted as above.

Action: NERTS.

D.31. Commissioning of RS-485 scheme in all ISGS of NER:

NERTS was advised to initiate action regarding implementation of RS-485 scheme in all ISGS at the earliest in line with point 4 of MOM of SEM meeting. It was agreed that if necessary, L&T personnel should be called for this.

Regarding detailed extensive training by L&T, it was decided it would be carried out after implementation experience of RS-485 in some Stations and training may be in one such Stations.

In the 141st. OCC meeting, NERTS representative intimated that status would be furnished in next OCC meeting.

In the 142nd. OCC meeting, NERTS informed that Kopili HEP had been identified as the pilot project. In this regard vendors have been approached and quotations would be received within 21.03.18. Regarding extensive training by L&T on metering issues it was decided that after laptops are delivered and RS-485 is implemented in at least one station, the training would be held.

A list of ISGS locations for RS-485 implementation along with no. of Meters is attached (Annex-**D.31**)

Deliberation in the meeting

After detailed deliberation it was decided that the work would be executed based on appx length of cables. Upon completion bill would be prepared based on actuals.

Further since no other parties are responding to submit offer , the forum opined to frame cost estimate based on offer received from M/s ISOSCELES Sales & Service

Pvt. Limited for tendering purpose.

The Sub-Committee noted as above.

Action: NERTS.

D.32. SEM for two 132kV extension bays at RHEP:

Status as per 142nd. OCC meeting:

- For 132kV RHEP-Chimpu – by Mar'18
- For 132kV RHEP-Itanagar – by Mar'18

Deliberation in the meeting

Manager, NERTS informed that SEMs have been installed for both the lines at RHEP end.

The Sub-Committee noted as above.

D.33. Providing 50 SEMs, 6 Laptops and 6 DCDs to TSECL:

In the 141st. OCC meeting, it was decided that 3 DCDs out of those to be supplied to TSECL would be retained by NERTS on loan basis in view of requirement of additional DCDs for Pare and Kameng, These would be replenished after procurement of new DCDs.

In 142nd. OCC meeting, Sr. Manager, TSECL informed that by 31.03.18 the materials would be collected from Kumarghat S/Sn of NERTS. He intimated that payment would released within 15 days of receipt of materials.

Deliberation in the meeting

Sr. Manager, TSECL informed that the materials have already been collected from Kumarghat S/S. NERTS requested for release of payment for the same. TSECL agreed to make payment soon.

The Sub-Committee noted as above.

Action: TSECL.

D.34. DCD of Sonabil sub-station of Assam faulty since last 2 months:

DCD replacement / alternative arrangement for Meter data downloading to be arranged.

In 142nd. OCC Meeting, DGM(MO), NERLDC suggested that personal laptop may be used to collect and send SEM reading at Sonabil. AEGCL agreed. NERTS would provide USB-Optical port cable.

Deliberation in the meeting

AEGCL informed that there is no spare laptop at Sonabil S/S. DGM(MO),NERLDC

stated that Laptop can be provided to Sonabil after procurement of 70 Laptops.

NERTS was also requested to provide APDCL with one SEM on returnable basis for installation at 33/11kV Bhutan feeder.

The Sub-Committee noted as above.

Action: NERTS.

D.35. Installation of VINPLUS in Udaipur (TSECL) PC:

In the 142nd. OCC meeting, TSECL representative intimated that there was some problem in the Computer at Banduar (Udaipur) and since then VINPLUS has not been working in the PC. He requested NERTS to depute its representative to re-install VINPLUS.

NERTS agreed to do the needful.

Deliberation in the meeting

NERTS intimated that the said work has been completed.

The Sub-Committee noted as above.

D.36 Tripping of 132 KV lines, and charging instruction to charge on dead bus

On 25.03.2018 At 10:02 hrs, 132KV line-01 got tripped on Distance protection and Fault received Zone-2 at distance (16.11 km), Breaker was not open at Udaipur end, manually opened by TSECL . Heavy Dip observed in OTPC 132 KV system which lead to tripping of critical auxiliary. Charged from OTPC side on dead bus.

On 26.03.2018 At 17:47 hrs, 132KV line-02 got tripped on over voltage protection. Charged from OTPC side on dead bus.

In general practice transmission lines first charge from receiving end and generators synchronise the same to avoid propagation of fault up to generator, which may lead to tripping or damage to system in case fault persist.

Deliberation in the meeting

After detailed deliberation it was decided that OTPC would reduce zone-2&3 timings at Palatana for 132kV Palatana-Udaipur.

The Sub-Committee noted as above.

Action: OTPC

D.37 Tripping of 400 KV lines

On 30.03.2018 At 16:51 Hrs 400KV Line -1 Distance protection acted and Fault received R-Phase Zone -2 at Distance (205km) – Auto reclosed.

At 16:54 Hrs 400 KV Line-2 tripped on Distance protection and Fault received B-Phase Zone -1 at distance (169 km). – Main Breaker open due to Auto recloser kept in Non-Auto mode from 10:57 Hrs as per NERLDC instruction for OPGW work.

If 400 KV line-1 did not come an auto recloser function in time or Fault duration sustained for more duration, it can lead to tripping of OTPC generation as well as NER Grid black out.

On 02.04.2018 At 12:52 Hrs 400 KV Line-2 tripped on Distance protection and Fault received R-Phase Zone-1 at Distance (77.57 km) - Main Breaker open due to Auto recloser kept in Non-Auto mode from 09:33 Hrs as per NERLDC instruction for OPGW work.

Deliberation in the meeting

DGM(AM), NERTS apprised that it is pan-India practice to turn off A/R scheme during Live Line stringing of OPGW.

Manager, OTPC opined that since line shutdown is not being taken, the purpose of turning off A/R scheme was not understandable. Further, he mentioned that OPGW work must be done online with keeping AR in service condition; so no consent is given from OTPC side to Keep AR in non auto mode for OPGW work.

DGM (AM) NERTS clarified OTPC and the forum that such practice is being adopted as safety measure to prevent aggravation of accident / electrocution of personal on account Auto Reclose of the line. After detailed deliberation, the forum in-principle agrees to the practice of turning off A/R Scheme during live line OPGW stringing as done in other parts of the country for safety purposes.

NERLDC stated that before taking online activities of any element (like OPGW work, PID work, protection related testing etc.,), permission from NERLDC is required.

The Sub-Committee noted as above.

ADDITIONAL AGENDA ITEMS:

D.38 Inspection of healthiness of FSC at Balipara:

NERLDC stated that the FSC at Balipara has been out of service for a long time. It is imperative to test it in view of impending CoD of Kameng HEP.

DGM(AM),NERTS intimated that the FSC at Balipara is healthy when went out of service less flow of Power in the circuit and FSC gets switched on at 300 Amps current.

The Sub-Committee noted as above.

D.39 Reversion of configuration of 132kV Balipara-Sonabil-Ghormari:

DGM, AEGCL informed that in interest of better load sharing and to reduce any occurrence of congestion in the near future, it is required to revert back the configuration of 132kV Balipara-Sonabil-Ghoramari. The present configuration would be shorting of 132kV Balipara-Sonabil and 132kV Balipara-Ghoramari at Loc.No.62. The forum approved the configuration and requested AEGCL to do the needful. Schematic attached at **Annexure D.39**.

The Sub-Committee noted as above.
Action: AEGCL.

D.40 Capacity Building for Load Flow Studies

AGM (HQR), AEGCL mentioned about the importance of developing the required expertise for conducting load flow studies for respective control areas viz. (i) Network Expansion & Augmentation (Network Planning) (ii) Optimization the real time load flow & find solution to operational problem. He requested NERPC to take initiatve for such training.

SE(O&P), NERPC stated that the point raised by Assam is very good indeed and requested Assam to send the nominations so that such basic training can be made accordingly.

The Sub-Committee noted as above.
Action: AEGCL.

Date & Venue of next OCC meeting

It is proposed to hold the 144th OCC meeting of NERPC on second week of May, 2018. However, the exact date and venue will be intimated in due course.

The meeting ended with thanks to the Chair.

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Annexure-I

List of Participants in the 143rd OCC Meetings held on 12.04.2018

SN	Name & Designation	Organization	Contact No.
1.	Sh. N. Perme	Ar. Pradesh	09436288643
2.	Sh. Z.A. Choudhury, CGM, SLDC	Assam	-
3.	Sh. Dipesh Ch. Das, AGM (LDC)	Assam	09954110254
4.	Sh B.C. Borah, AGM, SLDC	Assam	09435119248
5.	Sh. K. Gogoi, DGM,SLDC	Assam	09435119248
6.	Sh. K. Goswami, Consultant, APDCL	Assam	08638487200
7.	Sh. A. Boro, AGM (TRC), APDCL	Assam	08473049492
8.	Sh. J.U. Das, DGM (HQ)	Assam	09435011753
9.	Sh. G.K. Bhuyan, AGM (HQ)	Assam	09854015601
10.	Sh. N. Hazarika, AGM (HQ)	Assam	09435386310
11.	Sh. S. Priyananda Singh, DGM/TD-I	Manipur	09612152014
12.	Sh. Th. Sushanta Singh, DM, SLDC	Manipur	09402404857
13.	Sh. F.E. Kharshiing,SE, SLDC	Meghalaya	09863066960
14.	Sh. B. Nikhla, EE, SP, MePDCL	Meghalaya	09436314163
15.	Sh. S. Saha, AEE	Meghalaya	09436112798
	No Representatives	**Mizoram**	**-**
	No Representatives	**Nagaland**	**-**
16.	Sh. Debabrata Pal, Sr. Manager	Tripura	09436500244
17.	Sh. Suranjan Sarkar, Sr. Manager (E/M)	NEEPCO	08974009294
18.	Sh. Joypal Roy, Sr. Manager (E/M)	NEEPCO	09435577726
19.	Sh. N.R. Paul, GM	NERLDC	09436302723
20.	Sh. R. Sutradhar , DGM (MO)	NERLDC	09436302714
21.	Sh. V. Kaikhochin, DGM	NERLDC	-
22.	Sh. M.K. Ramesh, DGM (SL)	NERLDC	-
23.	Sh. Ankit Jain, Sr. Engineer	NERLDC	09436335381
24.	Sh. S.C. De, AGM	NERLDC	-
25.	Sh. Jerin Jacob, Sr. Engineer	NERLDC	-
26.	Sh. P. Kanungo, DGM (AM)	PGCIL	09436302823
27.	Sh. S.K. Singh, Mgr (AM)	PGCIL	09435706899
28.	Sh. Mahd. Faroque, Manager (Mech.)	NHPC	09871992115
29.	Sh. Pawan Tigga, Engineer (E)	NHPC	09402769593
30.	Sh. Narendra Kr Gupta, Sr. Manager (O&M)	OTPC	09774253426

	No Representatives	**NTPC**	**-**
31.	Sh. P. Jindal, Chief Engineer	NPC	-
32.	Sh. R.K. Bansal, Consultant	NLDC	-
33.	Sh. Pushpak Ghosh Dastidar, Director	PWC, Kolkata	09831205869
34.	Sh. Goutam Mondal, Manager	PWC, Kolkata	09903663082
35.	Sh. Soumya Mandal, Manager	PWC, Kolkata	09836311164
36.	Sh. Ajay Agarwal, GM (Marketing)	Scope T&M Pvt. Ltd.	09717466224
37.	Sh. Bhaskar Arraballi, Manager	Scope T&M Pvt. Ltd.	07710099341
38.	Sh. P.K. Mishra, Member secretary	NERPC	09968380242
39.	Sh. B. Lyngkhoi, Director/S.E (O&P)	NERPC	09436163419
40.	Sh. S. Mukherjee, AEE	NERPC	08794277306
41.	Sh. S.Ranjan, AE	NERPC	-

AUTOMATIC DEMAND MANAGEMENT SCHEME (ADMS)

Regulatory provisions

- Indian Electricity Grid Code (IEGC) 5.2
  - All Users, SEB, SLDCs, RLDCs, and NLDC to take all possible measures
    - to ensure grid frequency always remains within 49.90 to 50.05 Hz band.
- IEGC-5.4.2
  - Demand Disconnection by SLDC/ SEB/ distribution licensee
  - To initiate action to restrict the drawal of its control area, from the grid, within the net drawal schedule
  - Also to ensure that requisite load shedding is carried out in its control area so that there is no overdraw.
  - SLDC through respective State Electricity Boards/Distribution Licensees to formulate and implement state-of-the-art demand management schemes for automatic demand management like rotational load shedding, demand response (which may include lower tariff for interruptible loads) etc. to reduce overdraw and to limit the net drawal schedule with in limit.
- A report detailing the scheme and periodic reports on progress of implementation of the schemes has to be sent to the Central Commission by the concerned SLDC.

Regulatory provisions ---2

- In order to maintain the frequency within the stipulated band and maintaining the network security, the interruptible loads shall be arranged in four groups of loads,
  - for scheduled power cuts/load shedding,
  - loads for unscheduled load shedding,
  - loads to be shed through under frequency relays/ df/dt relays and
  - loads to be shed under any System Protection Scheme identified at the RPC level.
- no overlapping between different Groups of loads

Regulatory orders

- Suo Motu petition No. 208/2011 dated 01.12.2011 by CERC
  - For Implementation of Automatic Demand Management Schemes (ADMS)
  - SLDCs directed to file affidavit and provide the inputs as below by 20.12.2011
    - The current status of the automatic load management scheme, indicating date of implementation of the scheme, its maintenance and operational preparedness to meet the normal and contingent situations;
    - Where the scheme has not been implemented so far, the reasons thereof; and
    - The status of contingency procedures and arrangements for demand disconnection during normal or contingency conditions.

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ADMS implementation

- Trip signals initiated from the SCADA system at SLDC
  - Broadcast to the various substations via GPRS
- Tripping is carried out to balance the grid
  - Trip signals for covering a relief of 150MW to 600MW in steps of 150MW.
  - Scope of the project
  - Development of logic for initiation of remote trip signals and implementation at feeder level at 33 / 11 kV feeders
  - 322 Substations chosen by Kerala.
-

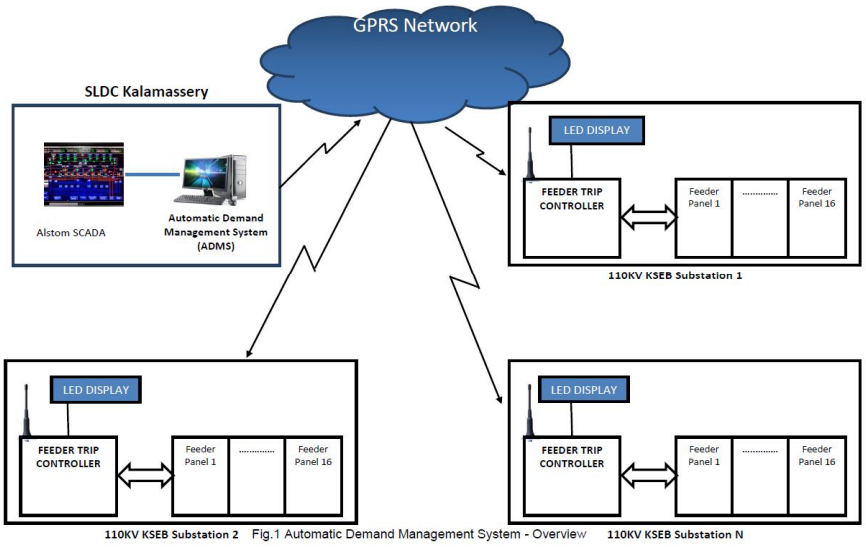

Fig.1 Automatic Demand Management System - Overview

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Components of ADMS

- The ADMS has two components
- ADMS server PC at the SLDC Control Centre
  - Issues the trip commands based on the signals received from SCADA
  - provided with a GUI to configure the Substations into groups
  - routes the trip command to the appropriate group based on round bobbin method
  - The trip command will be encrypted to ensure security
- Automatic Feeder Tripping System (AFTS) at the Substations
  - to intelligently carry out the feeder tripping instructions from the Control Centre.
- SCADA system carries out the logic check and issue the trip command in IEC 60870 – 5-104 standards.
- Command received by the ADMS server PC,
  - the payload extracted and broadcast via GPRS to the Substations using a proprietary protocol.
- logic for the trip command based on the relief to be obtained in the distribution network.
- The logic is software implemented
  - can be modified from time to time.
-

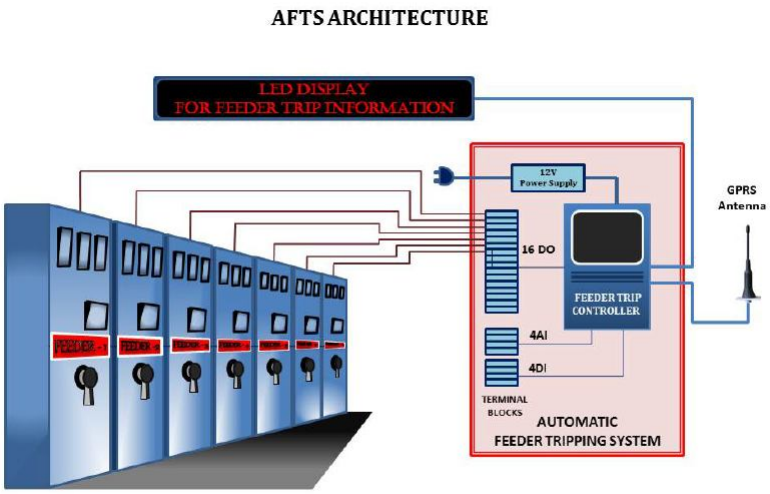
Automatic Feeder Tripping System (AFTS) at substations

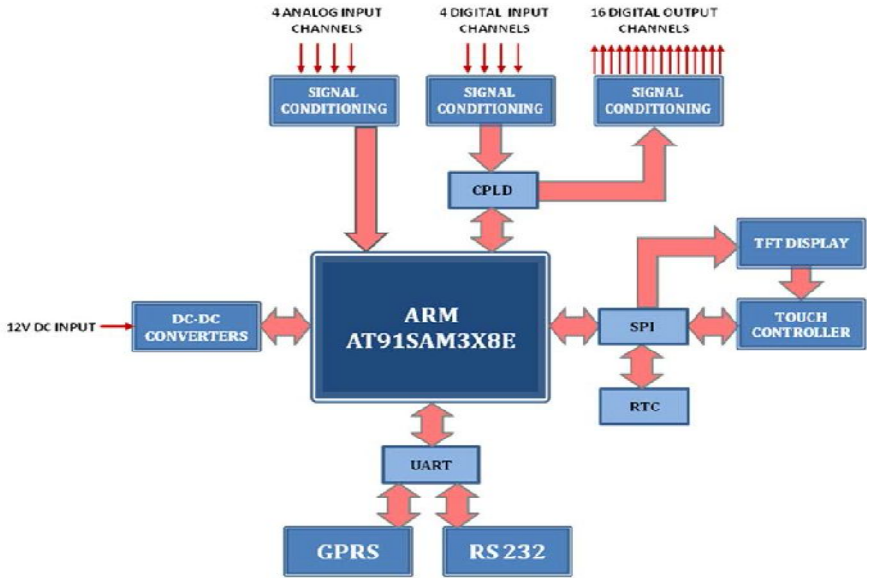
- The Substations will be equipped with an Automatic Feeder Tripping System (AFTS) consisting of a Feeder Trip Controller(FTC) with GPRS modem, LED panel to display the feeder / feeders currently tripped, power supply, interposing relays and a GPRS antenna. The Feeder Trip Controller is built around a Microcontroller and features Digital Outputs(16no's), Digital inputs(4 no's) ,Analog inputs (4 no's),a touch screen display and a GPRS modem. The Digital and Analog inputs are to cater to future needs.

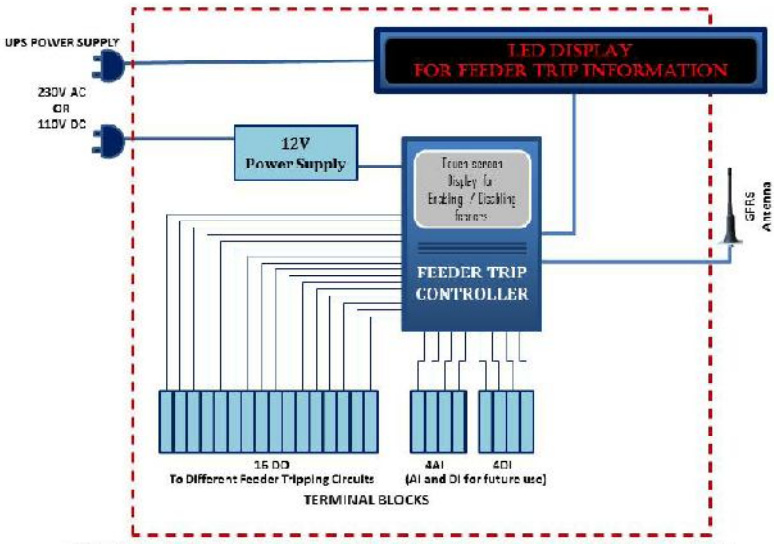
Feeder tripping arrangement

- The feeder tripping is executed via the Digital Outputs.
- A maximum of 16 feeders can thus be wired to Feeder Trip Controller.
- One interposing relay each is wired for tripping each feeder.
- LED display panel to show the feeder trip information.
- Status of the feeder and the time of tripping to be displayed
- A touch screen display and a GUI module
  - Configuration of feeders in active / inactive mode to avoid load shedding in important feeders.
  - The FTC password protected.
-
-
-

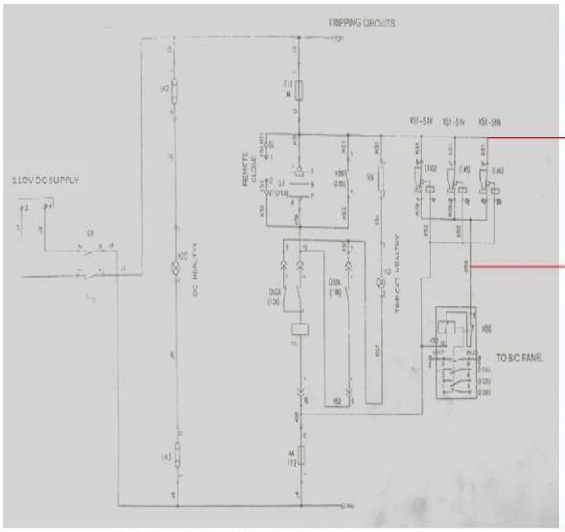
AFTS architecture

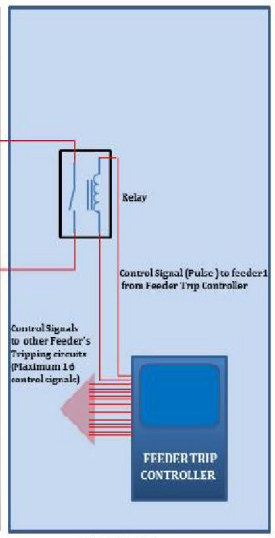






AUTOMATIC FEEDER TRIPPING SYSTEM (AFTS) AT SUBSTATIONS





Existing ALSTOM Feeder Tripping Circuit

FTC Wiring

Bill of material

r.No.	Description of the Item	Unit (Nos. /Sets)	Substation /Quantity
1	System Study, Engineering and Design of ADMS at 322 Substations	LS	322
2	Feeder Tripping Controller (FTC) with GPRS modem + connection charges	Nos	322
3	Power supply	Nos	322
4	Single Colour LED Display Panel with Rs 232 With Power Supply	Nos	322
5	Cables (1 sq mm)5 rolls	Nos	322
6	Cabinet	set	322
7	12V DC Relay (110V,6A Contact)	Nos	322
8	Terminal block and Din Rail 40nos	Nos	322
9	MCB ,6A (Double Pole, Single Throw)	Set	322
10	External Antenna for GPRS with Cable	Nos	322
11	Installation & Commissioning	Nos	322
12	Material cost at SLDC including Server and Broad Band	Set	1
13	Hardware & Software Customization charges , Testing,verification etc.	Ls	1

NER-ADMS Cost Comparision (Unit rate)

Items	Mizoram	Assam	Manipur	Arunachal	Nagaland	Meghalaya	Average	Range min	Range max	PGCIL SOR	MF
RTU @132 kV	14,93,562	13,02,241	10,38,565	8,79,035	10,65,198		11,55,720	8,79,035	14,93,562		
RTU @33kV	11,23,084			11,68,007	9,29,429		10,73,507	9,29,429	11,68,007		
ADMS Software	1,30,50,000	1,30,50,000	1,50,00,000	1,35,72,000	1,30,50,000	1,13,68,000	1,31,81,667	1,13,68,000	1,50,00,000		
LDMS Software	96,390		96,390	1,00,245	1,92,780	18,00,000	4,57,161	96,390	18,00,000		
GPS for time synch.	1,28,250	1,28,250	1,28,250	1,33,380	3,84,750		1,80,576	1,28,250	3,84,750		
24 Fibre OPGW cable	2,10,250	2,10,250	3,29,486	2,18,660	2,10,250		2,35,779	2,10,250	3,29,486	1,05,194	**2.241**
24 Fibre OPGW cable errection	94,500	94,500	2,17,002	98,280	94,500		1,19,756	94,500	2,17,002	49,590	**2.415**
Installation of hard ware set of OPGW	65,250	65,250	57,952	67,860	65,250		64,312	57,952	67,860	18,323	**3.510**
FODP 24F	89,900	89,900	31,186	93,496	89,900		78,876	31,186	93,496	59,606	**1.323**
FODP 48F	92,800	92,800	40,096	96,512	92,800		83,002	40,096	96,512	59,606	**1.393**
SDH/PDH	27,08,310	27,08,310	2,73,984	28,16,642	27,08,310		22,43,111	2,73,984	28,16,642	1,95,672	**11.464**
SDH/PDH Erection	3,37,500						3,37,500	3,37,500	3,37,500	15,326	**22.021**
Optical cards											
S1.1	6,525	6,525	40,834	6,786	6,525		13,439	6,525	40,834	949	**14.161**
L1.1	11,020	11,020	1,87,156	11,460	66,120		57,355	11,020	1,87,156	1,003	**57.184**
L1.2	13,340	13,340	1,87,156	13,873	53,360		56,214	13,340	1,87,156	3,626	**15.503**
Tributary card (Optional)											
E1 interface card	1,41,482	1,41,482	1,70,142	1,47,141	1,41,482		1,48,346	1,41,482	1,70,142	10,322	**14.372**
Ethernet Interface	2,57,942	2,57,942	1,24,771	2,68,259	2,57,942		2,33,371	1,24,771	2,68,259	79,123	**2.949**
Subscriber Line Interface cards											
2 wire Sub	1,48,023	1,48,023	1,02,085	1,53,943	1,48,023		1,40,019	1,02,085	1,53,943	19,864	**7.049**
2 wire Exch	1,48,023	1,48,023	1,02,085	1,53,943	1,48,023		1,40,019	1,02,085	1,53,943	20,667	**6.775**
2/4 wire E&M interface card	1,23,353	1,23,353	85,071	1,28,287	1,23,353		1,16,683	85,071	1,28,287		
Multiprotocol data card	2,11,217	2,11,217	75,997	2,19,665	2,11,217		1,85,863	75,997	2,19,665		
installing FOTE equipment	1,08,750	1,08,750	1,98,809	1,13,100	1,08,750		1,27,632	1,08,750	1,98,809		
NMS											
Hardware	2,87,824	2,87,824	1,98,499	2,99,336	2,87,824		2,72,261	1,98,499	2,99,336	50,667	**5.374**
software	1,64,543	1,64,543	1,13,428	1,71,124	1,64,543		1,55,636	1,13,428	1,71,124	10,349	**15.039**
Accessories for FOTE installation	3,26,250	3,26,250	3,26,250		3,26,250		3,26,250	3,26,250	3,26,250		
Toatal DPR Estimate cost	**5.1Cr**	**5 Cr**	**6.5 Cr**	**4.5 Cr**	**5 Cr**	**2.02Cr**					

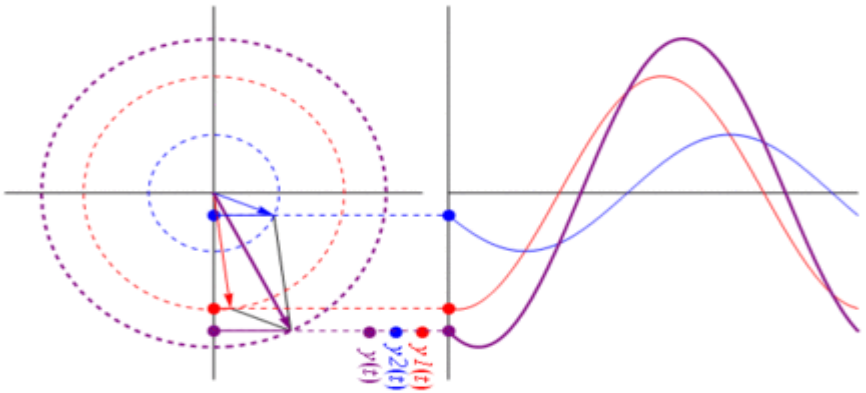
Estimation Of Peak Demand (In MW) NER States

Constituents	Peak Demand Met	Date	Freq (Hz)	Estimated Peak Demand at 50 Hz
Arunachal Pradesh	123	29.06.17	50.03	214
Assam	1623	15.06.17	50.10	1744
Manipur	155	26.06.17	50.02	156
Meghalaya	272	29.06.17	50.03	272
Mizoram	77	30.06.17	50.02	82
Nagaland	146	23.06.17	50.10	147
Tripura*	268	23.06.17	50.10	268
REGION	2391	26.06.17	50.03	2499

Entitlement, Schedule, Drawal and DSM Charges for the month of June 2017

Name of states	Entitlement from ISGS in NER (in MU)	Entitlement from ISGS in ER (in MU)	Total Entitlement (in MU)	Scheduled energy against entitlement (in MU)	Schedule Drawal (for Dev A/c) (Ex-PP State) (in MU)	Actual Drawal from Grid (in MU)	Over Drawal (+) / Under Drawal (-) (in MU)	Dev Payable (-)/ Receivable (+) (including additional deviation) (Rs. In Cr)
Arunachal Pradesh	75.57	3.87	79.43	73.48	74.93	58.79	-16.14	-1.21
ASEB	435.60	97.26	532.86	494.73	610.59	657.29	46.70	-17.96
Manipur	98.90	0.00	98.90	94.66	60.53	60.12	-0.41	0.07
MeSEB	117.76	0.00	117.76	103.13	15.94	5.69	-10.25	1.70
Mizoram	46.58	2.83	49.41	46.71	31.60	31.76	0.16	-0.66
Nagaland	55.45	8.55	64.00	60.61	62.27	64.73	2.46	-1.02
Tripura	144.69	0.00	144.69	137.77	78.27	75.96	-2.31	-2.34
PGCIL-HVDC	0.00	0.00	0.00	0.00	0.00	0.66	0.66	-0.13

Thanks



Unified Real Time Dynamic State Measurement(URTDSM)

By

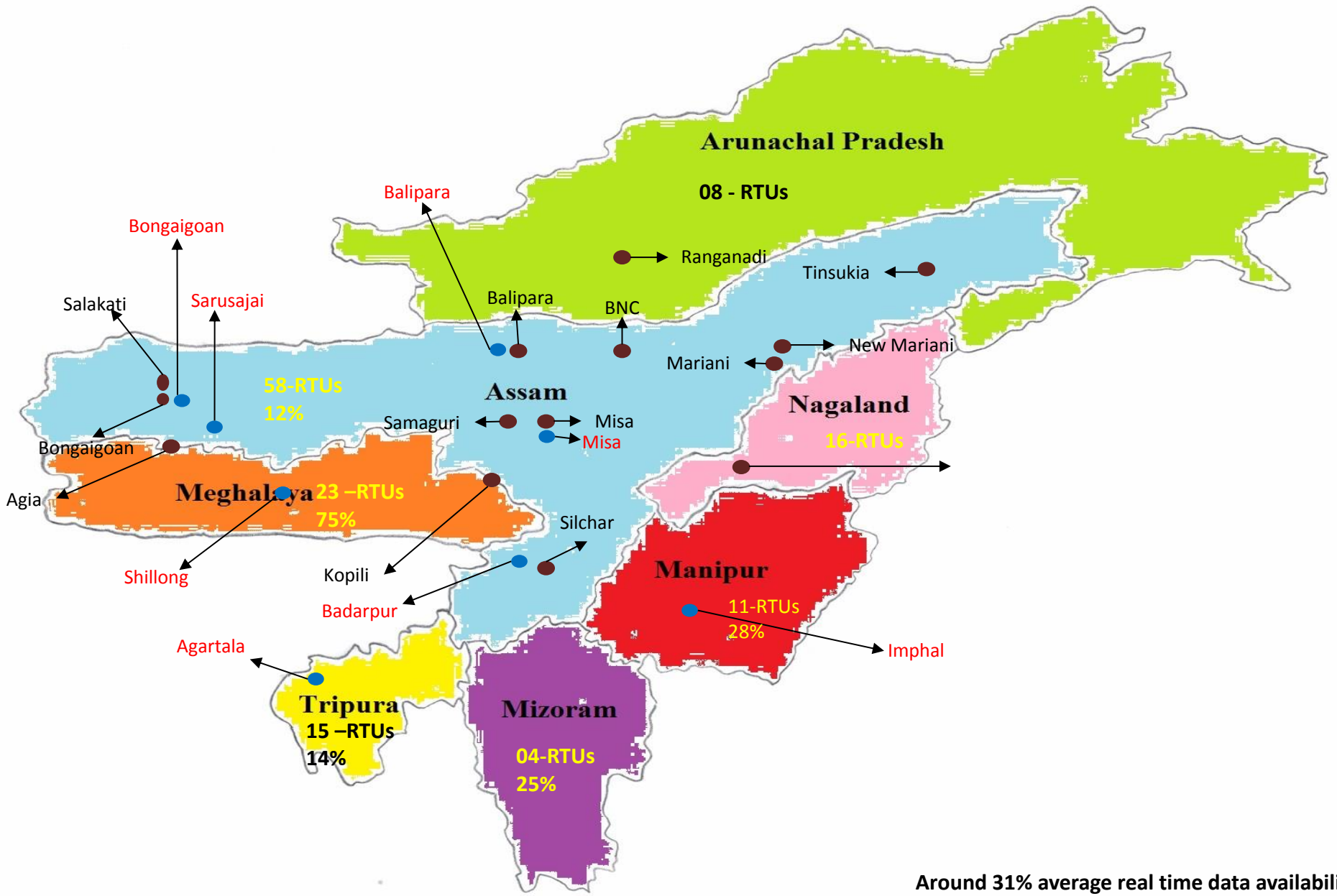
MK RAMESH

Dy.General Manager,NERLDC

Organisation

- Real time data in NER Grid
- Conception of URTDSM Project
- Over View of Project
- Pilot Project
- Analytics & Visualisation Features
- Case studies with the help of WAMS.
- Status of URTDSM Project in NER

Real Time Data (%)Availability at NERLDC



Around 31% average real time data availability

Conception of URTDSM Project

- POWERGRID appointed a Panel of Experts under the Chairmanship of Dr. Arun G. Phadke, Virginia Tech, USA for advice and guidance in development and deployment of synchro-phasor based WAMS system in Indian Power Sector.

- After the successful deployment of PMUs through Pilot projects, implementation of WAMS technology on Large scale across the entire Indian Power System has been taken up by POWERGRID.

- This project is identified as Unified Real Time Dynamic State Measurement (URTDSM) project.

- URTDSM Project aimed to provide planners and operators and other stake holders the tools to handle the upcoming challenges of power sector.

Objective of URTDSM

- For improving system visibility and operation.
- To monitor the dynamic behavior of the power system to handle the alert/emergency states of the Power System
- To Monitor the phase angle of voltage & currents, frequency, change in frequency, and power, etc.
- The phase angle differences allow abnormal power system conditions to be detected at an early stage.
- To Monitor power system oscillation modes.
- To Monitor power system stability.
- Post Disturbance Analysis.

Over View of Project

Chronological Order of URTDSM Project

- Joint Standing Committee meeting held on 05-03-2012
- CERC Order 129/MP/2012 with IA 18/2012 dated 6/9/2013
- Placement of Notice of Award from POWERGRID to M/s Alstom 15-01-2014

URTDSM Project consists of Two Packages:

- **LOA: 15.01.2014 to M/s Alstom**
- **Completion Schedule: - 24 Months from date of LOA (schedule to be completed Jan 2016)**
- **Project being implemented in Two Stages**
- **Stage – I**
- **Stage - II**
- **Scope in Stage I:- Installation & Commissioning of PDCs at 34 Control Centres**
  Installation & Commissioning of 1186 PMUs across 351 Substations
- **Scope in Stage II:- Installation & Commissioning of 483 PMUs.**
- **Package-I: NR, ER, NER, NTAMC & NLDC**
- **Package-II: SR, WR**
- **In NER Stage I - 14 Substations, 51PMUs**

Stage-I(Tentative)

Region	Sub-stations		No of Transmission line		PMU		Nodal PDC	MPDC	SPDC	Main & B/U NLDC
	ISTS	STU	ISTS	STU	ISTS	STU				
NR	74	42	394	224	206	120	6	9	1	
WR	49	18	456	135	234	71	11	4	1	
ER	51	31	395	149	202	79	4	5	1	
SR	57	16	338	90	178	47	6	4	1	
NER	9	5	69	24	36	13	0	3	1	
Total	240	111	1652	622	856	330	27	25	5	
	351		***2274***		***1186***		***57***			***2***

Stage-II(Tentative)

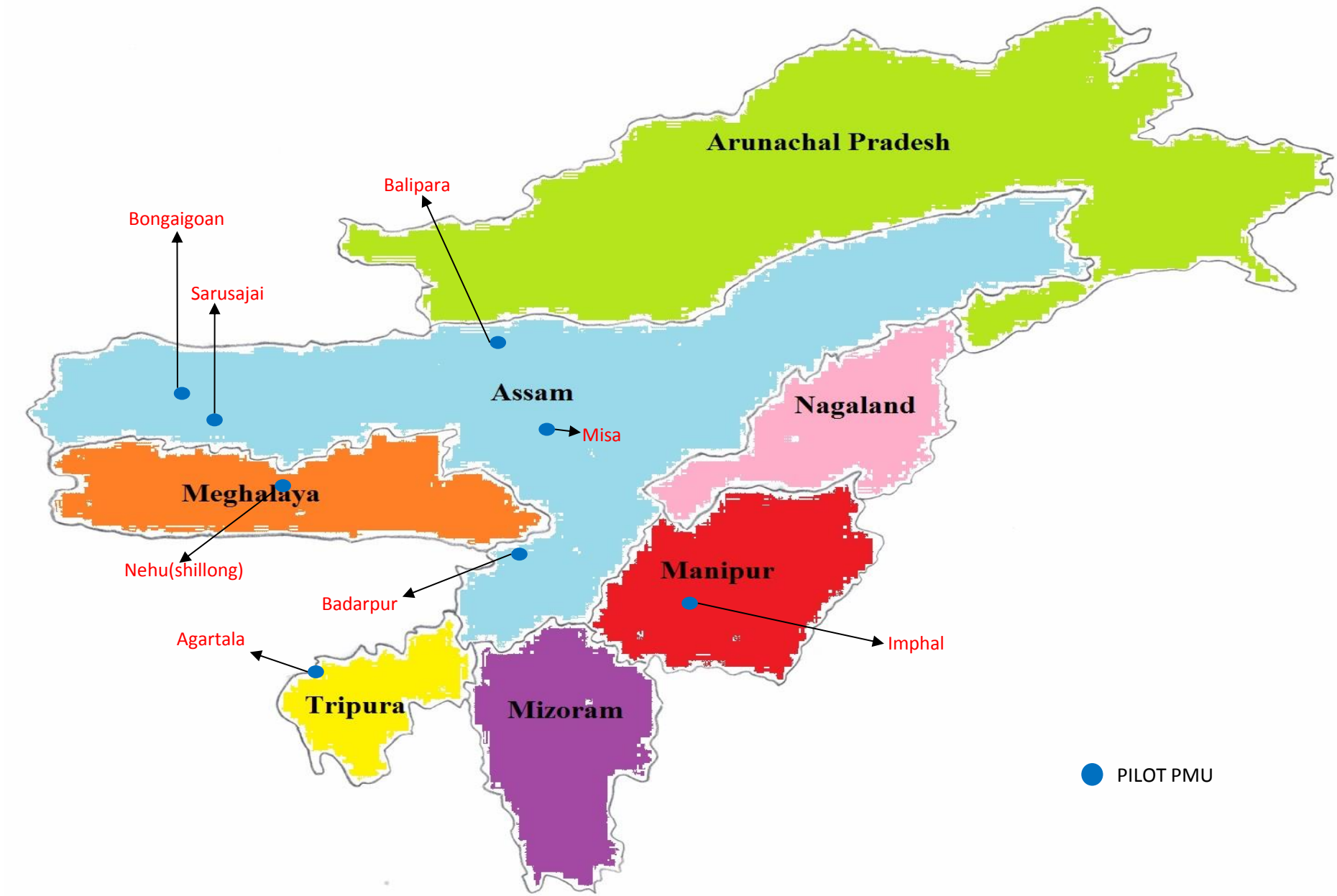
Region	Sub-stations		No of Line		PMU	
	ISTS	STU	ISTS	STU	ISTS	STU
NR	9	55	40	211	21	111
WR	11	58	64	280	33	145
ER	-	13	-	50	-	26
SR	3	55	10	199	5	105
NER	9	17	26	45	14	23
Total	32	198	140	785	73	410
	230		***925***		***483***	

Current Status of URTDSM

Region	Total PMU	Reporting	% percentage
Northern Region	400	238	60
Eastern Region	286	227	79
Western Region	406	368	91
Southern Region	255	248	97
NE Region	51	0	
	1398	1081	

Pilot PMU Project

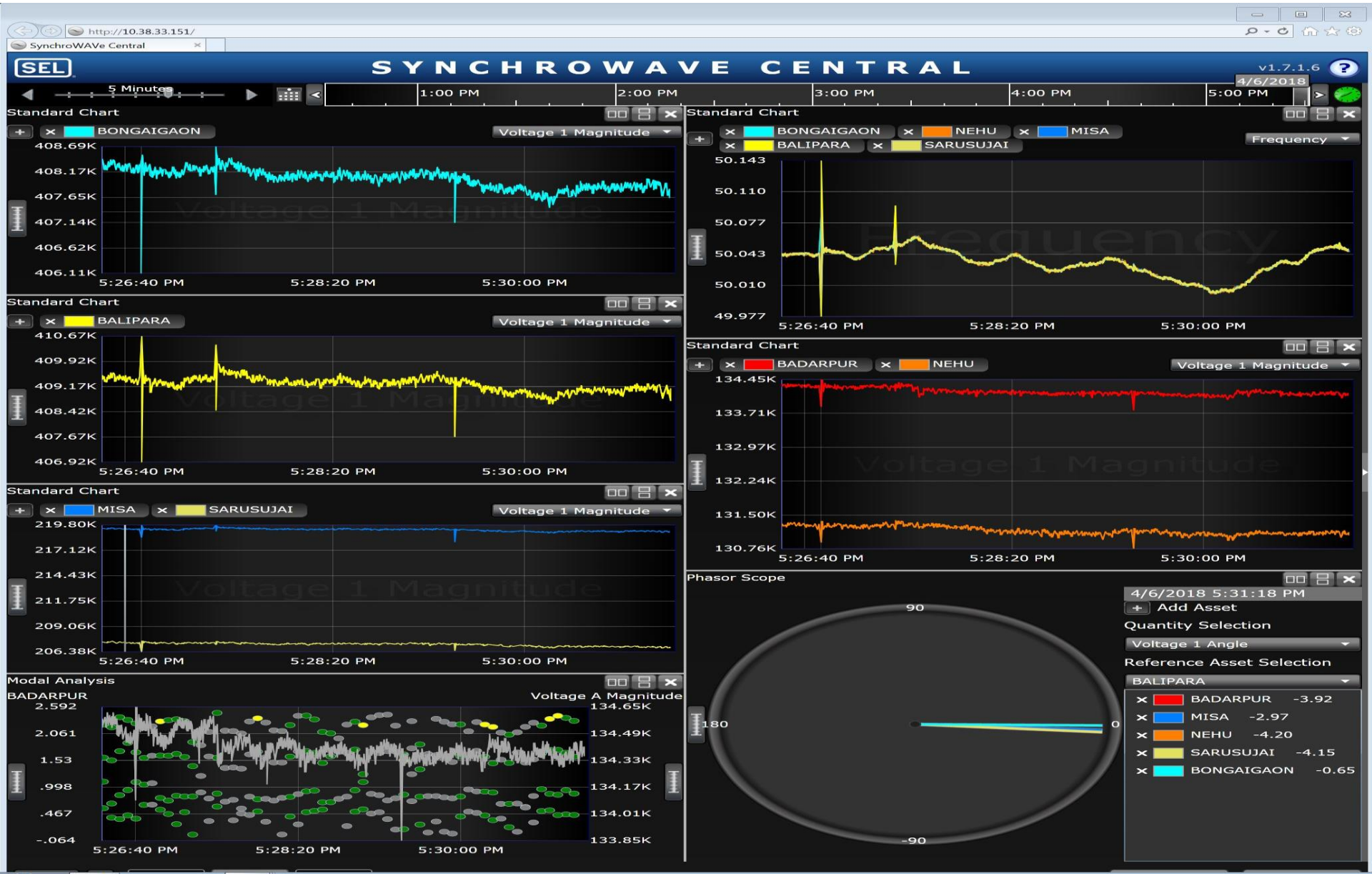
PILOT PMU LOCATIONS



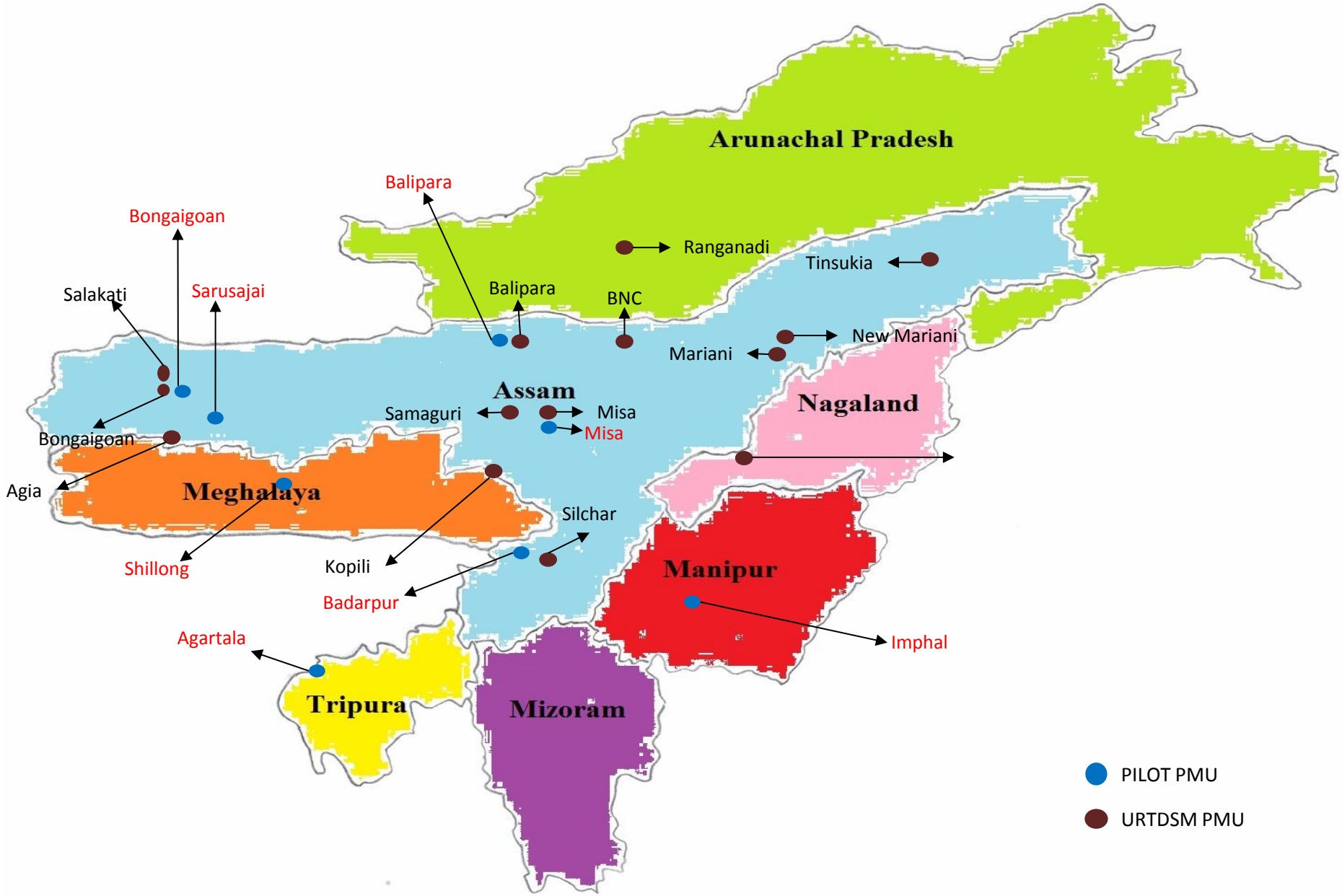
Pilot PMUs in NER

- BONGAIGAON (Balipara fdr 1 & 2)
- IMPHAL (Dimapur fdr,Ningthoukhong)
- NEHU (Sumer fdr, Khlieriat fdr)
- AGARTALA (RC Nagar fdr1, SM Nagar fdr1)
- BALIPARA (Bongaigaon fdr1, Misa fdr1)
- SARUSAJAI (Samaguri fdr2, Agia fdr2)
- MISA (Dimapur fdr2, Kopili fdr2)
- BADARPUR(Kumarghat fdr , Khlieriat fdr)

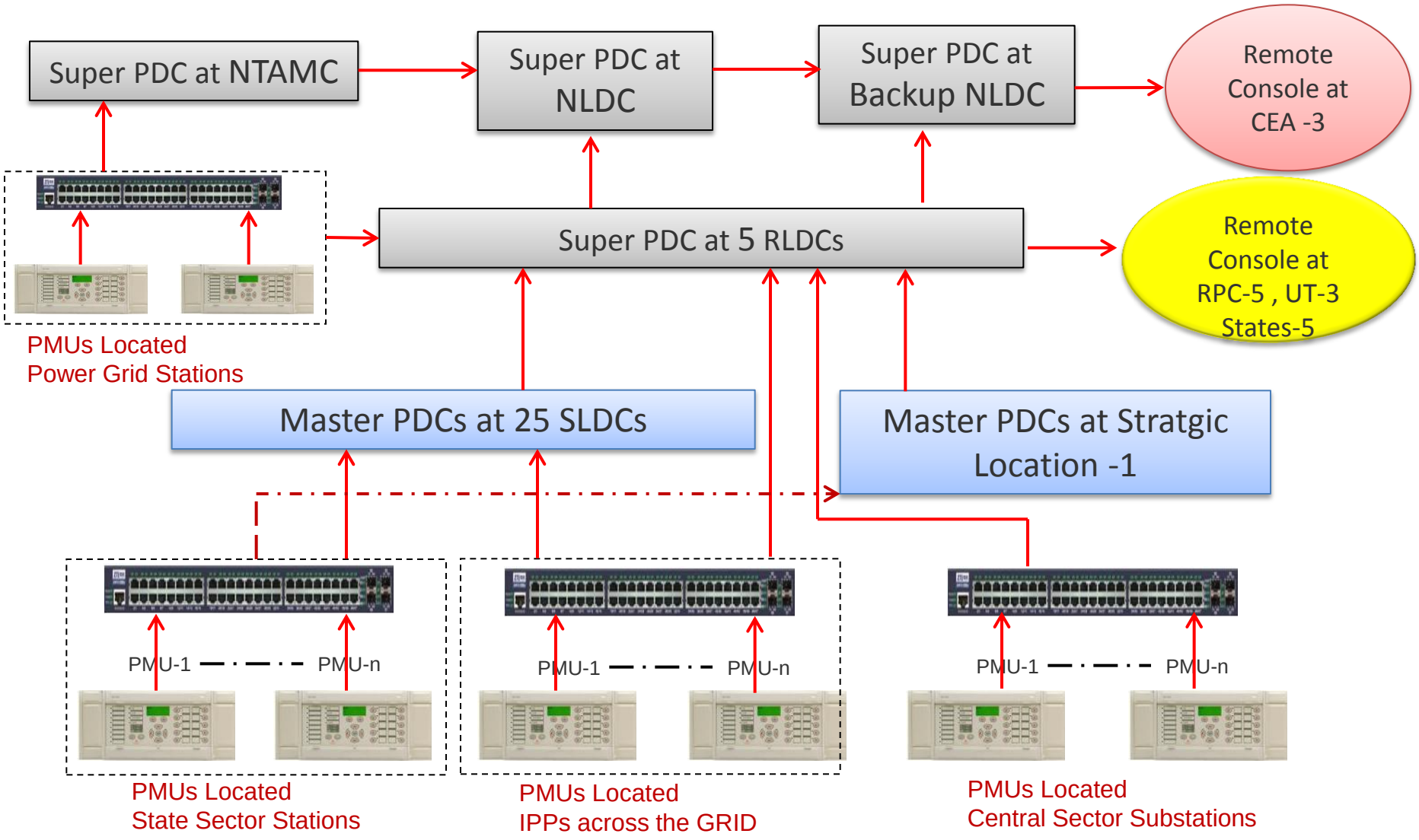
Visualisation of PILOT PMU User Interface



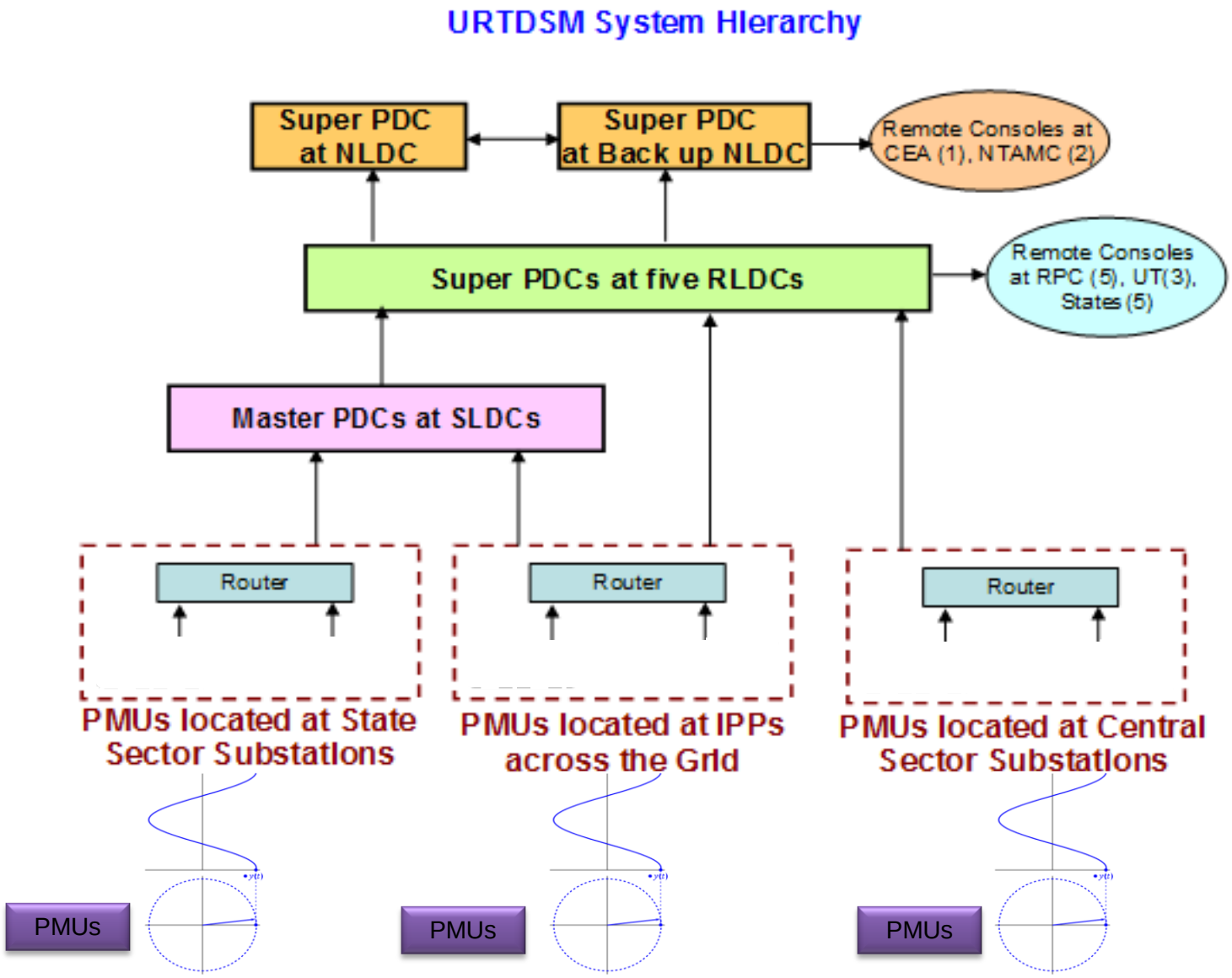
URTDSM AND PILOT PMU LOCATIONS



System Hierarchy

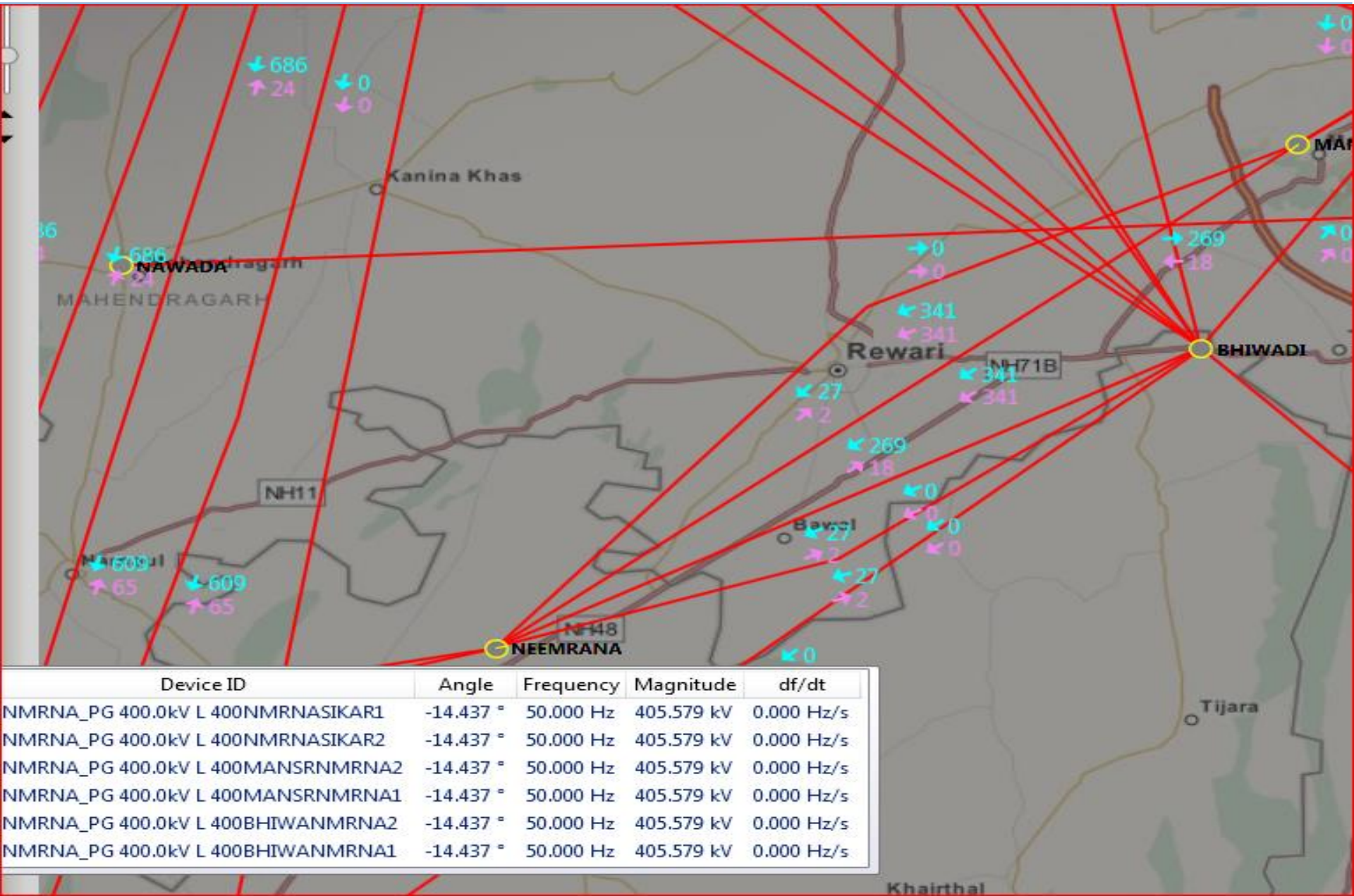


URTDSM System Data Flow Hierarchy



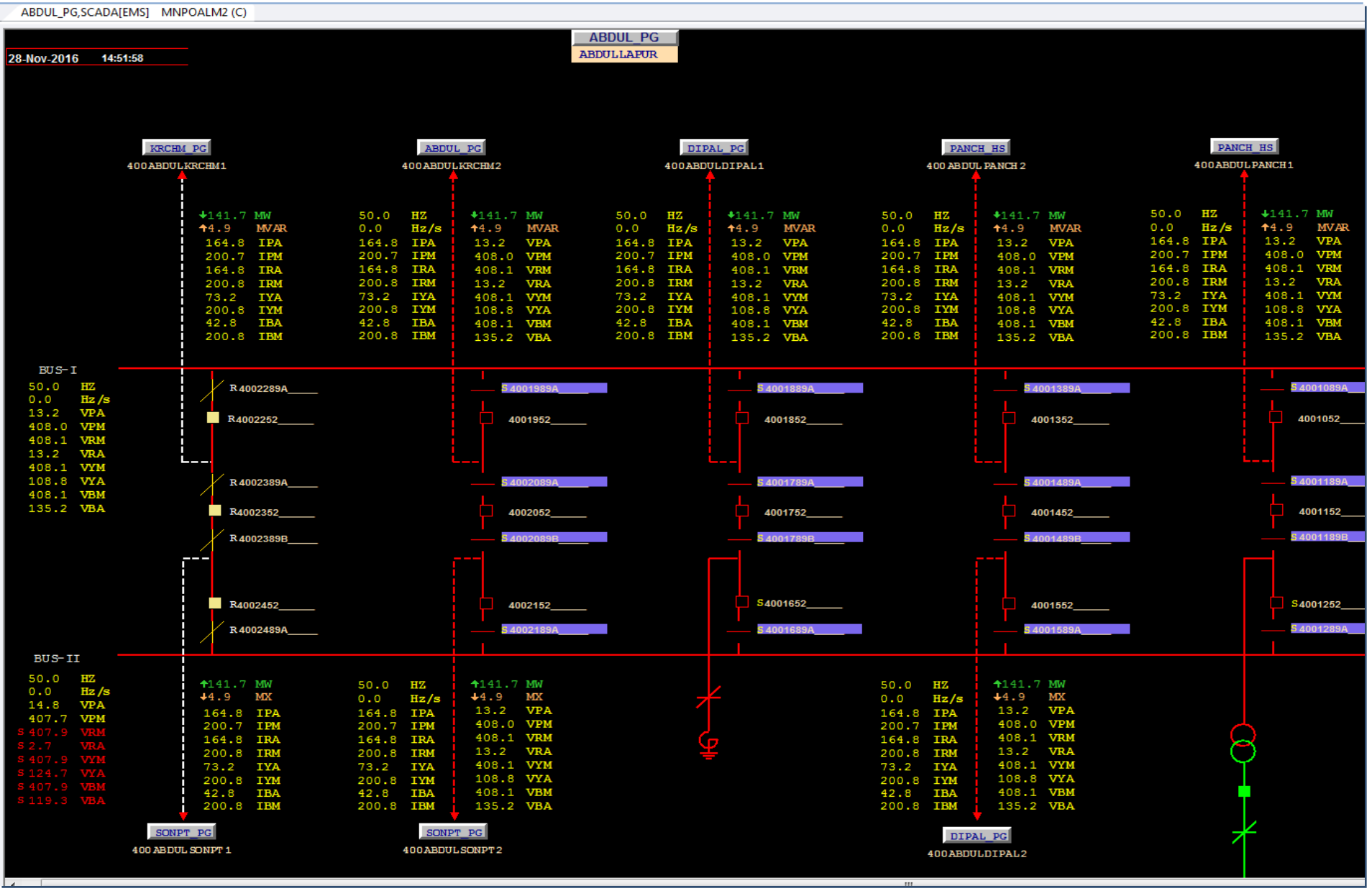
Analytics & Visualisation

Geo-Spatial Display



Device ID	Angle	Frequency	Magnitude	df/dt
NMRNA_PG 400.0kV L 400NMRNASIKAR1	-14.437 °	50.000 Hz	405.579 kV	0.000 Hz/s
NMRNA_PG 400.0kV L 400NMRNASIKAR2	-14.437 °	50.000 Hz	405.579 kV	0.000 Hz/s
NMRNA_PG 400.0kV L 400MANSRNMRNA2	-14.437 °	50.000 Hz	405.579 kV	0.000 Hz/s
NMRNA_PG 400.0kV L 400MANSRNMRNA1	-14.437 °	50.000 Hz	405.579 kV	0.000 Hz/s
NMRNA_PG 400.0kV L 400BHIWANMRNA2	-14.437 °	50.000 Hz	405.579 kV	0.000 Hz/s
NMRNA_PG 400.0kV L 400BHIWANMRNA1	-14.437 °	50.000 Hz	405.579 kV	0.000 Hz/s

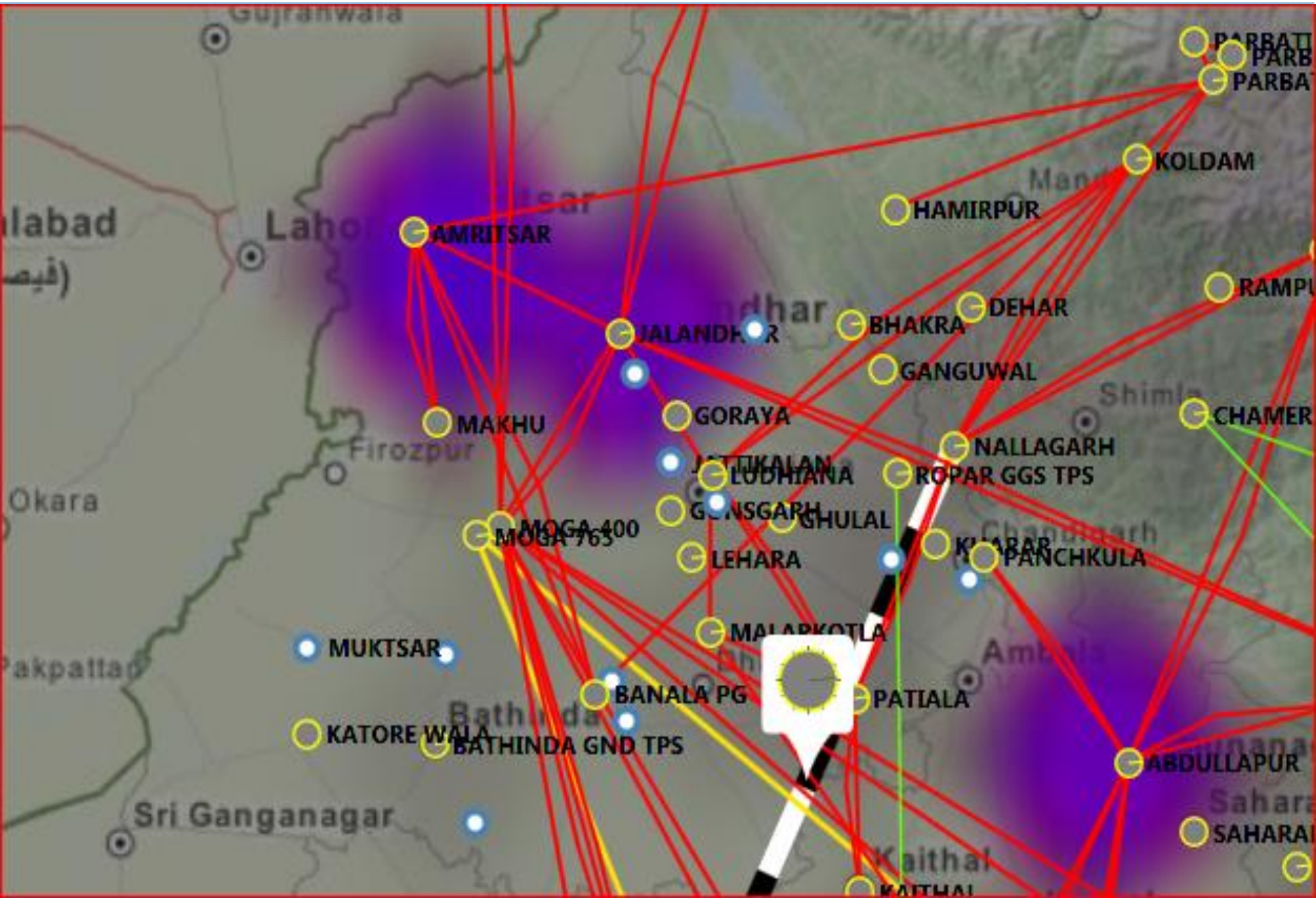
Data Visualization in SLD



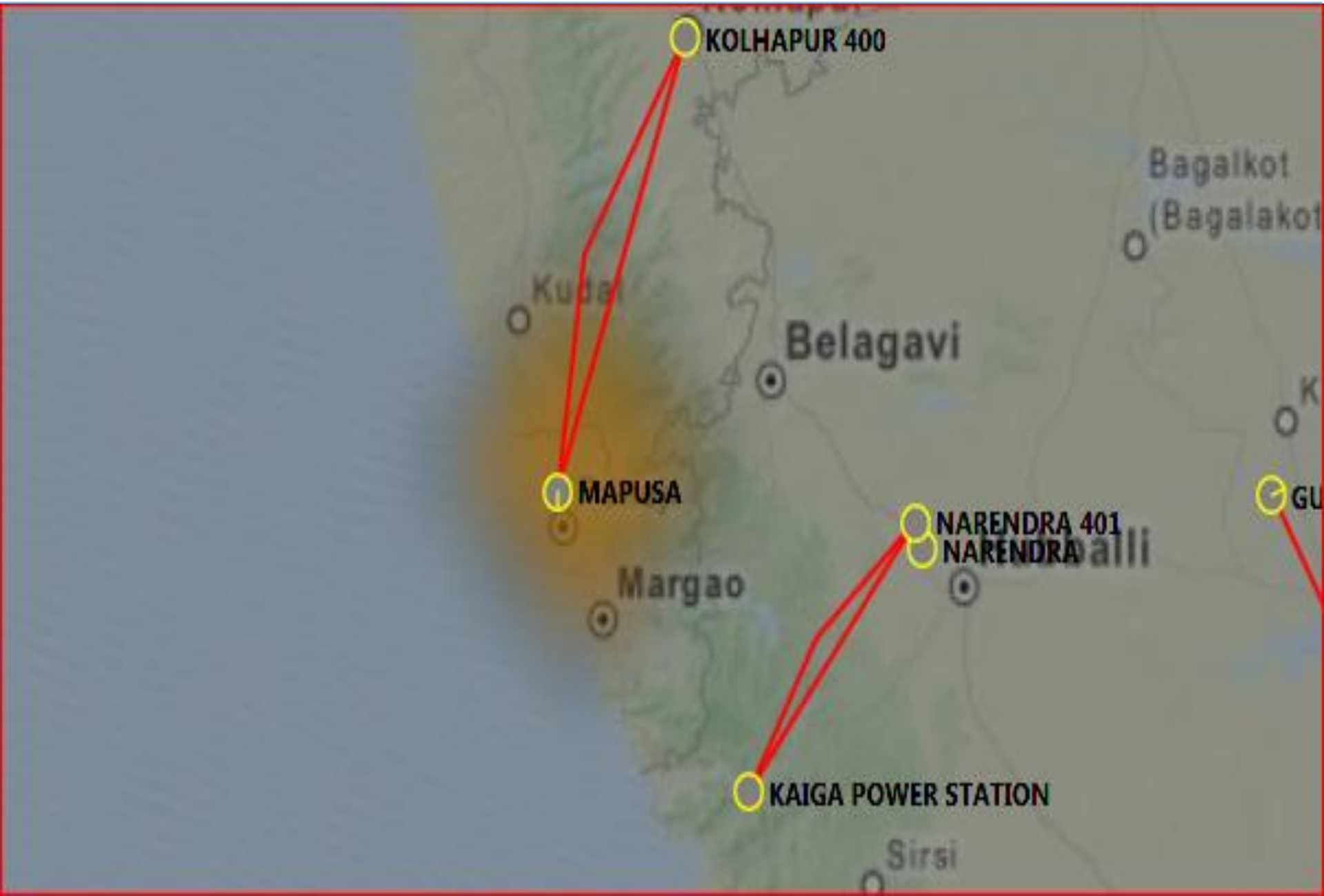
Trend Visualization

Trend Visualization

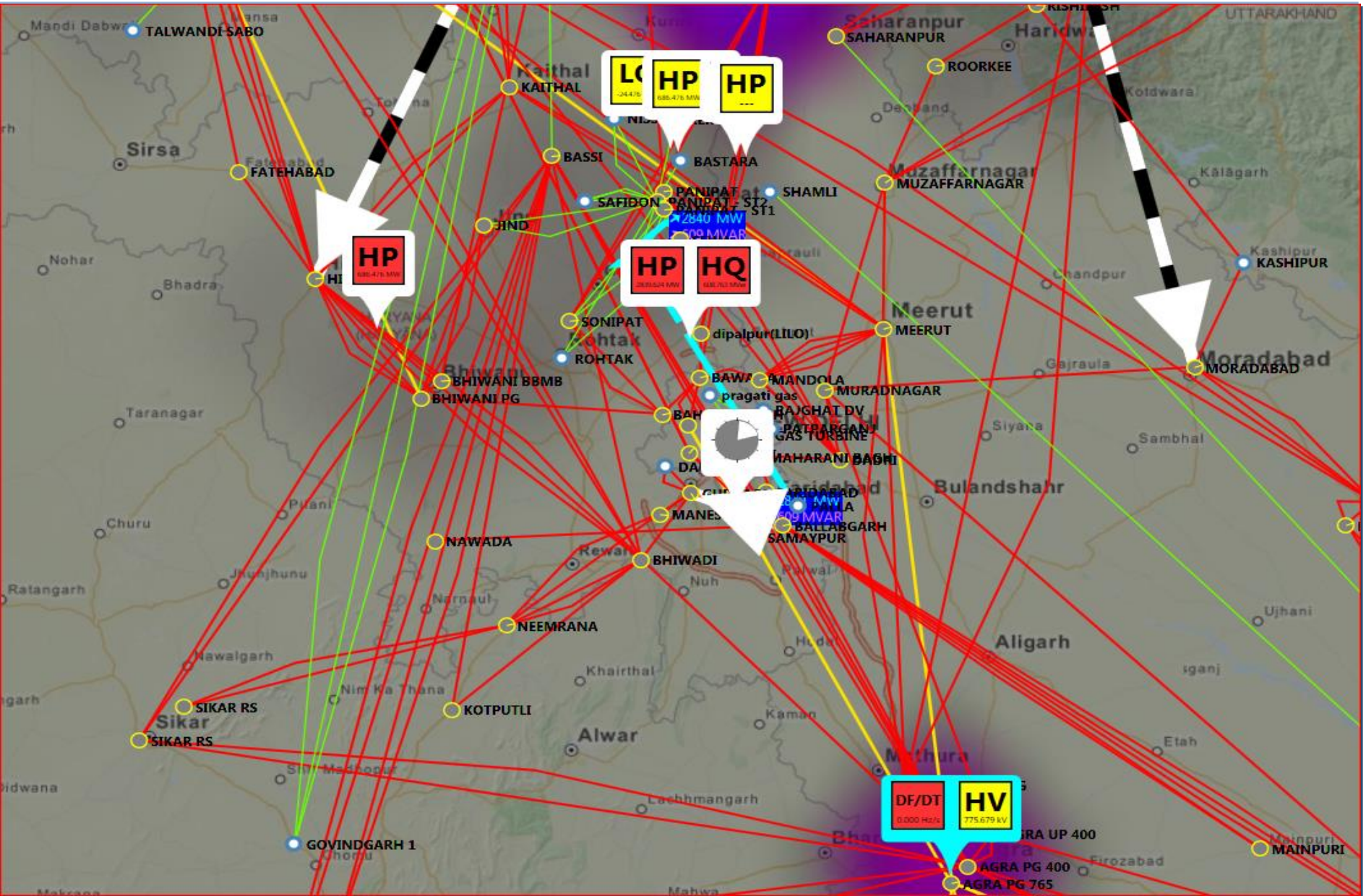
Voltage Contours



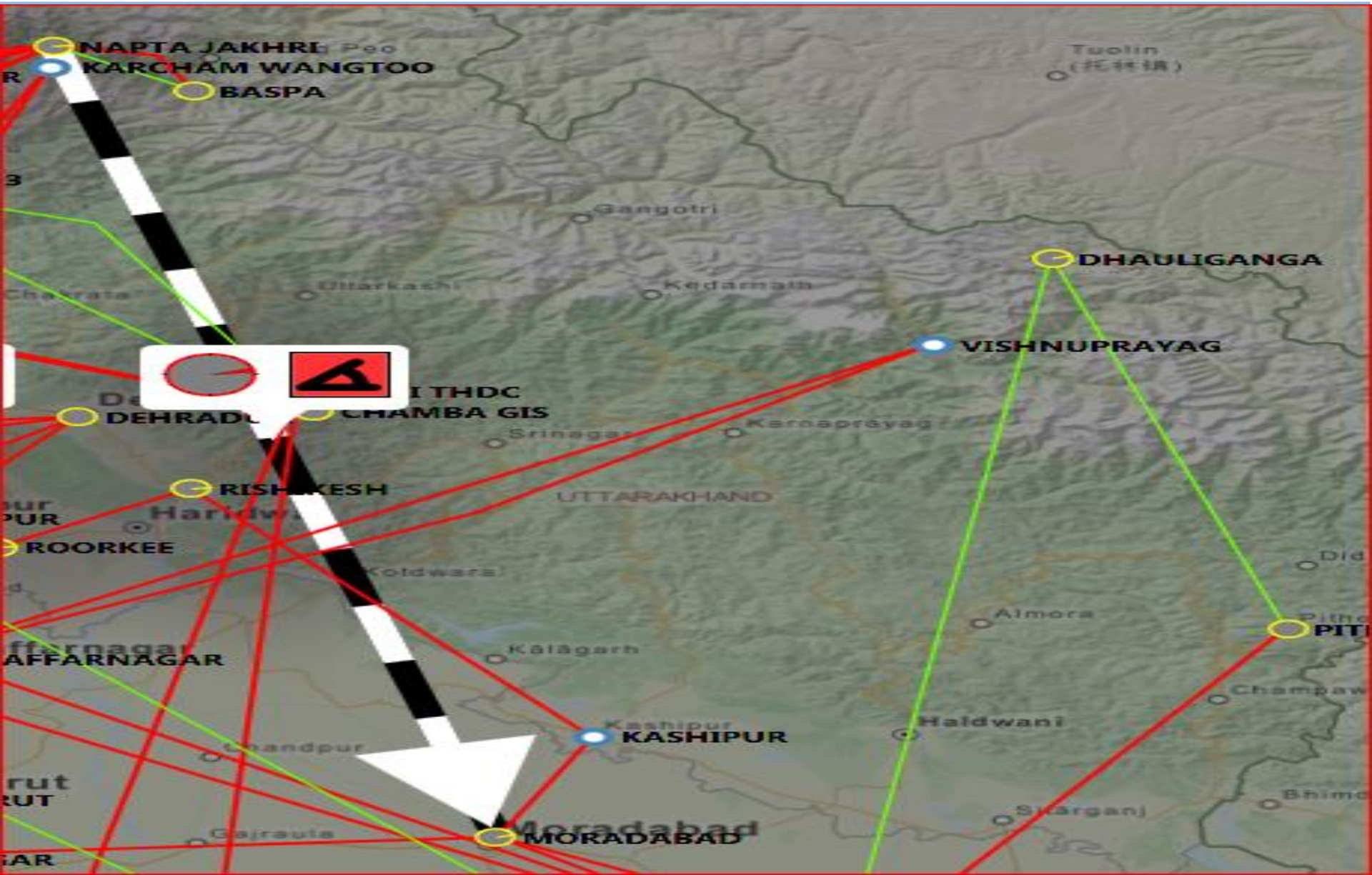
Frequency Contours



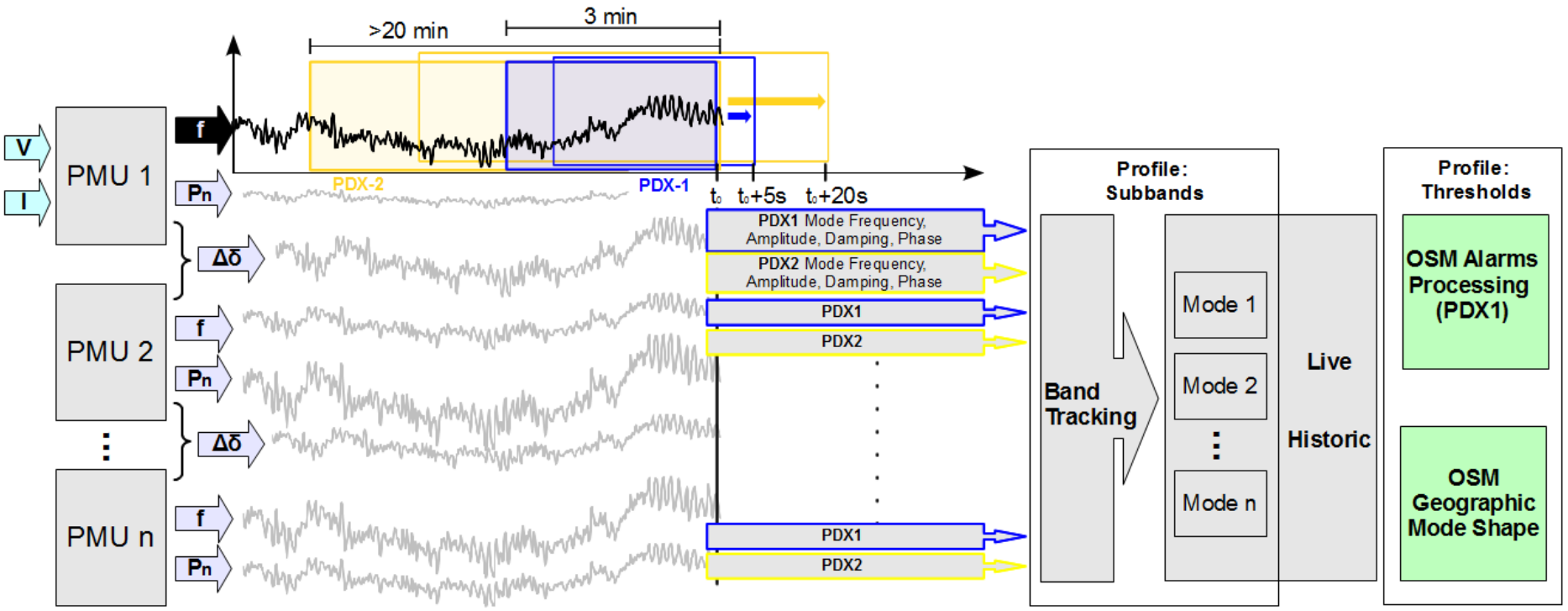
Alarm on Individual Signal



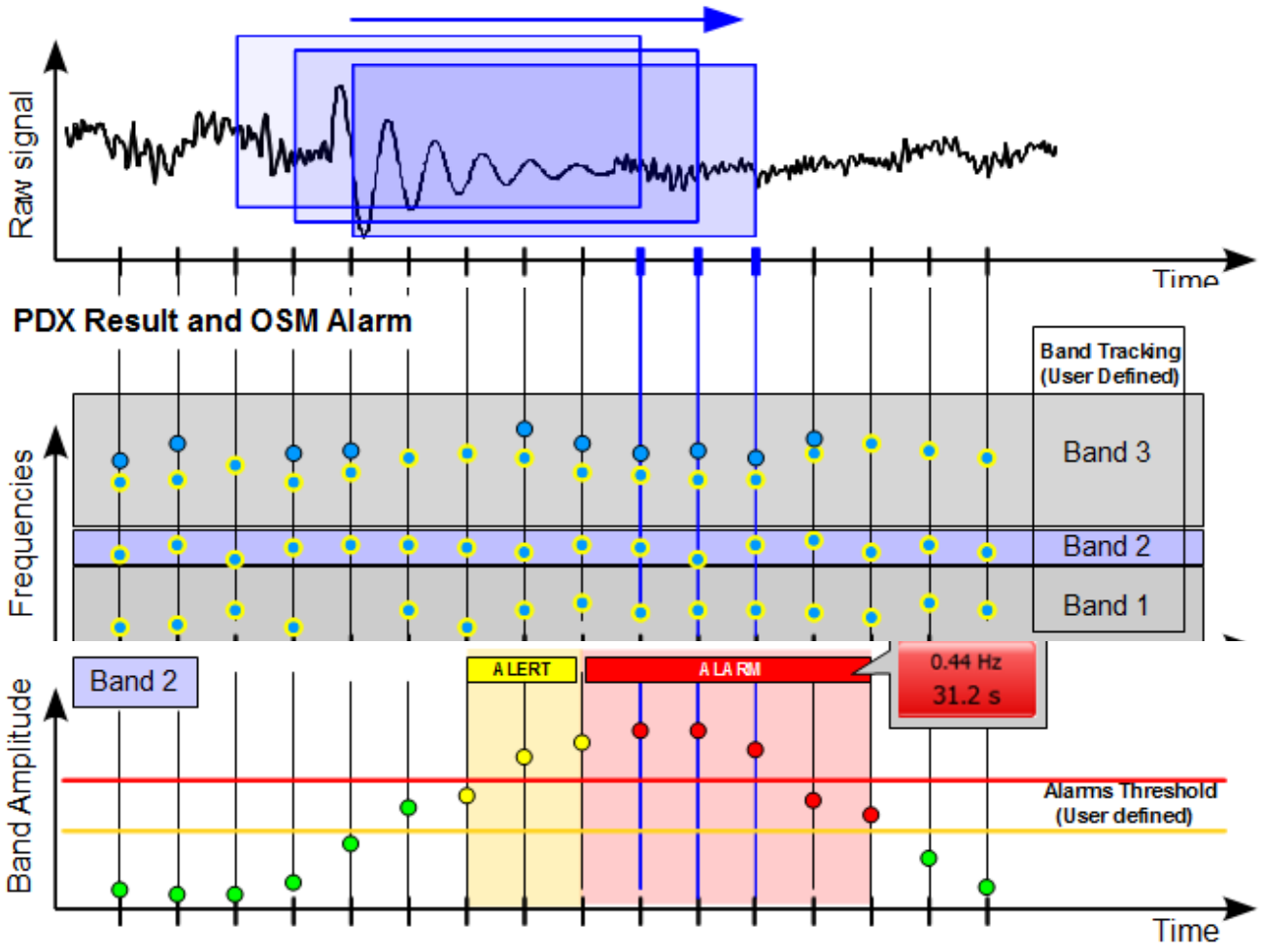
Angle Difference Visualization and Related Alarm



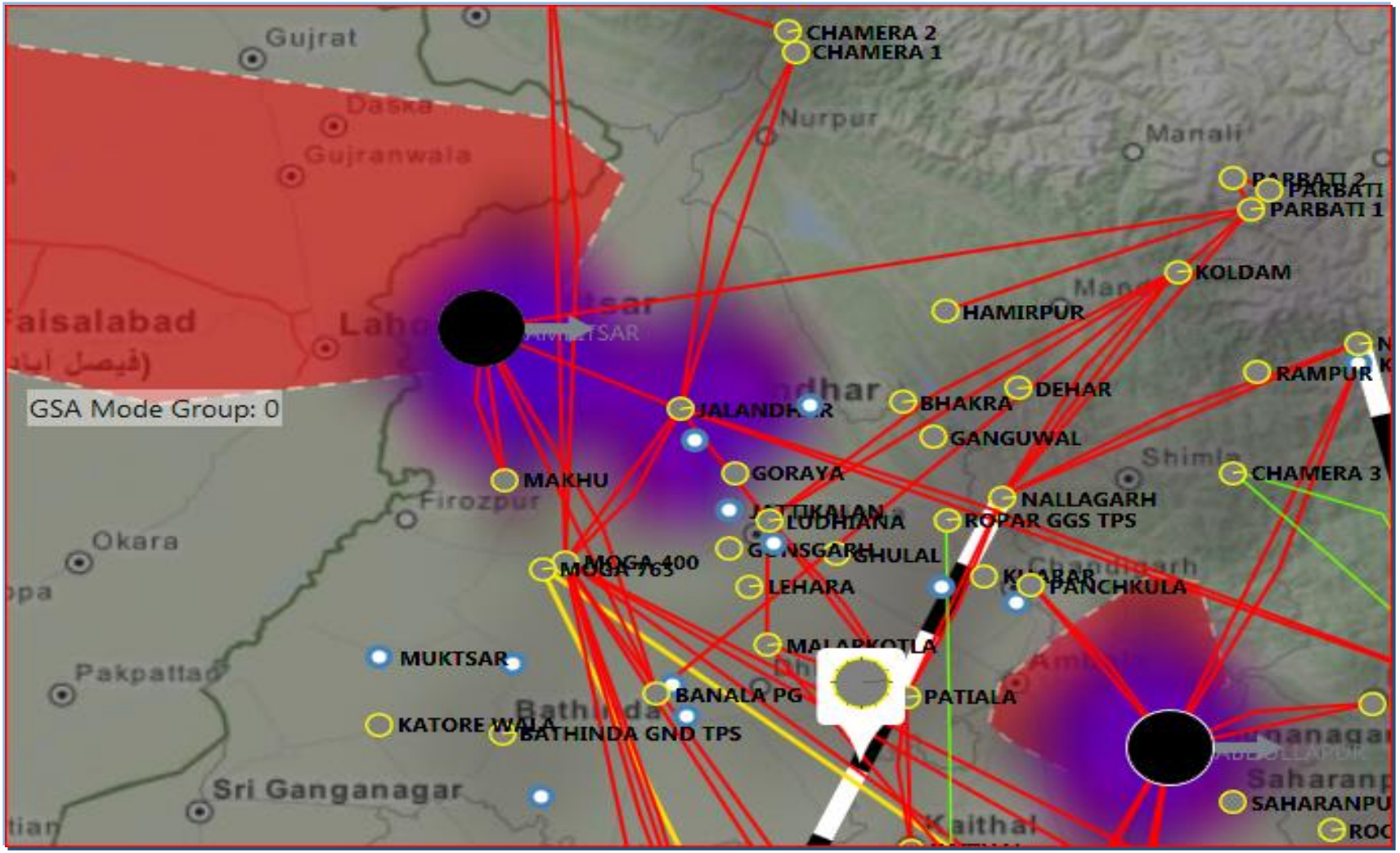
Using the Oscillatory Stability Management Application



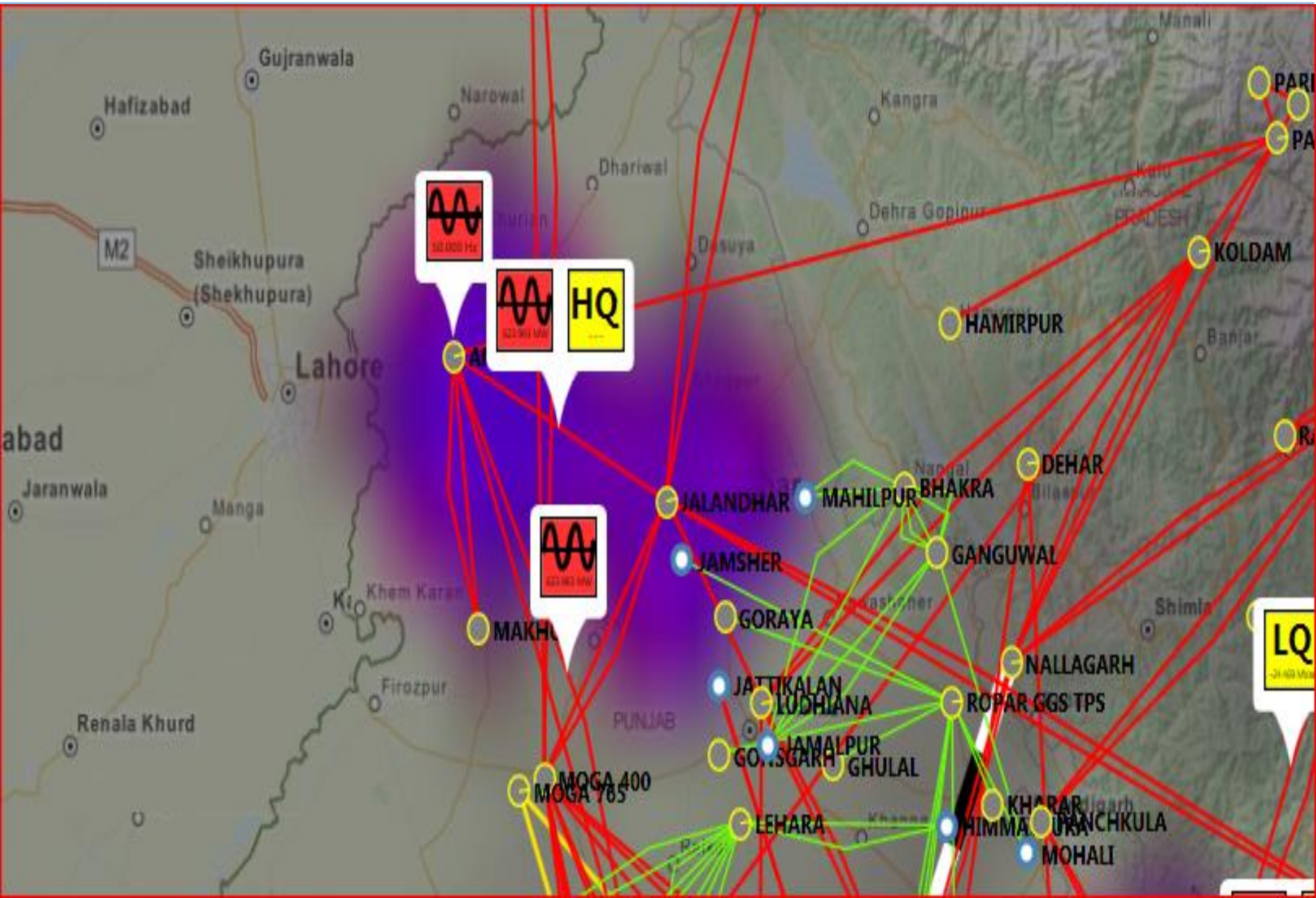
PDX Concepts: Raising Oscillatory Alarms



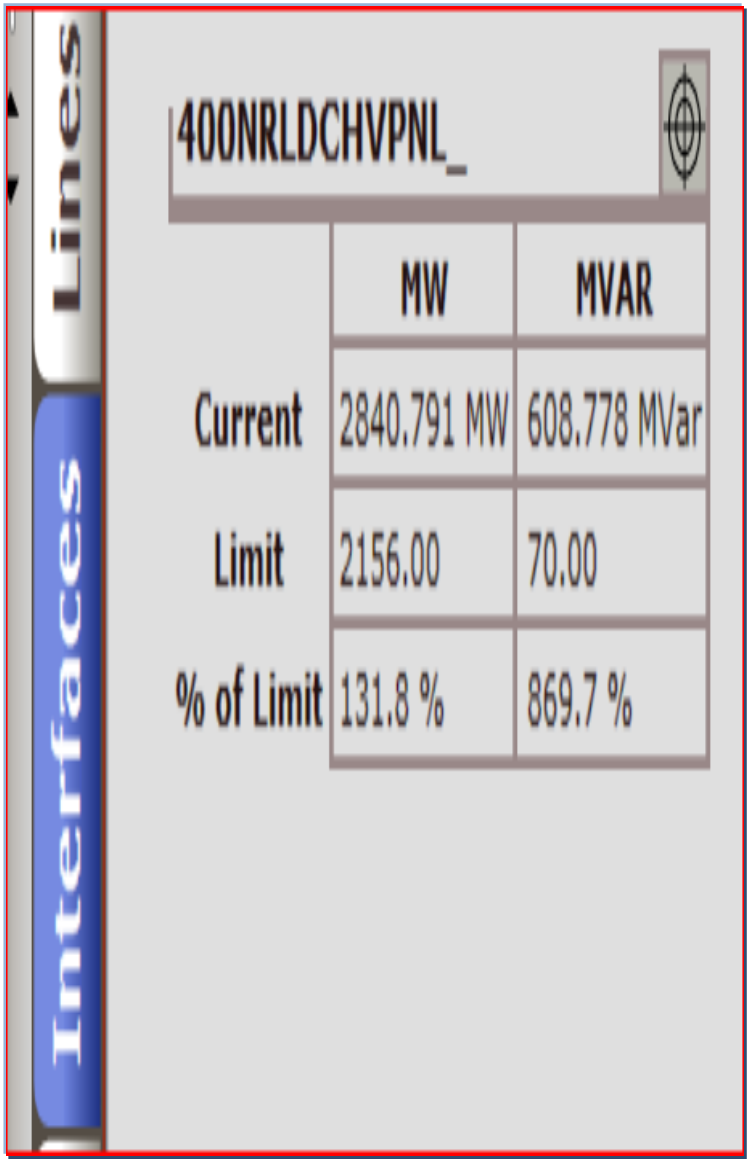
OSM Visualization on Geo-Spatial Display

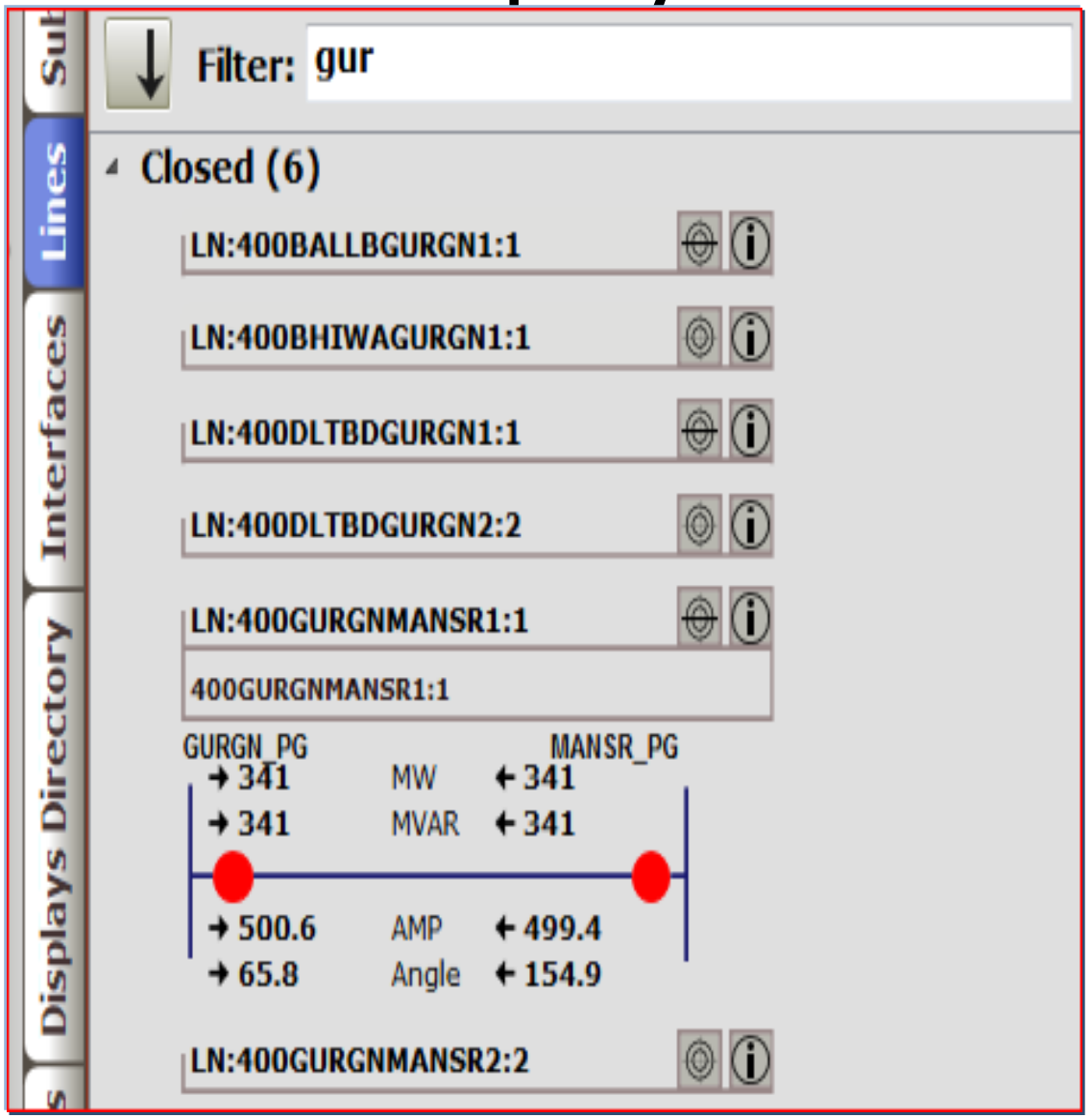


OSM Alarms

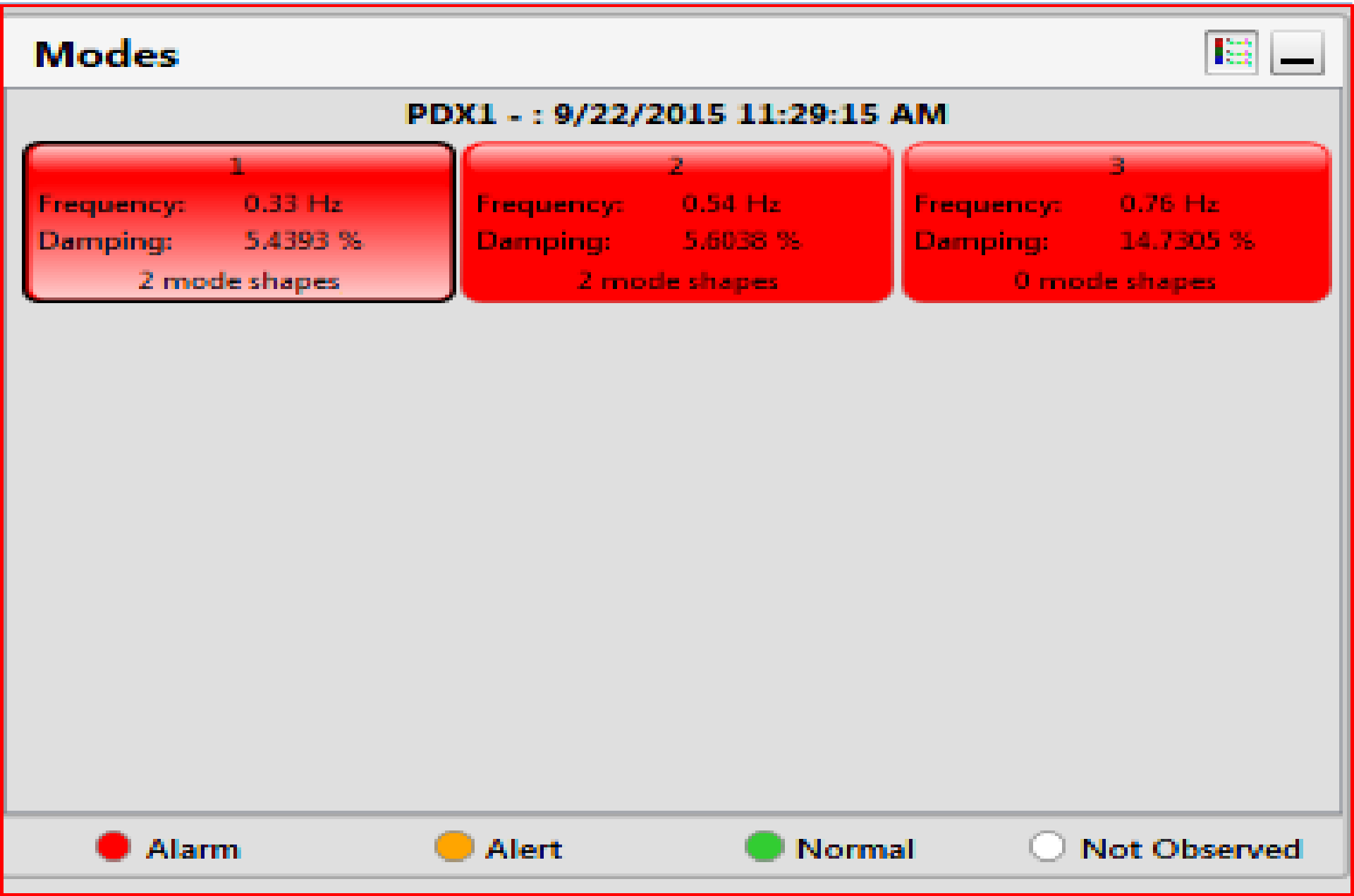

Gujranwala
Hafizabad
Narowal
Kangra
Manali
Dhariwal
Dehra Gopipur
M2
Sheikhupura
(Shekhupura)
Lahore
Jaranwala
Manga
Khem Karan
Firozpur
Renala Khurd
PUNJAB
HQ
KOLDAM
HAMIRPUR
DEHAR
BHAKRA
MAHILPUR
JALANDHAR
JAMSHER
GANGUWAL
GORAYA
NALLAGARH
JATTIKALAN
LUDHIANA
ROPAR GGS TPS
JAMALPUR
GHULAL
MOGA 400
MOGA 765
LEHARA
KHARAR
PANCHKULA
MOHALI
Shimla
LQ

Various Tabular Displays





Modes Monitoring



Advantages of OSM tool

Case Study of Low Frequency Oscillation

- On 14th July'2016 during 13:16:28.440 Hrs to 13:20:05.840 Hrs, oscillation observed in Voltage and Frequency
- Duration: 4 minutes
- Relative participation : Maximum oscillation at 132 kV Imphal
- Other oscillatory nodes: 220 kV Misa, 132 kV Badarpur

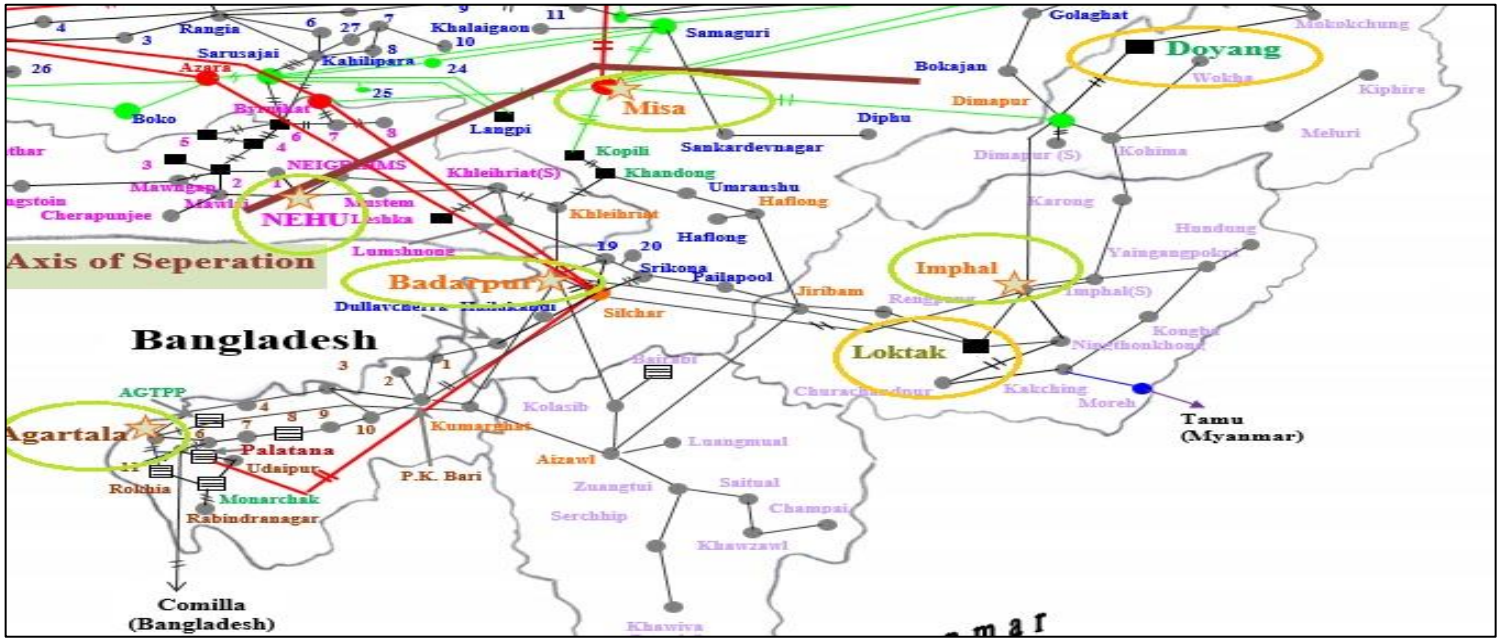


Fig: PMU Locations and participation generators

Case study – contd…

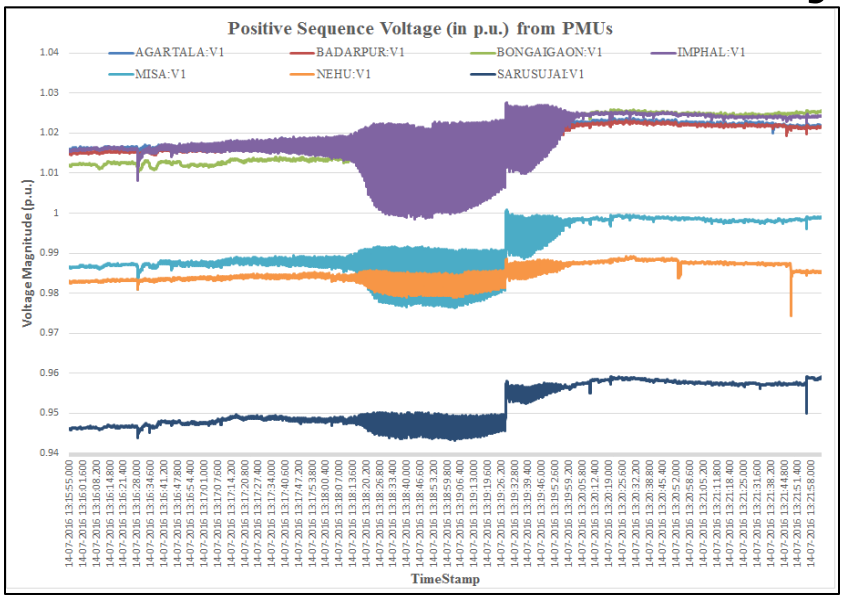


Fig: Positive sequence voltage (in p.u.)

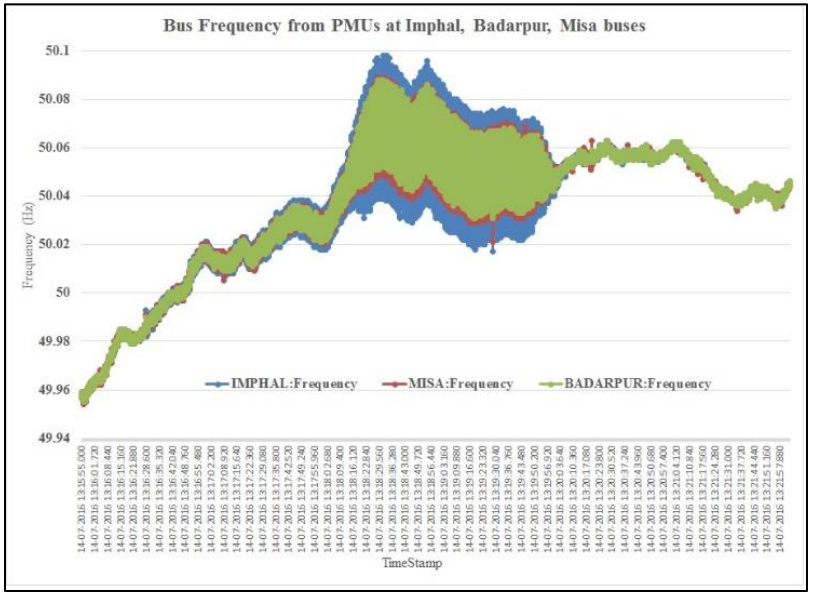


Fig: Bus Frequency (in Hz)

- Oscillatory mode from Prony analysis (OMS engine) : **0.98 Hz and 1.96 Hz** (Harmonic)
- Mode frequency indicates Local oscillations : Inter-plant and Intra-plant
- Oscillation not observed outside of NER Grid

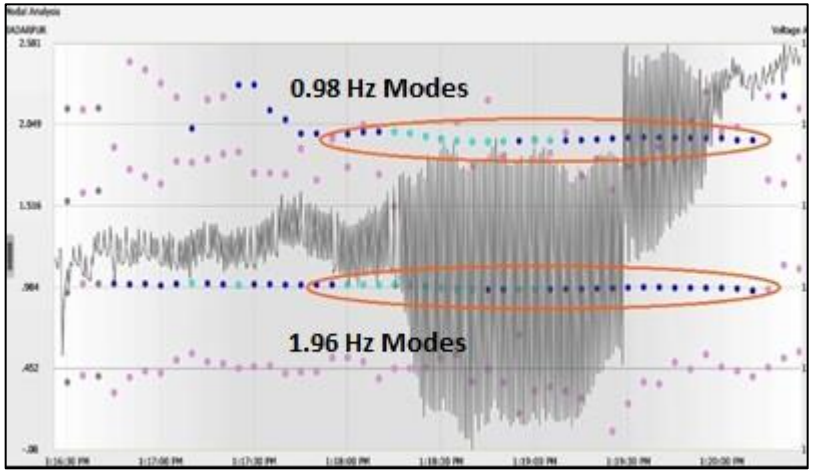


Fig: Modal Analysis (OMS engine)

Preliminary analysis and Control center actions

- Units at Loktak HEP and Doyang HEP were suspected to have participated in oscillations based on their close proximity to 132 kV Imphal (PG) and 220 kV Misa (PG), respectively
  1. **Loktak HEP: Reported hunting in line currents on 14th July case**
  2. **Doyang HEP: Reported hunting in unit on multiple dates**

- Change of network configuration noted since 12th July'2016: 220 kV Mariani – Mokokchung D/C line out of service due to Tower collapse
- Reduced Inertia of the power system around Doyang HEP
- Doyang HEP generation radially connected

- Change of scheduled injection pattern of Doyang HEP noted: Oscillations occur during generation near capability limits

Preliminary analysis and Control center actions - contd…

- State Load Despatch Center, Nagaland reported tripping of 132/66 kV transformer at Dimapur bus [close to Doyang HEP] and subsequent load loss

- All factors together: Doyang (3x25 MW) chosen to be candidate for investigation

- NERLDC instructed Doyang HEP to limit injection about 10% below capability limit.

- Further analysis on PMU data was done with Signal Processing toolbox of MATLAB

- Highest participation found at 0.965 Hz and 1.965 Hz => Corroborates with OMS engine results

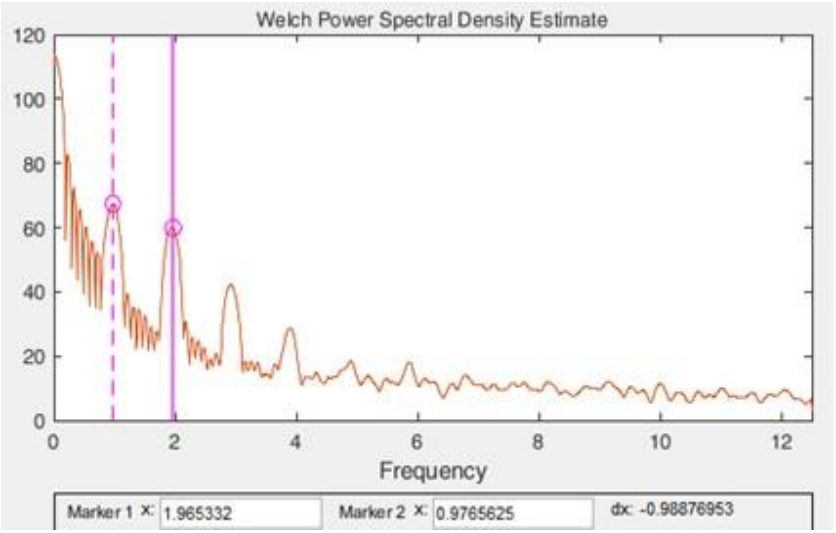


Fig: PSD estimate on measured PMU data

Corrective Action and Mitigation

- Hunting of generators is an expected phenomenon arising out of parallel operation of generators, and interaction between the Power-Angle curve and rotary inertia of generator
- Local mode oscillations have been commonly found in case of AVR of generating units acting with high output and feeding into a weak network.
- In such cases, damping can be improved by using supplementary controls to AVRs through Power System Stabilizers
- In case of Doyang HEP, the initial action was to limit injection schedule till proper solution
- From investigation, it was seen that Doyang HEP had disable their PSS in all units following a maintenance exercise
- In this case, PSS in all units of Doyang was enabled. Controlled test run displayed no presence of further oscillations
- Further action: Tuning of the PSS at Doyang after baselining of oscillation cases

PMU Analytics by IIT

- Line Parameter Estimation
- Online Vulnerability analysis
- Linear State Estimation
- CT/CVT Calibration
- Supervised Zone-3 Distance Protection
- Control Schemes for Improving System Security

URTDSM PROJECT STATUS IN NER

Status of NER-URTDSM Installation & Commissioning

- Control center Integrated FAT (Factory Acceptance Testing) completed in Aug'17 (NERLDC,SLDCs).
- Control centre Hardware at NERLDC Received in OCT-2017
- Control Centre Hardware at MeECL SLDC and Assam SLDC installation completed and yet to power up.
- Installation & Commissioning work of PMUs at field side completed except 9PMUs in 3 stations.
- Installation & Commissioning of NERLDC Control Centre Hardware March'18
- Site Acceptance Test(SAT)- Not yet started.
- SAVT – Not yet started.
- UPS Supply is pending

URTDSM Phase -I PMU Placements

URTDSM Phase -I					
SL No	Name of the Stn	Owner	Voltage level	Feeder Name	Feeders
1	Ranganadhi	AP	220	North Lakhimpur, Tezpur, Itanagar	4
2	Mariani	Assam	220	Kathalguri, Misa, Samaguri 1 & 2	4
3	Samaguri	AEGCL	400	Sarusajai, Misa PG 1 & 2, Balipara,	9
				Mariani 1 & 2,220kV tejpur 1 & 2, J.Nagar	
4	Agia	AEGCL	400	Boko	4
5	Tinsukia	AEGCL	400	Behiting 1 & 2 Makum	3
6	Balipara PG	PGCIL	400	Misa PG 1 & 2,BNC 1,2,3 & 4,Bongaigaon 1,2,3,4	12
				Kameng 1 & 2	
7	Bongaigaon	PGCIL	400	Balipara 1234,Binaguri 1& 2,400kV Azara 1& 2,400kV Alipur 1&2,220kv Birpara 1 & 2	14
8	Bishwanath	PGCIL	400	Subansiri 1234,Alipurdwar HVDC 1&2,Balipara 1234,Ranganadhi 1&2.	12
9	Silchar	PGCIL	400	Azara, Palatana 1&2,400kv Byrnihat	4
10	Misa	NEEPCO	400	Balipara 1& 2,220kv Mariani,220kv Mariani(N) 220kv Dimapur,220kv Kopili 1,2,3,220kv Byrnihat 1&2,N.Kohima	11
11	KOPILI	NEEPCO	220	Misa 123	3
12	Birpara	NEEPCO	220	Siliguri 1,2,Chukha 1,2,3 ,Bongaigaon 1,2	7
13	220kV Mariani	PGCIL	220	220kV Kathalguri,220kV Misa,220kV Mockochung 1,2	4
14	Dimapur	PGCIL	400	Misa, N Kohima	2


Thank you!

Annexure-D.16

As per Enquiry Committee recommendation/Grid Code periodical UFR inspection and audit of PSS at CSGS is to be carried out. A draft schedule in this regard is given below:

Name of State	Stages for which UFR inspection	Remarks	Quantum inspected(MW)	Name of ISGS for PSS Audit	Nominated officials	Nodal officer(s)
Arunachal Pradesh	All stages	Only one location i.e. Lekhi	20	Ranganadi HEP	DoP AP..... NERTS..... NERLDC..... NERPC.....	
Assam	Stg-I&II	10 locations	115.5	BgTPP, AGBPP	AEGCL..... NERTS..... NERLDC..... NERPC.....	
Manipur	Stg-I&II	2 locations	11	Loktak	MSPCL..... NERTS..... NERLDC..... NERPC.....	
Meghalaya	Stg-I&II	3 locations	30	Kopili, Kopili II, Khandong	MeECL..... NERTS..... NERLDC..... NERPC.....	
Mizoram	Stg-I	2 locations	5.09	-	P&ED Mizoram..... NERTS..... NERLDC..... NERPC.....	
Nagaland	Stg-I	One location i.e. Mokokchung	6	Doyang	DoP Nagaland..... NERTS..... NERLDC..... NERPC.....	
Tripura	Stg-I &II	3 locations	21	Palatana, AGTCCPP	TSECL..... NERTS..... NERLDC..... NERPC.....	
			208.59(appx. 50%)			

Annexure- D.17

Procedure for Reactive Capability Testing of Generators

A. Specific Requirements:

1. Scheduling of any tests shall first be coordinated with the system operator. System operators will assist in determining the amount of variation from scheduled voltage that is acceptable. When scheduling, the seasons and times of day that are conducive to the required Reactive Power capabilities shall be considered.
2. The over excited reactive capability validation shall be conducted for about two hours and leading (under excited) reactive power test for about one hour. Data for the under-excited reactive capability validation may be recorded as soon as a limit is encountered. Steady Real and Reactive Power output should be maintained during the data collection interval. Data should be collected with all auxiliary equipment needed for normal operation in service.
3. For hydrogen-cooled generators, the hydrogen pressure should be at the maximum operation pressure. If the maximum designed hydrogen pressure cannot be maintained for normal operation, then the reason for this condition shall be documented and the appropriate generator capability curve shall be used. Additional engineering evaluation may be required to ensure expected reactive capabilities are achievable.
4. When the maximum reactive power capabilities are validated, the reactive power at the generator terminals i.e. the generator step-up transformer (GT) primary (LV side, after auxiliaries), and the GT secondary (HV side) shall be documented. The corresponding MW outputs shall also be recorded.
5. During the validation, the scheduled and actual voltages at the system bus and the generator terminals shall also be recorded. In addition, the existing GT, UAT, ST tap setting shall be documented.
6. Reactive power testing for both over-excitation and under-excitation should be done at rated load and at reducing loading levels.
7. AVR should be in service.
8. If GT, ST, UAT taps are off-nominal, test should be repeated after changing the taps (may be when the unit is under outage).

9. It is to be ensured that over-excitation trip (V/f) does not occur until the generator terminal voltage is above 108%. During the test, it is expected that generator terminal voltage may reach 105% and this should not cause tripping through V/f protection.
10. The load-drop compensation setting to be indicated.
11. Details of relay settings of generator protection, control mode of operation, droop setting, range of operating parameters as per OEM shall be furnished by the generating station for unit wise about a week advance to NERLDC & NERPC.
12. Testing will be done well within the limits of parameters prescribed by the OEM and will be discontinued in case of any abnormality like excess noise / vibration / temperature / pressure / current rating / voltage rating / fluctuation and etc., observed during the testing
13. No maintenance activities shall be planned on any of station equipments during testing.
14. Necessary Advance communication of the testing schedule on day ahead basis will be to all the LTA / MTOA / STOA customers of the generating station by the Generator / Seller as well as by RLDC / SLDC. The revision of schedule, if any due to testing process, the same will be effected in the implemented schedule prepared in the following day.

B. Detailed Procedure

B.1. Pre-Condition

In order to obtain the steady state MVAR capability of a generating unit, perform the following tests. Operating conditions should be as close to normal as practicable, including loading, unit temperatures (field, etc.) and pressures (hydrogen, boi1er, etc.). Tests should be performed during periods of operation which maximize the MVAR in/output of the machine. Therefore, testing should be performed during a period when system voltage is most advantageous to yield these results. When possible other synchronous machines or power system components should be used, to obtain the most advantageous terminal voltage during these tests.

Ensure that controls such as volts/hertz 1imiters and UELs (see B) are coordinated and at proper settings prior to testing to prevent unnecessary operation of volts/hertz relays or loss of excitation relays.

B.2. Lagging Reactive Capability Test

While operating in a steady state mode at near rated output, raise excitation in automatic voltage control mode until one of the following conditions occurs:

a. The 100% MVA rating of the machine is reached (reach capability curve)
b. Rated field current or field voltage is reached;
c. Terminal voltage limit is reached (105-110%, depending on unit);
d. Generator temperature limits are reached (either stator winding or field winding);
e. The maximum/over excitation limiter is reached/alarms;
f. Maximum auxiliary bus voltage is reached.

Hold unit at this level for a minimum of 15 minutes (30 minutes is a preferable duration) or till the temperature stabilizes then take the measurements outlined in 3. Repeat the test at reduced loading (MW) level.

B.3. Leading Reactive Capability Test

While operating in a steady state mode at almost rated load, lower excitation in automatic voltage control mode until one of the following conditions occurs:

CAUTION -

Determine first the expected MVAR limiting point, and do not proceed past that point. If this point is reached without activating the under-excitation limiters (UEL)/minimum excitation 1imiters (MEL) return to normal excitation and determine why the limiter is not functioning. Also, ensure that all transformer taps throughout the power plant are coordinated so the terminal voltage can reach the minimum (90-95%, depending on unit) without causing problems to the auxiliary power further in the plant.

a. UELs are activated;
b. 100% MVA rating is reached;
c. Generator temperature limits are reached;(either stator or field)
d. Minimum auxiliary bus voltage is reached;
e. Minimum terminal voltage is reached.

Take measurements outlined in B.3.

B.4. Measurements & reporting:

a. Gross MW output at both test points;
b. Gross MVAR output limits of generator reached in tests A and B;
c. Generator terminal voltage at maximum positive and negative MVARs;
d. Actual field current at both test points;
e. Machine MVA rating, both original nameplate rating and tested rating, if different;
f. Generator rated terminal voltage and rated field current;
g. Auxiliary bus voltage at minimum and maximum points;
h. Ambient temperature before conducting the lagging and leading tests

B.5. The following machine parameters may be recorded for use during future testing (in addition to values being reported):

a. Generator field voltage;
b. Rotating exciter field current and voltage (if appropriate) ;
c. Generator stator currents;
d. Field current

PRECAUTIONS:

If the generator does not normally operate in these regions, strip chart recording of exciter quantities may be helpful for problem resolution. All relay targets on the generator protection and excitation system should be reset before testing. Some excitation systems transfer to manual or backup control1ers if over-excitation is detected. If this happens, record the level at which it occurs and reset the control to automatic before placing the unit back in normal service. If the machine trips for any reason during these tests, specify which element tripped and why it tripped. Correct the problem and retest the unit.

C. Commercial conditions

C.1. General

a. All efforts shall be made to carry out the test during the period when generation Scheduled from the station is less than its declared capability (DC).

b. The units other than the testing in the same stage/station (as the case may be) will be adjusted to ensure minimum impact of UI. However, the following is proposed for insulating the generator from penalties.

C.2. ISGS Generating Unit

a. **Rationale behind the Proposal:** Schedules can be adjusted both on positive UI as well as Negative UI as per the current practice explained below by adjusting the schedules.

b. Any deviations of actual station/stage generation (ex-bus) as the case may be w.r.t the schedule due to the testing of the identified unit will be taken care of by making schedule station/stage (as the case may be) generation = actual station/stage generation in order to insulate the concerned generating station from being subjected to any financial penalties under the existing UI mechanism and the drawls of the beneficiaries in the form of the station shall be deemed to have been revised accordingly, during the period of test.

C.3. State Generators / other than mentioned at item no (b) & (c):

a. **Rationale behind the Proposal**: Since states in NER are not having intrastate ABT & they can adjust the generation of the state as whole. The following is proposed

I. As mutually agreed by the states & generators.

Minutes of the meeting held on 27th March at NLDC, POSOCO
Regarding Automatic Generation Control (AGC) pilot project at Barh, Bongaigaon and Mauda-stg-II

1. Representatives from NLDC, NRLDC, NTPC CC, NTPC Barh, Bongaigaon and Mauda were present. List of participants is given as Annexe-I. WRLDC, ERLDC, NERLDC were connected through Video Conference (VC).
2. GM I/C NLDC welcomed the participants. In the opening remarks, it was mentioned that following the CERC Order on 6th December 2017 on AGC pilot project, new pilot projects were identified at NTPC Barh in Eastern Region, NTPC Mauda in Western Region and NTPC Bongaigaon in North Eastern Region. It was explained that AGC pilot project at NTPC Dadri is on continuous operation since 4th January 2017. Continuous accounts are being issued by POSOCO to NRPC. So, to expand this pilot project in other regions in line with CERC orders new plants are being envisaged to be added to the AGC pilot project.
3. A presentation was made by POSOCO on the implementation of secondary control and the first pilot project implemented at NTPC Dadri stg-II. Details of the implementation were shared with the members.
4. NTPC mentioned that second pilot project at NTPC Simhadri is under progress. NTPC Simhadri are in the process of issuing the award to M/S Siemens through single tender by second week of April 2018.
5. NTPC Mauda, Barh and Bongaigaon confirmed that their units are compliant of accepting the set points in NTPC Dadri model.
6. RLDCs mentioned that Secondary Control implementation and CERC orders are discussed in RPC forums.
7. It was decided that a joint survey will be made by RLDCs/NLDC and POWERGRID at the RLDC and the Power Plant to identify the communication requirements. Dual communication channel from RLDC / NLDC to Power Plant will be explored and reported to NLDC.
8. Mauda mentioned that Ethernet VOIP connection is available recently at their end and they will confirm on the stability of the communication link to WRLDC/NLDC.
9. Considering the compatibility and integration issue with NLDC software (procured through M/S Siemens on limited tender basis during the first pilot project at Dadri stg-II) and experience of implementation, it was proposed/suggested to award the tender to M/S Siemens for smooth implementation of the pilot projects in all the five regions. It was discussed that since this a pilot project and expeditious commissioning is necessary, procurement may be done on a single tender basis. After the discussions NTPC agreed to take up with M/S Siemens regarding the survey and requirements.
10. After discussion it was decided that a local survey will be made by Barh, Bongaigaon and Mauda and they will send the requirements to M/s siemens.

(Somes)

(P DEBNATH)

Dinesh Kumar
NTPC, Bongaigaon

27/3
NLDC | POSOCO

27/3/18
SHAILESH AJMERA
NTPC MOUDA

SACHIN GARG
M(EMD), NTPC Mouda

Annexe-I

List of participants

POSOCO Representatives

1. S. R. Narasimhan, GM I/C, NLDC, POSOCO
2. Debasis De, GM (SL), NRLDC
3. N.Nallarasan, DGM(SO), NLDC, POSOCO
4. Harish Rathour, Chief Manager, NLDC, POSOCO

NTPC Representatives

5. Somes Bandyopadhyay, AGM(OS), NTPC
6. Shailesh Ajmera, NTPC Mauda
7. Sachin Garg, NTPC Mauda
8. Dinesh Kumar, NTPC Bongaigaon
9. P. Debnath, NTPC Barh
10. Uday Shankar, DGM(OS), NTPC

Concept/Note on framework for replacement of SEMs

Status Report from NERPC

1. DETAILS OF SEMS INSTALLED IN NER SYSTEM

Sl. No.	Utilities	No. of Locations	Elster Make	Secure Make	L&T Make	L&T Make	Total
				A-Type	B-Type	A-Type	
			A	B	C	D	A+B+C+D
1	AGBPP (NEEPCO)	1				21	21
2	AGTPP (NEEPCO)	1				11	11
3	DOYANG (NEEPCO)	1				8	8
4	KHANDONG (NEEPCO)	1				10	10
5	KOPILI (NEEPCO)	1				15	15
6	KOPILI-II (NEEPCO)	1				2	2
7	RANGANADI (NEEPCO)	1				12	12
8	LOKTAK (NHPC)	1				8	8
9	PALATANA (OPTCL)	1	4			15	19
10	NTPC-BTPS	1				14	14
11	KAMENG (NEEPCO)	1				12	12
12	PARE (NEEPCO)	1				11	11
13	Ar. PRADESH	2		1		1	2
14	ASSAM	23	5	3	1	32	41
15	MANIPUR	4	1			8	9
16	MEGHALAYA	5				12	12
17	MIZORAM	4				9	9
18	NAGALAND	3	2	1		7	10
19	TRIPURA	6	2	0	1	12	15
20	POWERGRID	21	47	0		110	157
	TOTAL	80	61	5	2	330	398

2. DETAILS OF METER FAILURE IN PAST 3 YEARS - Failure reported mainly in Elster make meters. All locations of Main meters in NER replaced with L&T make. L&T meter failure reported from Palatana & Ranganadi on time drift correction.

3. TIME TAKEN FOR REPLACEMENT OF FAULTY SEMs – Normally 2 to 3 weeks taken to replace meters.

4. HOW REPLACEMENT OF METERS CARRIED OUT – Generally replacements are done from spares maintained at stores.

5. TIME TAKEN FOR FRESH PROCUREMENT OF SEMs – Two years taken for SEM procurement.

6. PRACTICE OF KEEPING SPARE SEMs – 5 to 10% of total SEMs in the Region.

7. ANY OTHER ISSUES PERTAINING TO SEMs – Meter time drift is a serious issue, provision to input the GPS signal for auto correction of time drift is need of the hour.

STATE-WISE LOCATION DETAILS

(FOR DISTRIBUTION OF 70 LAPTOPS FOR METERING ACTIVITIES)

ARUNACHAL PRADESH

1. KAMENG (NEEPCO)
2. PARE (NEEPCO)
3. NIRJULI (PG)
4. ZIRO (PG)
5. ROING (PG)
6. ITANAGAR (AP)
7. NAHARLAGUN (AP)
8. SLDC

ASSAM

1. KATHALGURI (NEEPCO)
2. KOPILI (NEEPCO)
3. KHANDONG (NEEPCO)
4. KOPILI STG-2 (NEEPCO)
5. BADARPUR (PG)
6. BISWANATH CHARIALI (PG)
7. BALIPARA (PG)
8. SALAKATI (PG)
9. HAFLONG (PG)
10. NEW MARIANI (PG)
11. RANGIA (PG)
12. SONABIL (AS)
13. MARIANI (AS)
14. PANCHGRAM (AS)
15. GOHPUR (AS)
16. TINSUKIA (AS)
17. HAILAKHANDI (AS)
18. KAHELIPARA (AS)
19. SARUSAJAI (AS)
20. BTPS (AS)
21. UMRANGSOO (AS)
22. AGIA (AS)

23. SONAPUR (AS) **FUTURE** (To be kept at Misa)
24. DULLAVCHERRA (AS)
25. PAVOI (AS)
26. BOKAJAN (AS)
27. BACK-UP NERLDC
28. SPARE AT MISA 03 Nos.

MANIPUR

1. IMPHAL (PG)
2. JIRIBAM (PG)
3. NINGTHOUKONG (MN)
4. RENGPANG (MN)
5. KARONG (MN)
6. THOUBAL (MN) **FUTURE** (To be kept at Imphal-PG)
7. TIPAIMUKH (MAN) **FUTURE** (To be kept at Imphal-PG)
8. SLDC

MEGHALAYA

1. KHLIERIAT (PG)
2. BYRNIHAT (PG)
3. KHLIERIAT (ME)
4. LUMSHNONG (ME)
5. SLDC
6. NERLDC

MIZORAM

1. AIZAWL (PG)
2. MELRIAT (PG)
3. KOLASIB (MZ)
4. SLDC

NAGALAND

1. DOYANG (NEEPCO)
2. DIMAPUR (PG)
3. DIMAPUR (NG)
4. KOHIMA (NG)
5. KOHIMA (TBCB) **FUTURE** (To be kept at Dimapur-PG)
6. SLDC

TRIPURA

1. AGTCCPP (NEEPCO)
2. KUMARGHAT (PG)
3. AGARTALA (T & L OFFICE POWERGRID)
4. SURJAMANI NAGAR (TR)
5. UDAIPUR (TR)
6. DHARMANAGAR (TR)
7. PK BARI (TBCB)
8. SLDC

SEM LIST FOR TESTING

SN	NAME OF BAY/FEEDER	SEM SL.NO.
	MISA (PG)	
1	220KV Dimapur-1	NP 8643-A
2	220KV Dimapur-2	NP 8640-A
3	220KV Kopili-1	NP 8641-A
4	220KV Kopili-2	NP 8636-A
5	220KV ICT#1	NP 8599-A
6	220KV Kopili-3	NP 8603-A
7	220KV New mariani	NP 8608-A
8	220KV Old Mariani	NP 8605-A
9	220KV ICT#2	NP 8638-A
10	400KV Balipara-1	NP 5299-A
11	400KV Balipara-2	NP 5300-A
12	400KV ICT#1	NP 5291-A
	JIRIBAM(PG)	
13	JBM-AZL	NP7798A
14	JBM-BDP	NP8623A
15	JBM-LKT-II	NP 7797A
16	JBM-PL	NP 8499A
17	JBM-HFG	NP 7796A
18	6.3MVA TRANSFORMER	NP 8501A
19	JBM-JBM	NP 8500A
	BADARPUR(PG)	
20	SLR # 1 (BDP end)	NP-8493A
21	SLR # 2 (BDP end)	NP-8495A
22	KHLT Bay	NP-6874A
23	BDP(PG) END OF PANCHGRAM FEEDER	NP-6871A
24	KOLASIB Bay	NP-6873A
25	JIRIBAM Bay	NP-6870A
26	KUMARGHAT Bay	NP-7799A
	HAFLONG (PG)	
27	Khandong Bay	NP-8502-A
28	ASEB Bay	NP-8494-A
29	Jiribam Bay	NP-8656-A
	SILCHAR (PG)	
30	132kV Badarpur-1	NP-8662A
31	132kV Srikona-1	NP-8664A
32	132kV Srikona-2	NP-8665A
33	132kV Badarpur-2	NP-8663A
34	132kV Hailakandi-2	NP-8666A
35	132kV Imphal-1	NP-8571A
36	132kV Imphal-2	NP-8570A
37	132kV Panchgram	NP-8667A
38	132kV P.K.Bari-1	NP-8569A
39	132kV P.K.Bari-2	NP-8563A
40	400kV Palatana-1	NP-8660A

SN	NAME OF BAY/FEEDER	SEM SL.NO.
41	400kV Palatana-2	NP-8659A
42	400kV Brynihat	NP-8661A
43	400kV Azara	NP-8561A
44	132kV Silchar-1 at Srikona S/S	NP-8562A
45	132kV Silchar-2 at Srikona S/S	NP-8668A
	ZIRO (PG)	
46	132kV Ranganadi-Ziro T/L (Ziro end)	NP-6878-A
	BALIPARA(PG)	
47	400 kV Bongaigaon # 1	NP - 8655
48	400 kV Bongaigaon # 2	NP - 8653
49	400 kV Bongaigaon # 3	NP - 8654
50	400 kV Bongaigaon # 4	NP - 8585
51	400 kV RHEP # 1	NP - 5310
52	400 kV RHEP # 2	NP - 5308
53	400 kV Misa #1	NP - 8594
54	400 kV Misa # 2	NP - 5285
55	220 kV Samaguri	NP - 5307
56	132 kV Khupi	NP - 5306
57	132 kV Depota	NP - 6149
58	132 kV Gohpur	NP - 6150
59	400/220/33 kV ICT # 1 (HV)	NP - 5309
60	220/132 kV ICT # 1 (HV)	NP - 6868
61	220/132 kV ICT # 1 (LV)	NP - 6891
62	220/132 kV ICT # 2 (HV)	NP - 6151
63	220/132 kV ICT # 2 (LV)	NP - 6890
64	400/220/33 kV ICT # 2 (HV)	NP - 5811
65	400/220/33 kV ICT # 2 (LV)	NP - 5800
	NIRJULI(PG)	
66	132KV NDTL(NIRJULI END)	NP-6031A
67	132KV GITL(NIRJULI END)	NP-5771A
68	50 MVA ICT I	NP 5825A
69	50MVA ICT-II	NP-5824A
	ARUNACHAL	
70	132KV RANGANADI-LEKHI(LEKHI END)	NP-8372A
	IMPHAL (PG)	
71	Imphal -II 132kV Bay	NP-8670-A
72	Loktak -II 132kV Bay	NP-8672-A
73	Imphal-I 132kV Bay	NP-8378-A
74	Dimapur 132kV Bay	NP-8669-A
75	Ningthoukhong 132kV Bay	NP-8576-A
76	ICT - I	NP-8581-A
77	ICT - II	NP-8647-A
	JIRIBAM(MN)	
78	JIRIBAM(MAN) END OF JIRIBAM(PG)FDR	NP-8645-A

SN	NAME OF BAY/FEEDER	SEM SL.NO.
	YUREMBUM, MSPCL	
79	Imphal -I 132kV Bay	NP-8374-A
80	Imphal -II 132kV Bay	NP-6950-A
	NINGTHOUKHONG, MSPCL	
81	Loktak 132kV Bay	NP-8375-A
	KARONG, MSPCL	
82	Kohima 132kV Bay	NP-8373-A
	DIMAPUR, PG+ ASEB	
83	KOHIMA	NP-8472-A
84	ICT 1 LV	NP-8802-A
85	ICT2 LV	NP-6889-A
86	NAGALAND POWER HOUSE	NP-8478-A
87		NP-5777-A
88		NP-6032-A
89	BOKAJAN POWER HOUSE	NP-8482-A
90		NP-7587-A
	SALAKATI(PG)	
91	Alipurduar# 1	NP-7581-A
92	Alipurduar# 2	NP-5303-A
93	Gelephu	NP-8800-A
	KUMARGHAT(PG)	
94	EK Bari Bay	NP-6860-A
95	Aizawl Bay	NP-6861-A
96	Badarpur Bay	NP-6862-A
97	RC Nagar Bay	NP-6863-A
	EAST KANCHANBARI , TSECL	
98	Silchar1 Bay	NP-4501-A
99	Silchar2 Bay	NP-8564-A
	MARIANI(PG)	
100	Misa	NP8591A
101	Kathalguri	NP8596A
	SMNAGAR	
102	S.M.NagarBay-I of S.M.Nagar-Comilla line	NP-9078-A
103	S.M.NagarBay-II of S.M.Nagar-Comilla line	NP-9076-A
	BONGAIGAON(PG)	
104	New Siliguri#1	NP-8468A
105	New Siliguri#2	NP-8469A
106	ICT HV SIDE	NP-5318A
	KHLIEHRIAT(PG)	
107	132kV Powergrid-Khandong Feeder-I(PGCIL end)	NP 6883 A
108	132kV Powergrid-Khandong Feeder-II(PGCIL end)	NP 6884 A
109	132kV Powergrid-Badarpur Feeder (PGCIL end)	NP-8477-A
110	132kV Powergrid-MeECL Feeder-I(PGCIL end)	NP 6881 A
111	132kV Powergrid-MeECL Feeder-II(PGCIL end)	NP 6880 A

SN	NAME OF BAY/FEEDER	SEM SL.NO.
	RANGIA(PG)	
112	Rangia-Deothang -Rangia End	NP-8368-A
113	Rangia-Deothang -Deothang End	NP-8380-A
	AGTCCPP	
114	AGTPP GTG-2	NP-6858
115	AGTPP GTG-4	NP-6864
116	AGTPP GTG-3	NP-6859
117	AGTPP STN TRF-2	NP-6852
118	AGTPP STN TRF-1	NP-6853
119	AGTPP GTG-1	NP-6857
	RHEP	
120	RANGANADI END OF 132KV ZIRO FDR	NP-5278
121	RANGANADI END OF 132kV NIRJULI FDR	NP-5792
122	RANGANADI END OF 400KV BLP-2	NP-5817
123	RANGANADI END OF 400KV BLP-1	NP-6033
124	RANGANADI 400/132KV AUTO TFR-2	NP-5275
125	RANGANADI STN.TFR-1	NP-5276
126	RANGANADI GT-1	NP-5277
127	RANGANADI GT-2	NP-5813
128	RANGANADI GT-3	NP- 5814
129	RANGANADI STN.TFR-2	NP-5815
130	RANGANADI 400/132KV AUTO TFR-1	NP-5816
131	RANGANADI END OF 33KV PARE-2	NP-7664
	PALATANA	
132	PALATANA END OF SLCHAR I FDR	NP- 7583
133	PALATANA END OF UDAIPUR I FDR	NP-7603
134	PALATANA ST I	NP-7602
135	PALATANA END OF SM NAGAR FDR	NP-8381
136	PALATANA ICT (HV Side)	NP-8382
137	PALATANA ST II	NP-7584
	MEGHALAYA	
138	BYRNIHAT END OF 220KV MISA-I	NP-6856
139	BYRNIHAT END OF 220KV MISA-II	NP-5302
140	KHLRT(MeSEB) END OF KHLRT(PG) FDR-1	NP-6865
141	KHLRT(MeSEB) END OF KHLRT(PG) FDR-2	NP-6866
142	KHLRT END OF KHANDONG-1 FDR	NP-6883
143	KHLRT END OF KHANDONG-2 FDR	NP-6884
	TRIPURA	
144	DHARMANAGAR END OF DULLAV FDR	NP-6892-B
145	P'KANCHANBARI END OF K'GHAT(PG) FDR	NP-6875
146	PK'BARI end of 132 kV Silchar-2	NP-8564
147	AGARTALA END OF AGTPP-1 FDR	NP-6850
148	AGARTALA END OF AGTPP-2 FDR	NP-6851
149	SM Nagar end of Palatana	NP-8471
150	Udaipur end of Palatana	NP-8470

SN	NAME OF BAY/FEEDER	SEM SL.NO.
	ASSAM	
151	TINSUKIA END OF 220KV KTG FDR-I	NP-8383
152	TINSUKIA END OF 220KV KTG FDR-II	NP-8386
153	PAILAPOOL END OF JIRIBAM FDR	NP-8498
154	SONABIL END OF 220KV BALIPARA	NP-5795
155	SONABIL END OF 132KV BALIPARA	NP-6147
156	MARIANI END OF 220KV KATHALGURI	NP-6888
157	MARIANI END OF 220KV MISA	NP-6886
158	MARIANI END OF 33 KV CHANKI	NP-6893
159	PANCHGRAM END OF BDP(PG)FDR	NP-6872
160	SAMAGURI END OF 220KV MISA-1	NP-5797
161	PANCHGRAM END OF LUMSHONG FEEDER	NP-7595A
162	SAMAGURI END OF 220KV MISA-2	NP-5795
163	DULLAVCHERA END OF 132 KV DHARMANAG	NP-6876
164	HAILAKANDI END OF SILCHAR-II	NP-7596A
165	HAILAKANDI END OF SILCHAR-I	NP-5301A
166	220KV SALAKATI_BTPS#1(BTPS End)	NP-8476A
167	Gohpur END OF 132KV NIRJULI FDR	NP-6907-A
	TOTAL NO OF METER TO BE TESTED	**167**

SEM LIST FOR RS-485 SCHEME

Sl.NO	Utilities	EXISTING METER	FUTURE METER **	Total
1	AGBPP (NEEPCO)	21	0	21
2	AGTPP (NEEPCO)	14	2	16
3	DOYANG (NEEPCO)	12	0	12
4	KHANDONG (NEEPCO)	15	0	15
5	KOPILI (NEEPCO)	15	0	15
6	KOPILI-II (NEEPCO)	4	0	4
7	RANGANADI (NEEPCO)	17	2	19
8	LOKTAK (NHPC)	12	0	12
9	PALATANA (OPTCL)	15	0	15
10	KAMENG	12	0	12
11	PARE	11	0	11
12	NTPC-BTPS	10	0	10
	TOTAL	**158**	**4**	**162**

** **Check Meters to be installed.**

Annexure-D.39