भारत सरकार Government of India
विद्युत मंत्रालय Ministry of Power
उत्तर पूर्वी क्षेत्रीय विद्युत समिति
North Eastern Regional Power Committee
मेघालया स्टेट हाउसिगं फिनांस को- आपरेटिव सोसायटी लि. बिल्डिगं
Meghalaya State Housing Finance Co-Operative Society Ltd. Building
नांग्रिम हिल्स, शिलोंग – 793003
Nongrim Hills, Shillong – 793003.

ISO 9001:2008

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No. NERPC/OP/OCC/2013/2880-907 Date: 15th February, 2013

To,

1. Managing Director, AEGCL, Bijuli Bhawan, Guwahati – 781 001
2. Director (Distribution), Me. ECL, Lumjingshai, Short Round Road,Shillong – 793 001
3. CGM, (LDC), SLDC Complex, AEGCL, Kahelipara, Guwahati-781 019
4. Chief Engineer (WE Zone),Department of Power,Govt. of Arunachal Pradesh,Itanagar- 791 111
5. Chief Engineer (EE Zone),Department of Power,Govt. of Arunachal Pradesh,Itanagar- 791 111
6. Engineer-in-Chief (P&E), Department of Power, Govt. of Mizoram, Aizawl – 796 001
7. Chief Engineer (P), Electricity Department, Govt. of Manipur, Keishampat, Imphal – 795 001
8. Chief Engineer (P), Department of Power, Govt. of Nagaland, Kohima – 797 001
9. General Manager, TSECL, Agartala – 799 001
10. ED (O&M), NERTS, PGCIL, Dongtieh-Lower Nongrah, Lapalang, Shillong -793 006
11. ED (O&M), NEEPCO Ltd., Brookland Compound, Lower New Colony, Shillong-793003
12. ED (Commercial), NEEPCO Ltd., Brookland Compound, Lower New Colony, Shillong-793003
13. ED (O&M), NHPC, NHPC Office Complex, Sector-33, Faridabad,Haryana-121003
14. GM (Plant), OTPC, Badarghat Complex, Agartala, Tripura - 799014
15. AGM, NERLDC, Dongtieh-Lower Nongrah, Lapalang, Shillong -793 006
16. Member Secretary, ERPC, 14 Golf Club Road, Tollygunge, Kolkata-700033
17. Chief Engineer, GM Division, Central Electricity Authority, New Delhi – 110066

Sub: Minutes of the 82nd OCC Meeting held on 7th February, 2013 at Shillong.

The Minutes of the 82nd OCC Meeting of NERPC held on 07.02.2013 at "Shillong Club", Shillong is enclosed for favour of kind information and necessary action please.

The minutes is also available on the website of NERPC **www.nerpc.nic.in**

Encl: As above

भवदीय / Yours faithfully,

बी. लिंगखोई

(बी. लिंखोई /B. Lyngkhoi)
अधीक्षण अभियंता / Superintending Engineer (O)

Copy to:

1. Chief Engineer, AEGCL, Bijuli Bhavan, Guwahati - 781001
2. Chief Engineer, APGCL, Bijuli Bhavan, Guwahati - 781001
3. Chief Engineer, DISCOM, Bijuli Bhavan, Guwahati - 781001
4. Head of SLDC, MeECL, Lumjingshai, Short Round Road,Shillong – 793 001
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. DGM (C&M), OTPC, 6th Floor, A-Wing, IFCI Tower -61, Nehru Place, New Delhi – 110019.

North Eastern Regional Power Committee

MINUTES OF THE 82nd OPERATION COORDINATION SUB-COMMITTEE MEETING OF NERPC

Date : 07/02/2013 (Thursday)
Time : 10:30 hrs
Venue : "Shillong Club," Shillong.

The List of Participants in the 82nd OCC Meeting is attached at **Annexure – I**

The meeting was started with welcome address by Shri S. K. Ray Mohapatra, Member Secretary I/C, NERPC. He informed the house that after grid disturbance on 30th and 31st July, 2012, efforts are being made at different levels to implement various recommendations of the enquiry committee to avoid re-occurance of such incidences in future, to maintain grid discipline for smooth and safe operation of the grid. CERC is also issuing directives from time to time to take up various issues for discussion at RPC level and communicate the decision within a time frame. Hence many important issues are to be discussed in the meeting like the implementation of Unified Real Time Dynamic State Measurement (URTDSM) scheme, Grid Security Expert System (GSES). He appreciated the full co-operation of PGCIL, NEEPCO, NHPC and state constituents, because of which the independent third party audit of the protection system of NE Region is likely to be completed by end of February, 2013. He also informed that as per CERC's order NERPC has to submit the status and implementation of recommendations of Third Party Protection Audit for NE Region by 18th February, 2013. Further, he informed that as per CERC's direction NERPC is also going to organize a Special TCC meeting, being hosted by POWERGRID, on 9th February, 2013 at Shillong to discuss implementation of GSES in NER region and the decision is to be filed on an affidavit within a week. He requested all the participants to actively participate in the discussion for fruitful outcome.

Thereafter, Member Secretary I/C requested Shri B. Lyngkhoi, SE(O), NERPC to take up the agenda items for discussion.

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 81st MEETING OF OPERATION SUB-COMMITTEE OF NERPC.

SE(O), NERPC mentioned that the minutes of the 81st OCC meeting held on 11th January, 2013 at Guwahati were circulated vide letter No. NERPC/OP/OCC/2013/7448-75 dated 28th January, 2013.

He informed that communication was received from Nagaland regarding on last paragraph of Item No. C.5 to be modified as "**The Committee requested NERPC to take up the matter with Nagaland**" in place of "As representative from Nagaland was not present, the committee requested NERPC to take up the matter with Nagaland".

NEEPCO has also requested for correction in the recording of minutes of 80th OCC meeting in respect of Item D.12.5 regarding absorption of VAR by Generating stations. The 2nd paragraph of Item D.12.5 may be read as

"On enquiry, NEEPCO representatives informed that generally machine absorbs / generate VAR as per grid condition. Absorption of additional VAR depends upon the machine parameters on real time operation without sacrificing the active generation (MW)."

In place of

"On enquiry, NEEPCO representatives informed in present scenario their machines don't absorb any VAR however, their machine can absorb VAR but there should be adequate amount of MW generation so that machine will be under stable conditions."

With the above corrections the minutes of 80th and 81st OCC meeting was confirmed.

SE(O), NERPC requested NERLDC to give the presentation about the grid performance of NER during the month of January, 2013.

I T E M S F O R D I S C U S S I O N

B.1. OPERATIONAL PERFORMANCE AND GRID DISCIPLINE DURING JANUARY' 2013

As per the data made available by NERLDC, the grid performance parameters for January, 2013 are given below:

i) **Average frequency** during January, 2013 was 50.01 Hz as compared to 50.02 Hz in December, 2012.

ii) **Minimum frequency** in January, 2013 was 49.30 Hz (05.01.13 at 14:21 hrs) as compared to 49.25 Hz recorded in the previous month.

iii) **Maximum frequency** was 50.78 Hz (17.01.13 at 23:22 hrs) as compared to 50.71 Hz recorded in December, 2012.

iv) **System frequency** remained within permissible range of 49.7 Hz to 50.2 Hz for 83.12 % of the time, below 49.7 Hz for 5.57 % and above 50.2 Hz for 11.31 % of the time as compared to 84.03 %, 4.72% and 11.25 % respectively in the previous month.

v) **Regional peak** demand in January, 2013 was 1943 MW as compared to 1948 MW in December, 2012, a decrease of 0.26 % over the previous month.

vi) **Regional peak availability** was 1815 MW as compared to 1853 MW in previous month, a decrease of 2.09 % over the previous month.

vii) **Energy requirement** was 991.54 MUs in January, 2013 compared to 993.93 MUs in December, 2012, a decrease of 0.24 % over the previous month.

viii) **Regional energy availability** was 924.82 MUs compared to 945.80 MUs in the previous month, a decrease of 2.2% over the previous month.

ix) **Rise in demand met** was recorded in Meghalaya (3.0%) over the previous month.

x) **Drop in demand met** was recorded in Arunachal Pradesh(3.0%), Assam(9.0%),Manipur(2.0%),Mizoram(4.0%),Nagaland(11.0%), Tripura(4.0%) States over the previous month viz. December, 2012.

xi) **No Over Voltages** at 400 kV & 220 kV substations were observed.

xii) **No over Voltages** were observed at 132 kV S/S.

xiii) **Under Voltages** No under voltage was observed at 400 kV S/S & 220 kV S/S .Under voltage, was observed at 132 kV S/S at Aizawl, was 119 kV.

xiv) **Regional Generation & Inter-regional Exchanges** during the month of January, 2013 compared to December, 2012 are given below:

SN	Parameter	January, 2013	December, 2012
REGIONAL GENERATION & INTER – REGIONAL EXCHANGES (in MU)			
1	Total Generation in NER (Gross)	**687.508**	**664.116**
2	Total Central Sector Generation (Gross)	**419.115**	**373.919**
	Total State Sector Generation (Gross)	**268.393**	**290.197**
3	Inter-Regional Energy Exchanges		
	(a) NER - ER	**6.02**	**3.07**
	(b) ER - NER	**268.36**	**307.36**
	(c) Net Import	**262.34**	**304.29**

The Summary of Category A,B,C Messages issued by NERLDC for the constituents of NER for the Month of January, 2013 is given as below:

State	A (<49.8 Hz)		B (<49.7 Hz)		C (<49.7 Hz Persistent Overdrawal)		Total	
	Dec'12	Jan'13	Dec'12	Jan'13	Dec'12	Jan'13	Dec'12	Jan'13
Ar. Pradesh	54	53	14	7	0	0	68	60
Assam	31	28	7	0	0	0	38	28
Manipur	45	45	11	6	0	0	56	51
Meghalaya	32	27	5	4	0	0	37	31
Mizoram	47	46	8	6	0	0	55	52
Nagaland	52	52	13	7	0	0	65	59
Tripura	39	35	4	5	0	0	53	40

The Sub-committee noted as above.

FOLLOW UP ACTION

C.1 Synchronization of Pallatana Module -I

During 79th OCC meeting, AGM, NERLDC informed that OTPC had synchronized their machine and generated around 30 MW during Durga Puja which was of great help to NER grid during puja.

During 79th OCC meeting, GM, OTPC had informed that to ensure capability of plant and various equipment, auxiliaries & ancillaries associated with Block-1 / Unit-1 of Pallatana Generating station, trial operation is required with increase of loads in steps as per schedule and after unit stabilization run, machine needs to be run at full / base load and the continuous run of unit for minimum period of 72 hours is required for declaration of COD. SE(Com) informed that for declaration of COD, the running of machine continuously for 72 Hrs is not a mandatory requirement. But as per PPA of OTPC with the constituent states of NER, each block/unit is to operate seventy two (72) consecutive hours at or above 95% of the contracted capacity. OTPC had informed that after running of Block-1 continuously for 72hrs. at full / base load, the machine could be run at reduced load for fifteen (15) days. The running of Unit at full / base load is required to demonstrate gross generation, heat rate, auxiliary consumption, and NOX level including capability & reliability of various equipment, auxiliaries, ancillaries and associated control and protection system.

AGM, NERLDC stated that all tests required for commissioning of Pallatana U#1 will be facilitated by NERLDC as agreed in previous OCC meetings but the commercial issues with the stake holders i.e. NEEPCO/NHPC/Tripura have to be settled by OTPC.

POWERGRID informed that 400 kV Silchar- Pallatana-II tripped number of times on 07/11/12 on overvoltage due to some problem at OTPC end, the same needs to be checked.

OTPC informed that the investigation is going on and it will be rectified soon.

NERLDC also informed that as per the previous decision in OCC meeting all constituents had agreed for 72 hours of continuous run of Palltana U#1 at full load (i.e. 300 MW). For evacuation of full generation of Pallatana U#1, Tripura, Assam, NEEPCo and NHPC have to back down their generation. Therefore, if OTPC requires continuous load more than 72 hours (3 days), all constituents should agree for such transaction and the commercial issues also needs to be resolved beforehand.

NERPC had given a presentation on the commercial implication of backing down of generation by NHPC, NEEPCO, Tripura, and Mizoram due to injection of generation by Unit-1 of Pallatana taking into account the previous load flow study on case to case basis.

Assam stated that backing down of generation may be allowed, but frequent ramping up/down of generation is not desirable as it may lead to cascading effect resulting in a grid disturbance. Further they stated that the generation status at Pallatana should be integrated with the SCADA system of all SLDCs.

Tripura also stated that the commercial implication should be settled beforehand.

NEEPCO also informed that for running of Unit-1 for more than 72 hours, prior approval from their management would be required. NEEPCO requested for steady injection of power for the whole day to manage their gas supply. OTPC informed that it is difficult to maintain steady injection of power to the grid during trial operation.

OTPC informed that since all constituents are not agreeing for full load generation for 15 days, reduced generation of 250-280MW may be allowed after continuous run of Unit-1 for 72 hrs. at full / base load.

During discussion POWERGRID was requested to inform the committee about the present status of 400kV Silchar – Byrnihat line and the 400kV substation at Byrnihat. Committee requested for commissioning of line and substation by the end of November 2012. But POWERGRID informed that it is difficult to commission the GIS substation before December 2012.

In the 79th OCC meeting, after detailed deliberation the committee reiterated its earlier decision to allow continuous run of the Unit-1 for 72 hours at full load. Further OTPC should furnish its schedule at least 48Hrs beforehand to enable all the stake holders to carry out proper planning. However, the commercial matter regarding running of Unit-1 beyond 72 hours at full / reduced load needs to be discussed in commercial committee and NERPC meeting to settle the commercial implications.

During 80th OCC meeting, Committee requested POWERGRID to inform the house about the status of 400kV Silchar – Byrnihat line and the 400kV substation at Byrnihat. POWERGRID informed the committee that the stringing work of 400kV Silchar – Byrnihat line is under progress and is likely to be completed by January, 2013. Regarding 400kV GIS substation at Byrnihat it was informed that Reactor oil filteration is in progress and one transformer has also reached the site. The pre-commissioning tests will be completed as early as possible. The commissioning of 400kV GIS cannot be completed before January, 2013 although most of the erection commissioning activities on 220kV side will be completed by December, 2012.

GM (Plant), OTPC informed that synchronization of Unit -1 would be done again on 14.12.12 for further tests and COD and submitted the schedule to NERLDC. The committee deliberated the generation schedule of OTPC Pallatana w.e.f. 14.12.12 and after detail discussion it was decided that:

i) On 14.12.12 OTPC should synchronize Unit-1 before Peak Hours (i.e. 17:00 Hrs) and the generation should be in the range of 50 to 80 MW so that it will help NER grid during Peak hours and moreover, start-up power should be drawn from the Grid during off-peak hours, which will help the TSECL system. Afterwards the load may be increased gradually.
ii) On 15.12.12 OTPC should plan to generate about 300 MW (for 2 hours) during Peak hours so that such quantum of generation can be easily accommodated.
iii) From 15.12.12 to 24.12.12 OTPC should generate around 230 to 250 MW continuously. However, the generation needs to be rescheduled, if required, depending on real time grid conditions and as per the advice of NERLDC.

iv) If OTPC's generation would be found to be stable, then generation of 230 to 250 MW can be continued further till 02.01.2013 to support the grid during Christmas and New Year eve.

v) From 03.01.2013 onwards, OTPC may plan for generation of 363 MW (full load/base load) continuously for 72 hours in consultation with NERLDC.

During 81st OCC meeting, the Sub-committee enquired about the status of commissioning of Unit#2 of GBPP at Palatana from OTPC and also the status of the ATS from POWERGRID.

OTPC informed that the commissioning schedule of Pallatana U#2 is May/June, 2013. Further, OTPC requested to facilitate for following schedule of generation.

i) Generation of 300 MW for 4-5 hours on 11.01.2013 for DLN testing
ii) Continuous Generation of 250 MW for seven (7) days for trial operation.
iii) Generation of 360 MW for three (3) days to meet the requirement of COD.

POWERGRID informed that the commissioning schedule of ATS is as follow:

a) 400 kV Silchar –Byrnihat Transmission line – By end of January, 2013
b) 400 kV GIS Byrnihat S/S- By end of January, 2013
c) 400 kV Byrnihat – Bongaigaon Transmission line –By May/June, 2013.

TSECL and Assam representatives requested NERLDC not to issue ATC violation message as States were overdrawing continuously to match the load requirement with generation from OTPC. They also requested for some action to avoid UI drawl at higher rate as it effects commercially.

After detailed deliberation the committee decided that:

i) On 11.01.2013 OTPC will inject 300 MW for five (5) hours during peak hours to perform the DLN testing.

ii) Subsequently generation of OTPC will be restricted to 250 MW during peak hours and 150 MW during off-peak hours till 400 kV Byrnihat S/S and 400 kV Silchar –Byrnihat line is commissioned.

iii) However, in case of any contingency, OTPC will have to back down generation as per advice of NERLDC.

Deliberation of the Committee

GM (Plant), OTPC informed that DLN tuning in PPM mode has been completed for generating Unit#1 at Palatana. But the DLN tuning in PM mode is yet to be done. For DLN tuning in PM mode, load of about 300MW would be required and after DLN tuning, load of about 250 MW is required continuously for further trial run of the machine.

POWERGRID was requested to intimate the status of commissioning transmission system associated with evacuation of power from generating units of OTPC at Pallatana and NTPC at Bongaigaon. POWERGRID informed that the status of transmission system is as below:

i) 400 kV Silchar –Byrnihat Transmission line – By February 15, 2013
ii) 400 kV GIS Byrnihat S/S- Charged on January 5, 2013.
iii) 400 kV Byrnihat – Bongaigaon Transmission line – By June, 2013.

NERLDC presented the recent trippings and shut down programme of OTPC generating unit during trail operation. The committee requested OTPC to stabilize their machine as the records of NERLDC shows the machine is not stable and it is tripping during trial operation and shut down is being taken now and then. Since the NER grid may not be able to survive in case of tripping of generating unit of such capacity (363MW) as it may lead to cascade trippings. The machine should be stabilized before going for trial run with full generation.

After detailed deliberation the committee has decided as follows:

i) The generating Unit#1 of OTPC should be stabilized as tripping of the machine at full load may cause grid disturbance.
ii) Because of election in the state of Tripura on February 14, 2013, trail operation of machine with full generation may be deferred till 400 kV Silchar-Byrnihat line is ready in order to avoid interruption of power supply.
iii) The commissioning of 400 kV Silchar-Byrnihat line is expected by January15, 2013 and trial run of OTPC machine with full generation can be carried out after 15th February, 2013.

The Sub-committee noted as above.

C.2 Independent third party audit of protection system and self-certification in respect of operationalisation of Under Frequency Relay (UFR) and df/dt relay

The Chairperson, CEA vide his D.O letter No. 7/AI/GD/GM/2012/397-407, addressed to Hon'ble Chairperson, NERPC had requested for completion of independent third party audit of protection system and to ensure operationalisation of Under Frequency Relay (UFR) and df/dt relay based automatic load shedding within one month. In response to above letter NERPC vide letter No. NERPC/OP/OCC/2012/5687-702 had circulated extract of CEA & CERC regulation and some formats, with typical example (which can be downloaded from NERPC website), to help in collecting various information. No. of groups need to be formed to carry out the protection audit. The action plan needs to be discussed so that the work can be completed as early as possible.

However, the self-certification (by STUs / CTU) in respect of operationalisation of Under Frequency Relay (UFR) and df/dt relay based automatic load shedding may please be submitted in the prescribed format to NERPC and CEA at the earliest.

During 79th OCC meeting, SE (Comml), NERPC informed that as recommended by Enquiry Committee, the third party independent audit for the Protection systems in NER is to be completed as early as possible and presently Ministry of Power and CEA are also monitoring the progress in various regions it very closely. Therefore, for the benefit of the NER, the upgradation of protection system is very much required for smooth and reliable operation of grid and action should be initiated at the earliest. Further, he informed that third party independent audit of Protection systems for Northern region has already been completed by PGCIL in association with CPRI and other regions have also started their action plan. He informed that in NER there are about 135 Nos. of substations/ generating stations of 132kV and above voltage class and also proposed to carryout protection audit for all these substations / generating stations as 132kV system forms the backbone of NER unlike other regions. Since arrangement of funds is the major constraint in NE region, small groups /teams have to be formed taking representation from NER constituents. The committee decided to form teams comprising of four (4) members from different state utilities/owner, PGCIL/NEEPCO/NHPC and NERPC/NERLDC. NERPC will co-ordinate the audit and prepare the further course of action in consultation with NERLDC and POWERGRID. The nominated member of NERPC/NERLDC will be the co-ordinator of each group.

Further, NERPC, in consultation with POWERGRID and NERLDC, had prepared the detailed plan for carrying out the audit of protection system of all 132 kV and above voltage class substations/generating stations in NER. NERPC vide letter dated 26th November, 2012 and 30th November, 2012 had requested PGCIL and other constituents to provide logistic support inform of road transport and stay at various places in NER.

During 80th OCC meeting, Member Secretary I/C, NERPC informed that ED, POWERGRID has agreed to provide required support for carrying out the audit of protection system. He also informed that the protection audit for Tripura is likely to be completed before Christmas and from second week of January, 2013, other teams will proceed for the audit and entire audit is likely to be completed by February, 2013. Further, he requested all the constituents to nominate their representatives for the audit.

Assam submitted their nominations for audit team. Other constituents agreed to nominate their persons for audit team. After detail deliberation all the constituents agreed to the proposed dates and to extend their supports to complete the audit in time bound manner.

During 81st OCC meeting, MS I/C informed that Protection Audit of most of the substations/generating stations in the state of Tripura had been completed. He requested all the constituents to extend their supports to complete the audit by February 2013 as per Schedule.

The Committee reviewed the status of the Protection Audit and requested each Audit team to prepare a report on findings / observations pertaining to various substations / generating stations audited by them.

MS I/C, NERPC informed that as per the planning out of nine (9) routes identified the audit of protection system pertaining to route no. 1, 4, 6, 7 and 8 have been completed and presently audit in respect of route no. 2 and 5 is going on which will be completed by 11th February, 2013. These routes cover most of the 400/220/132kV Sub-Stations and Generating stations in Ar. Pradesh, Assam, Manipur, Mizoram, Nagaland and Tripura. The audit of rest of two (2) routes (route no. 3 and 9) will commence from 11th February, 2013. Further, he stated that as on date protection audit in respect of about 100 substations / generating stations has been completed and rest of the work is likely to be completed by February, 2013.

After completion of protection audit, the deficiencies in the NER system will be highlighted and discussed in OCC/PCC meetings. The course of action and time frame of implementation of recommendations of protection audit will be planned accordingly. The report on Protection audit along with recommendations will be submitted by March, 2013.

The Sub-committee noted as above.

C.3 Details of Installations and self-certification (by STUs and CTUs) in respect of operationalisation of Under Frequency Relays (UFRs) in NER systems and additional requirement of UFR and df/dt relays:

During 79th OCC, Manipur had informed that the UFRs have been installed on 33 kV Yurembum-Limukhong radial feeder as advised by the committee. In the process installation of all UFRs in the NER has been completed as per earlier decision of the committee. Further all constituents (STUs and CTUs) were requested to furnish the relevant information in the format prescribed by CEA. It was also discussed that the requirement of UFR and df/dt relays need to be reviewed based on the recommendation of the enquiry Committee constituted by the Ministry of Power headed by Chairperson CEA.

During 80th OCC meeting, MS (I/C) informed that after the grid disturbance, the Ministry of Power and CEA are closely monitoring the progress in implementation of recommendations of Enquiry Committee. CEA is also asking the operation details of UFRs every now and then. Therefore, all constituents are requested to submit the requisite data at the earliest. Constituents, who have not submitted the required information, have agreed to submit the same at the earliest. Further, he informed that the frequency band has been tightened further by CERC to 49.7 to 50.2, therefore the frequency settings and load relief is further required to be reviewed.

During the 81st OCC meeting, NERLDC informed that the Committee for Security of grid constituted by Ministry of Power has revised the quantum of under frequency based load shedding at various frequency bands. Therefore, the under frequency based load shedding in respect of NER needs to be reviewed.

The Committee requested NERPC to finalize the UFR based load shedding in consultation with NERLDC. However, for finalization of UFR based load shedding, further detailed discussion would be required.

During the 82nd OCC meeting, SE (O), NERPC enquired from constituents whether the UFRs installed in the region have operated during the recent grid disturbances occurred on 14.12.2012 & 20.01.2013. He requested all the constituents to furnish the details of UFR operation. All constituents agreed.

As per clause no. 5.2(n) of IEGC, utilities are to submit UFR operation report on monthly basis to RPC. All constituent states are requested to inform the committee about the operation of UFR since its commissioning, particularly during grid disturbances, which is being monitored strictly by CEA/MoP after the grid disturbances on 30th & 31st July, 2012. The UFR operation detail may please be furnished to RLDC and NERPC as per format circulated.

All constituents agreed to submit the data in the prescribed format.

The Committee also suggested that if UFR operation can be linked to annunciation on control panel, then operation of UFR can be easily recorded.

The Sub-committee noted as above.

C.4 Lines under long outages

During 80th OCC meeting, the status of lines which are under long outages as given below were reiterated

(a) 220kV BTPS – Agia (one ckt) since Novemeber, 1997
(b) 132kV Mariani – Mokokchung since April, 2008.
(c) 39km of 132kV Rengpang – Jirbam since October, 2002
(d) 132 kV Dimapur-Dimapur-II

Assam representatives informed about 220 kV BTPS-Agia- II that it is under stringing stage and it was delayed as the tender was terminated because contractor cannot complete the said job in time. The new tendering is in progress and it will be completed at the earliest. Regarding Mariani-Mokokchung line the Assam side is ready; the Nagaland side is required to be checked.

Regarding 132 kV Rengpang-Jiribam line the Manipur representatives informed that the work is in progress and the same will be completed by January, 2013.

Further, NERLDC informed that the Dimapur-Dimapur-II is also under long outage.

The committee requested NERPC to take up the matter with the concerned State for early restoration of these lines for better grid operation.

During the 81st OCC meeting, Assam informed that 220 kV BTPS-Agia will be restored by September, 2013.

Manipur informed that commissioning of 132 kV Rengpang-Jiribam line will be completed by January, 2013.

The Committee requested NERPC to take up the matter with Nagaland.

In response to NERPC's letter dated 14-12-2012, CE, Nagaland, vide his letter dated 21st January 2013, have informed that the portion of 132kV Mokokchung – Mariani line (under the jurisdiction of Nagaland) has been kept charged at 33kV and can be charged at 132kV at any point of time provided portion of line in Assam is ready. With regard to 132kV Dimapur (PG) – Dimapur (N), in a joint meeting on 16-01-13, it has been decided that POWERGRID, Dimapur will discuss the matter regarding operation procedure with DoP, Nagaland.

The status as reviewed in the meeting are as under:

(a) 220kV BTPS – Agia (one ckt) – Assam informed that the tender has been opened and same is under technical evaluation.
(b) 132kV Mariani – Mokokchung –Assam and Nagaland to co-ordinate and bring back the line by February, 2013.
(c) 39km of 132kV Rengpang – Jirbam – Manipur informed that stringing for 5 km section is left out and the same is likely to be completed by February 2013.
(d) 132 kV Dimapur-Dimapur-II – POWERGRID to co-ordinate with Nagaland and discuss operation issues before election (i.e. 23.02.2013)

The Sub-committee noted as above.

C.5 SPS scheme for Pallatana

It was observed from load flow studies carried out by NERLDC that tripping of Pallatana unit during peak hours would cause loading of Kopili ICT (160 MVA). To save the situation shedding of around 100 MW of load would be required in the 132 KV pocket through SPS.

During 76th OCC meeting, DGM, NERLDC had informed that a special protection scheme is required to be planned for shedding the above load. The committee advised NERPC Secretariat to design the SPS in consultation with NERLDC, Assam, Meghalaya, Tripura, NEEPCO, NHPC and OTPC.

POWERGRID representatives had informed that not only SPS but protection schemes are also required to be reviewed before commissioning of Pallatana GBPP. From the load flow study it was observed that in certain lines there will be reverse flow of power due to tripping of Pallatana.

The committee had requested POWERGRID to study the protection schemes and prepare a report. The same will be discussed in the next OCC meeting.

During 77th OCC meeting, DGM, NERLDC stated that in case of tripping of Pallatana unit, around 120 MW load shedding through SPS would be required in Mizoram, Tripura and South Assam (each 40 MW) and some load shedding would be required in Meghalaya. POWERGRID informed that the implementation of SPS for tripping of far off lines/loads will be difficult as there will be co-ordination problem because of non-availability of communication links and NERLDC should find some other nearby lines or SPS can be linked with Kopili ICT. NERLDC informed that they have identified the list of radial lines in NER system for disconnecting during emergency conditions to save the grid. They pointed out that the SPS can be implemented on those lines which are available in 132 kV Pocket. All the constituents agreed for implementation of SPS on these lines and also for emergency disconnection of listed lines in case of necessity.

The committee felt that the SPS scheme is required to be in place at least before the synchronization of Pallatana unit. After detailed deliberation committee requested NERLDC to prepare the SPS scheme of Pallatana in consultation with NERPC and POWERGRID.

During 79th OCC meeting, NERLDC informed that lines have been identified in NER system for disconnection during emergency conditions to save the grid. SPS can be planned accordingly. The committee requested NERLDC to give the list of lines associated with tripping of Unit-1 at Pallatana and POWERGRID was requested to plan the implementation of the SPS scheme.

During 80th OCC meeting, the committee felt that NERPC, NERLDC and POWERGRID may discuss the matter and plan accordingly for implementation of SPS scheme.

NERLDC gave a presentation on grid security for tripping of i) 400 kV Silchar-Killing (Byrnihat) line and ii) Palatana Units. The handout of the slides is enclosed at **Annexure- C.5**.

After detailed deliberation the committee recommended to form a sub-committee for planning of load shedding and implementation of the scheme. The committee should comprise of representatives from NERPC, NERLDC, POWERGRID, OTPC, Assam, Meghalaya, Tripura, NEEPCO and other beneficiaries of Palatana viz. Manipur, Mizoram, Nagaland and Ar. Pradesh may also join the sub-committee, if required.

The Sub-committee noted as above.

C.6 Implementation of islanding scheme in NER

For survival of different parts/pockets (with identified generation along with some load) of NER grid in the event of grid disturbance, islanding schemes are required to be planned properly & implemented.

DGM, NERLDC stated that some islanding schemes need to be planned so that the islands survive during any grid disturbance so that start-up power can be extended to other generating stations.

During 77th OCC meeting, the islanding scheme for NER was discussed in detail for separating of NER system from NEW grid and forming of islands in NER. Two proposals for islanding scheme were discussed.

In both proposals, first step is isolation of NER from NEW Grid at a particular frequency by tripping of 400kV D/C line and 220kV D/C line connecting ER and NER. In one case it has been proposed for formation of two Sustainable Small System (SSS) and then Unit islanding and ultimately Safe shutdown of Generating units when frequency falls to different levels. The frequency level at which actions are to be initiated is to be finalized after discussion.

The Committee requested all the constituents to study the islanding schemes and communicate their comments/suggestions at the earliest so that the islanding scheme for NER can be finalized.

Further, DGM, NERLDC informed that the list of radial lines in NER system, which can be tripped during emergency to save the grid, have been identified. During emergency there may not be time to co-ordinate with SLDC (like written message etc.) before taking such action. However, formal communication shall be made by NERLDC afterwards.

During 79th OCC meeting, the committee felt that further study is required before finalizing the islanding scheme for NER. The committee requested all the NER constituents to study their systems and give suggestions/comments, if any before finalization of the same. All constituents agreed.

During 80th OCC meeting, MS I/C stated that the frequency level at which actions are to be initiated, location of UFR & df/dt relays and communication link required etc. needs to be studied for implementation of islanding scheme. The committee suggested that NERPC, NERLDC and POWERGRID may discuss and plan accordingly for implementation.

MS (I/C) informed that as per the minutes of the second meeting of Task Force for Power System Analysis Under Contingencies under the Chairmanship of ex-Member (PS), CEA, the number of small islands may not be the optimum solution. Further, he informed that as NER grid is a small grid, so the Task force may consider NER as a single island. Therefore, few numbers of island scheme for NER grid should be considered to avoid operational difficulty.

SE(O), NERPC suggested that NER system may be divided into two islands, however, further studies and discussion would be required for finalizing the scheme.

GM, NERLDC also stated that further studies are required for planning and implementation of the scheme.

The committee requested NERLDC and NERPC to study the system and prepare final islanding scheme requiring minimum number of line opening and keeping in view the system operation as well as implementation aspects.

The Sub-committee noted as above.

C.7 Loadability Enhancement of 132KV Transmission lines

NERLDC has requested POWERGRID, vide their letter No.NERLDC/GM/547 dtd 14.11.2012 for enhancement of loading capacity of the following lines:

a) 132KV S/c Badarpur-Khliehriat Line
b) 132KV S/c Loktak-Jiribam-II Line
c) 132KV S/c Dimapur-Imphal Line
d) 132KV S/c Imphal-Loktak-II Line

NERLDC has stated that enhancement of loading capacity of the above lines is required for higher load dispatch, particularly in the context of evacuation of power from Pallatana GBPP.

Accordingly, POWERGRID has already taken the following actions for increased loadability:

Upgradation of existing CTs

Upgradation of the terminal CTs of 132KV S/C Loktak-Jiribam_II line, 132KV S/c Dimapur-Imphal line is being taken up by POWERGRID for which the required number of CTs of higher capacity (600/1) had already been ordered by POWERGRID & subsequently dispatched from the manufacturer premises in the month of July-12. However, 10Nos. CTs were damaged during transit. The matter has been taken up with the concerned manufacturer for replenishment of the damaged CTs. The new CTs expected to arrive at site by January'13.

Installation of the same shall be carried out on arrival of the new CTs. As for 132KV Badarpur-Khliehriat line, the terminal CTs installed are of 600/1 capacity.

During 80th OCC meeting, NERLDC requested to include following lines for enhancement of loading capacity:

i) 132 kV Khandong- Khlerehiet –I
ii) 132 kV Khandong - Haflong

The committee requested POWERGRID to complete the CT replacement of the above lines at the earliest to increase the loadability of these lines.

During 81st OCC meeting POWERGRID informed that the Khandong end CTs are having ratio of 300/1 which belongs to NEEPCO. The committee requested NEEPCO to replace the CTs with higher ratio depending on system requirement at the earliest.

The committee requested NERPC Secretariat to write a letter to NEEPCO regarding replacement of above CTs at the earliest.

Fixing of Additional Jumpers:

Fixing of additional jumpers at Tension Locations of 132KV Dimapur-Imphal line has been completed while that for 132KV Jiribam-Loktak_II line is planned for execution in the month of January-13.

In addition to the above, additional jumpering is now planned to be taken up for 132KV Loktak-Imphal-II & Badarpur-Khliehriat lines in line with NERLDC's observation.

The required Special Connectors/Clamps for the purpose are under procurement by POWERGRID. A tentative schedule for execution of Additional Jumpering Works in the subject lines is appended below:

Sl. No.	Name of Line	No. of Tension Locations for Additional Jumpering	Proposed schedule
1	132KV Loktak-Imphal- II	38 Loc.	10th February'13 to 20th Feb'13
2	132KV Badarpur-Khliehriat	176 Loc.	25th Feb'13 to 10th Mar'13

POWERGRID shall accordingly propose for the required daytime shutdown of the respective lines in the preceding OCC Meetings

Constituents agreed to support POWERGRID for carrying out the modification required for the lines. The committee requested POWERGRID to plan for additional jumpering.

The committee requested POWERGRID to plan for the above work.

D. N E W I T E M S

D.1 Proforma for Operational Statistics

The operational Statistics as given below was not furnished in the meeting.

(i) – Schedule Vs Actual Generation.

(ii) – Peak Demand: Schedule Vs Actual.

(iii) – Integrated Operation of the system.

(iv) – Details of DC, schedules and injections from Central sector stations, drawal schedules and entitlements of constituents.

(v) – Details of major reservoirs in NER.

The operational statics were shown in the presentation by NERLDC.

The Sub-committee noted as above.

D.2 State-wise anticipated peak demand/requirement, shortage for February-June, 2013.

The sub-Committee reviewed & finalized the anticipated peak demand/energy requirement/Availability (without Pallatana generation) for the months of February to June-2013.

A. Peak Demand

S.No.	State	Peak Demand (MW) Feb' 13	Peak Demand (MW) Mar' 13	Peak Demand (MW) Apr' 13	Peak Demand (MW) May' 13	Peak Demand (MW) Jun' 13
1	Ar. Pradesh	105	105	105	110	110
2	Assam	1200	1210	1230	1250	1250
3	Manipur	105	105	100	110	110
4	Meghalaya	280	280	280	290	280
5	Mizoram	75	75	70	75	70
6	Nagaland	110	115	110	120	110
7	Tripura	240	230	230	240	230
	Region	2115	2120	2125	2195	2160

B. Peak Availability

S.No.	State	Peak Availability (MW) Feb' 13	Peak Availability (MW) Mar' 13	Peak Availability (MW) Apr' 13	Peak Availability (MW) May' 13	Peak Availability (MW) Jun' 13
1	Ar. Pradesh	80	75	70	65	65
2	Assam	950	920	900	850	825
3	Manipur	80	75	70	70	70
4	Meghalaya	190	180	175	170	165
5	Mizoram	60	55	50	45	45
6	Nagaland	85	75	75	75	65
7	Tripura	155	145	140	130	120
	Region	1600	1525	1480	1405	1355

The Committee noted as above.

D.3 LGBR for 2013 -14

The LGBR for 2013 -14 for NE Region is required to be finalized. All the constituents are requested to submit the data for preparation of LGBR at the earliest as per the proforma circulated. The formats are also available in NERPC website (www.nerpc.nic.in) and cover the outage planning for Generating units as well as important transmission elements in state and central sector.

All utilities agreed to submit the data by February, 2013.

The Committee noted as above.

D.4 Grid Security Expert System (GSES)

Subsequent to the recent Grid Disturbance of 30th and 31st July 2012, a meeting was held on 06th August 2012 between Union Power Minister of India with Chief Ministers/Power Ministers of States of Northern Region and a 12 point resolution was drawn to ensure that such type of incidents do not occur in future. The points pertaining to defence plans are as follows:-

Point No. 1: Adequate defence plans and protection system shall be put in place to ensure integrated operation of the National/ Regional Grids in adherence with the Indian Electricity Grid Code [IEGC]. All the states shall ascertain preparedness of power system defence plans and cooperate at the Regional level for coordinating their Protection systems.

Point No. 2: Defence plans of the states must include islanding schemes, under frequency relays, rate of change of frequency relays, special protection schemes and automatic demand management schemes. The defence plans shall also include restoration procedures that shall be updated and reviewed regularly.

Point No. 11: POSOCO would evolve a contingency load shedding protocol, especially when non frequency related load shedding is required."

Further CERC in the order of petition number 125/MP/2012 for Northern Region on the subject of " Effective Proper load management by Northern region Constituents and curbing overdrawl" has directed as follows:-

"NRLDC is directed to identify in consultation with the CTU, CEA,STUs and SLDCs the feeders in the State network which are incidental to the inter-State transmission of electricity which can be opened in case of sustained overdrawal from the grid or any other imminent danger to the grid. It also emerged during the hearing that the identified feeders can be disconnected and restored centrally through the SCADA network."

Accordingly POSOCO prepared a template for ten numbers of scenarios when the power system would be under stress along with the substation and feeder details. The same was communicated by POSOCO vide letter dated 11th September 2012 to CEA with a copy to POWERGRID/RPCs/CERC for automated defense plan for all five regions. (Summary of the scheme is attached at **Annexure – D.4 (I)**.

Based on the above inputs, POWERGRID has planned an automated defense plan for all five regions named as Grid Security Expert System (GSES). The brief detail of the GSES system is enclosed at **Annexure – D. 4 (II)**.

The implementation of the above scheme has been proposed through following projects:-

(i) ***GSES system****: This would involve the installation of relays, PLCs etc at Substation/Generating station level and advance GSES Software at all SLDCs and RLDC. The list of feeders where the relays shall be put has been proposed by RLDC and is proposed to be monitored in the Centralized GSES system at SLDCs. The logics for operation of the above relays shall be finalized by RLDC/RPC in consultation with SLDCs. As per this plan, the automated feeder disconnection has been proposed at 125 No. Substations in North-Eastern Region.*

(ii) ***Communication System for GSES system****:- This would require dedicated and reliable communication system. Accordingly Fiber Optic based Communication from Substations to SLDCs/RLDC has been proposed.*

The communication system for GSES system shall have to be reliable, dedicated and fully secure system. Further, the system shall have to be monitored and operated in real time and hence a fast and dedicated communication network based on fiber optics would be required. The Detailed Project Report for the Fiber Optic based communication for GSES system has been prepared separately.

The Region wise estimated cost based on the feeders identified by POSOCO including IDC shall be as follows:

S.N	Subject	NR	SR	WR	ER	NER	All India
1.	Estimated DPR cost of GSES (in Rs. Crores)	82.59	42.13	124.85	55.42	49.47	354.46
2.	Number of Feeders	1064	763	1502	503	410	4242
3.	Estimated DPR cost of OPGW based communication system (in Rs. Crores)	141.61	368.37	174.24	83.18	80.42	847.82
4.	Length of OPGW	4967	14706	6111	2868	2688	31340
	Total Estimated cost (in Rs. Crores)	**224.20**	**410.50**	**299.09**	**138.60**	**129.89**	**1202.30**

It may be mentioned that the actual quantity may vary during implementation depending upon the number of feeders and substations included in the project.

After detail deliberation the committee requested POWERGRID to come with more details of the scheme before finalization of the scheme.

The Committee referred to Special TCC for discussion.

D.5 Implementation of state of art PABX system

During the recent grid disturbance, operators at control center faced many problems in voice communication with other control centers and important stations due to non-availability of fast dialing, easy directory sorting and inter-regional voice connectivity etc. which consequently delayed the grid restoration process. Considering this, POWERGRID has proposed to install state of the art PABX system at all SLDCs, RLDCs and NLDC of the country with features such as computerized touch screen dialing, directory sorting, voice recording system etc. The proposal for implementation of state of art PABX system for NLDC/NERLDC & all SLDCs of North-Eastern region under the additional Fiber Optic Project requirements for central Sector of North Eastern Region was deliberated in 16th UCC meeting. The NIT for this requirement has already been floated and bids are under evaluation. This requirement is being included in the Additional Fiber Optic requirements for Central Sector project of North-Eastern Region approved by 12th NERPC meeting.

After detailed deliberations all constituents agreed to the proposal of POWERGRID for installation of state of the art PABX system.

The Sub-committee endorsed the decision to Special TCC.

D.6 Expansion and Up-gradation of SCADA/EMS system at NERLDC & SLDCs of North Eastern Region

In the 13th NERPC meeting held on 10th July 2012 at Faridabad, POWERGRID proposed to implement the Project of Up-gradation/ Expansion of SCADA/EMS system for SLDCs except Assam under the existing commercial agreement of ULDC and the tariff to be recovered as determined by CERC. NERPC/TCC agreed for the above proposal, however, the NERPC Committee also suggested to approach the DoNER/ NEC, Govt. of India for funding. Accordingly POWERGRID vide letter dated 13.09.12 intimated to the NER constituents that POWERGRID is moving ahead with the implementation of the above project in line with the approval of NERPC

and the same shall be included in the existing commercial agreement already signed by the constituents and the tariff for the same as determined by CERC shall be payable by the NER constituents.

Subsequently, Assam Electricity Grid Corporation Limited (AEGCL) vide their letter ADB/ASEB/CE/TT/BID/Tech-2201/Part-XI/2011/52 dated 15th Sept' 2012 has also requested for inclusion of their portion in the above project. Accordingly BOQ for AEGCL portion was finalized in the meeting held at POWERGRID, Gurgaon office on 16th October 2012. Further, AEGCL vide their letter dated 12th November 2012 requested NERPC for suitable amendment in the resolution of RPC/TCC meeting for inclusion of scope for AEGCL. AEGCL has also confirmed vide letter MD/AEGCL/SLDC-PGCIL/2012 dated 01st December 2012 that Up-gradation of existing SCADA/EMS system of Assam SLDC Shall be part of the existing Commercial Agreement Signed between Assam and POWERGRID under ULDC project and the tariff shall be determined by CERC.

The issue was deliberated in the 16th UCC MEETING held on 11th December 2012 at Guwahati and the Finalized BOQ was circulated.

The tenders are under evaluation and Award is likely to be placed by January 2013.

The representatives from Assam stated that the final BOQ for the scheme is yet to be circulated; the same may be submitted to Assam for examination.

The Committee referred to Special TCC.

D.7 Unified Real Time Dynamic State Measurement (URTDSM) Scheme

With the growing dimension of Indian Power System and consequent manifold increase in complexities of integrated grid operation in new regime of open electricity market and increasing variability of non-conventional energy outputs, need of fast and reliable synchronous measurement and monitoring system is being felt for effective planning of system and for reliable, secured and economical system operation of such geographically spread Power network on real time basis. Application of synchrophasor technology for Wide Area measurement/Monitoring

(WAMS) in Indian Power System has been proposed as "Unified Real Time Dynamic State Measurement" (URTDSM) scheme. This technology has capability of measuring & monitoring the system on real time, which would be helpful in better visualization of the system and utilization of existing transmission assets with reliability, security and economy. The scheme covers placement of Phasor Measurement Units (PMUs) at sub-stations and both ends of transmission lines at 400 kV and above voltage level including generating stations at 220 kV level of STU, ISTS & IPP coming up by 2014-15 time frame. The scheme will be implemented in two stages. In the stage-I PMUs will be placed at those locations where fiber optic communication link is either available or would be made available under microwave frequency vacating program and regional strengthening program by 2014-15 along with installation of PDCs at all SLDCs, RLDCs, NLDC, NTAMC, strategic locations in state, remote consoles at RPCs, CEA, CTU and other locations. In stage-II PMUs would be installed at balance locations along with communications links.

The scheme was discussed and finalized in the Joint Meeting of all the five Regional Standing Committees on Power System Planning held on 05.03.12 wherein it was decided that in the Indian context, PMUs need to be installed in such a way that voltage phasor of each substation and current Phasor at both ends of each transmission line can be monitored to take care of redundancy in the event of outage of PMU, associated communication link etc. for wide area measurement and control. Experience of WAMS pilot project already implemented in Northern Region with PMU located at nine(9) locations was shared and benefit by way of preventive actions in advance based on synchrophasor measurements to avoid large scale disturbance and operation of the system in a more reliable manner was deliberated. Pilot Project in Northern Region has helped system operation on real time, protection co-ordination, disturbance analysis etc. It has helped in improving situational awareness by tracking the phase-angle separation, df/dt, voltage phasors and line loadings. With PMU data it has also become possible to identify the line tripping, generator tripping, inter area oscillations, load crash & auto-reclosure of lines. The archived PMU data has helped in the analysis of grid events, validation of protection schemes and validation of transfer capability through different flow gates.

In addition, possible utilization of PMU data through analytical software viz. supervised zone-3 blocking, dynamic (linear) state estimator, CVT parameter

validation, CT validation, angular stability, emergency control like frequency control, voltage instability, transient stability model validation etc. was also deliberated for development of analytics in parallel with implementation of the URTDSM scheme, in association with premier academic institutions (like IITs).

It was agreed that scheme shall be implemented as system strengthening and cost shall be added in the National transmission pool account and to be shared by all the Designated ISTS Customers (DICs) as per the POC mechanism under the CERC regulation. Estimated cost of the scheme is about Rs.650 Crore.

In NER, 40 numbers of sub-stations/generating stations (ISTS – 18 and STU – 22) and 164 number of feeders (ISTS – 95 and STU – 69) have been identified for installation of 86 number of PMUs (ISTS – 50 and STU – 36), 6 nos. of Master Phasor Data Concentrator (MPDC) and 2 nos. Super Phasor Data Concentrator (SPDC) in two phases at an estimated cost of Rs. 50.77 Crores (Phase – I = Rs. 24.23 Crores and Phase – II = Rs. 26.54 Crores). The details of installation of PMUs and PDCs in constituent states of NER are as follows:

North Eastern Region (PMU &PDC)									
NER – Phase I				**NER – Phase II**			**PDC**		
	S/S	feeder	PMU	S/S	feeder	PMU	Nodal PDC	MPDC	SPDC
Ar. Pr.	1	4	2	3	8	4	*	2	
Assam	4	20	11	10	27	14	0	2	
Tripura	0	0	0	1	2	1	*		
Megh.	0	0	0	2	6	3	*	2	
Naga	0	0	0	1	2	1	*		
Central	9	69	36	9	26	14			2
G. Total	**14**	**93**	**49**	**26**	**71**	**37**	**0**	**6**	**2**

The above issue has been taken up by NERPC with the constituents of NER and they have agreed in principle regarding implementation of the above scheme.

MS I/C, NERPC informed that written communication has been received from Assam, Tripura and Nagaland for in principle acceptance of the Scheme.

All constituents agreed to the proposal for better grid performance.

The Committee referred the matter to Special TCC.

D.8 Pollution mapping for North Eastern Region

In order to facilitate cost effective selection of insulators for transmission lines and minimizing the trippings of transmission lines due to insulator flash over, it is essential to have knowledge of the pollution severities. Inquiry Committee on Grid Disturbance in Northern Region on 2nd Jan' 2010, recommended POWERGRID to complete pollution mapping in association with CPRI. Transmission corridors of region are adversely affected due to heavy pollutants emitted by Industries / Costal Pollutants in the region. Proper mapping is necessary to develop a pollution profile of the region.

Pollution mapping of the region is proposed to be executed in association with CPRI using approach similar to the one adopted in Northern region.

- CPRI & POWERGRID shall provide training (including hands on training) to the associated engineers of POWERGRID & constituents (State Utilities) at suitable locations in the region and suggest the Guidelines/Procedures.
- Dummy insulator to be arranged & installed by POWERGRID and STUs on their transmission lines. Measurements shall be carried out three (03) times representing three seasons per year and shall repeat the same for next year also. (i.e. total 6 samples for two years)
- Initial samples shall be installed & measurement of Equivalent Salt Deposited Density (ESDD) & Non Soluble Deposited Density (NSDD) to be done under the supervision of CPRI. Subsequent measurements shall be carried out by officials of constituents.
- Chemical Analysis of selected samples shall be carried out by CPRI. The CPRI shall analyze the measurements / results of test carried out at site & laboratory and determine the pollution levels. Pollution map shall be produced on geographical map of region.

Funding:

- Expenditure on pollution mapping is to be reimbursed to POWERGRID directly from the beneficiaries as one time reimbursement. **Expected expenditure for the program is INR 3 Crores.**

The above methodology & funding mechanism for Pollution Mapping Program is similar to the one adopted for Northern Region and in line with the decision taken in 22nd NRPC & 66th OCC meeting.

The Committee referred the matter to Special TCC for discussion.

D.9 Ensuring FGMO/RGMO, AVR & PSS tuning for operation of units

In line with IEGC & other regulations the following aspects may be ensured while operation of generating units:

i. Operation of generators under Free Governor Mode of Operation (FGMO) or Restricted Governor Mode of Operation (RGMO).

ii. Operation of Generating Units within capability limits as per Capability Curves.

iii. Proper settings of Automatic Voltage Regulator (AVR) and

iv. Proper tuning of Power System Stabilizers.

The issue has gained significant importance in the aftermath of twin grid disturbances on 30th & 31st July, 2012. All concerned are requested to please attach maximum priority on this aspect and do the needful at the earliest. In this regard directions of Hon'ble CERC against Petition nos. 191/2011(Suo-motu) & 47-52/MP/2012 may please be referred.

During the 81st OCC meeting, the subcommittee had requested all generating companies and constituent states of the region to furnish status of implementation of RGMO.

The status of implementation of FGMO/RGMO & PSS is as given below:

Assam: Karbi Langpi HEP- The machines are very old (Manufactured in 1983) and there is no provision ~~of~~ for putting FGMO/RGMO.

MeECL: Umiam Stage-III- Extension has been requested from CERC for putting FGMO.

NEEPCO: RHEP- RGMO installed; Khandong/Kopili- Extension till March, 2014 has been requested from CERC.

NHPC: Loktak- Machines are under FGMO and RGMO will be installed by March, 2013.

NEEPCO informed that PSS has been tested for two units of Ranganadi HEP.

OTPC also informed that the Generating units are with PSS.

Meghalaya informed that for Umiam Stage III PSS has not been tested.

The Committee noted as above.

D.10 Generation Planning (ongoing and planned outages)

The daily availability for hydro stations was reviewed in the meeting as per the present water level of different reservoir which is as given below:

Khandong –	0.072 MU
Kopilli –	1.000 MU
Kopili- II-	0.072 MU
Ranganadi -	(subject to inflow)
Doyang –	0.165 MU
Loktak -	1.00 MU (After 25.02.13, 0.5 MU)

The shutdown proposal of NEEPCO/NHPC as approved by the committee is enclosed at **Annexure D.10**.

The Sub-committee noted as above.

D.11 Outage Planning Transmission elements

After detail discussion the sub-committee approved the shutdown proposal for February/March, 2013 as given in **Annexure – D.11.**

SE (O), NERPC requested NERTS to submit the Shutdown proposals by end of the preceding month so that it can be planned in better way for smooth grid operation and last minute change in shutdowns programme can be avoided. NERTS, POWERGRID agreed to intimate the list of shutdowns in advance.

The Sub-committee noted as above.

D.12 Estimated Transmission Availability Certificate (TAC) for the month of January, 2013.

The Estimated Transmission/System Availability for the month of January, 2013 furnished by PGCIL is **99.9765%** as per details at **Annexure D.12**. NER constituents were requested to give their comments and observations, if any, by 28th February, 2013 so that Final TAC for the month of January, 2013 can be issued.

The sub-Committee noted as above.

D.13 Major grid disturbances in the previous month (January, 2012)

As intimated by NERLDC, there was a major grid disturbance of category GD-V during the month of January, 2013 (on 20.01.13). The same was discussed in detail. The detail of occurrence is enclosed at **Annexure-D.13**.

The sub-Committee noted as above.

D.14 Assessment of Total Transfer Capability (TTC), Transmission Reliability Margin (TRM) and Availability Transfer Capability (ATC) by SLDC on respective Inter-state transmission corridor:

As per Clause No. 4.1 of 'Detailed Procedure for Relieving Congestion in Real Time Operation', SLDC shall assess TTC, TRM and ATC on it's inter-state transmission corridor considering a mesh intra-state corridor for import or export of power with the Inter-state Transmission system (ISTS).

SLDCs of NER are requested to assess the above on monthly basis, 5 months in advance (e.g: TTC/TRM/ATC for the month of November to be calculated by 15th of July), for further assessment of TTC, ATC and TRM of NER –ER corridor by NERLDC and for assessment of TTC / ATC for a group of control areas, individual control areas with the region and state-control-area to state-control-area by NERLDC, if required.

Power Utilities are requested to send the results of calculations along with assumptions and *.sav (PSS/E saved case format) files to NERLDC by 15th of the month.

During the 81st OCC meeting, the committee requested SLDCs to take initiatives for assessment of TTC, TRM, ATC for their inter-state transmission system.

NERLDC gave a presentation on the congestion of ER-NER corridor which is enclosed at **Annexure D.14**.

Assam Representatives stated that the criteria and methodology of calculation of TTC/ATC with typical example may be made available to the constituents so that they will be aware of the TTC calculations and they can calculate TTC/ATC for their own system / inter-regional/intra-regional transmission line.

NERLDC agreed to provide the details of criteria and methodology of calculations of ATC/TTC.

The sub-Committee noted as above.

D.15 Submission of Protection System Details:

With the commissioning of Palatana GBPP, NER Grid has become more complex. It is required to review relay settings (reach and time) of protection systems for generation and transmission elements for proper relay co-ordination. Power utilities of NER are requested to furnish relay setting details (for DP, OC, EF, REF, OV, Overflux, etc relays) for above purpose.

During the 81st OCC meeting, the committee felt that after the completion of protection audit, relay setting of protection systems for generation and transmission elements in the region would be available and settings etc. needs to be reviewed in PCC / OCC meeting for standardization.

NERLDC informed that for accurate ATC/TTC calculation they requires some of the protection settings of relays/CTs. So these data may be provided to NERLDC at the earliest.

The committee requested NERLDC to collect information data from the report of Protection Audit, which is scheduled to be over by February, 2013.

The sub-Committee noted as above.

D.16 Grid security in case tripping of 400 KV Silchar – Byrnihat line or tripping of Pallatana machine:

Design of SPS for disconnection of load in Tripura, Mizoram, Manipur, Meghalaya & South Assam in case tripping of 400 kV Silchar-Byrnihat Line or triping of Palatana Machine

During the 81st OCC meeting, the sub-committee had requested NERLDC for conceptualization of a 'SPS' to mitigate the problem associated with the outage of unit.

Refer to Item No. C.5.

D.17 Submission of Periodic data by power utilities of NER:

Formats for submission of periodic data by NER utilities are available at **NERLDC website** (http://www.nerldc.org/DocumentIndexNew.aspx). Power utilities of NER are requested to furnish these data periodically in time.

A list of data not yet furnished is attached along with.

All utilities agreed to submit the data to NERLDC.

The sub-Committee noted as above.

D.18 Availability and healthiness of DAS (Data Acquisition System), DR (Disturbance Recorder) and EL (Event Logger):

Availability of recording instruments are to be informed by the power utilities of NER. If these are not available, the same shall be provided as per clause no 4.6.3 of IEGC for recording of dynamic performance of the system. These data are to be furnished to NERLDC whenever there is major event in any part of NEW Grid.

MS I/C informed that these information will be available after the completion of Protection Audit of the NER. Based on the available information collected during protection audit course of action can be planned accordingly.

The sub-Committee noted as above.

D.19 Furnishing Specific Report/Data by power utilities of NER:

In addition to submission of periodic data by power utilities of NER, Specific Report/Data are also to be submitted within specified time for onward submission to MOP/CEA/CERC etc. for their requirement and for detailed investigation and analysis of major events within specified time.

All Constituents agreed to submit the data within specified time to NERLDC and NERPC for detailed investigation/analysis.

The sub-Committee noted as above.

D.20 Mock Black start exercise of ISGS stations as well as state sector generating stations of NER:

In line with the stipulations of IEGC clause 5.8(b) mock black start exercise of ISGS stations are being carried out every year. The exercise for RHEP & DHEP will be carried out in the last week of February, 2013. States, who are having own generation are also requested to carry out similar exercise.

During the 81st OCC meeting, the subcommittee had requested all generating companies (state & central sector) to provide details of the Mock Black start exercise of generating station (if carried out so far).

NEEPCO agreed to carry out the exercise as decided by NERLDC.

OTPC informed that they don't have adequate capacity of DG set to Black Start their machine.

The sub-Committee noted as above.

D.21 Empowering of SLDC:

It has been observed in many occasions that Shift-In-Charges available in control rooms of some SLDCs are not able to take decision in respect of curtailment of overdrawal, without the consent of superiors, despite of several requests from NERLDC. This practice should be avoided by empowering the Shift-In-Charges to take decisions on their own considering the grid condition.

Manipur and Nagaland- Have already empowered their shift-in-charge available in the control room to take action for curtailment of loads as per advice of NERLDC instructions.

Assam, MeECL, - They also co-ordinate with NERLDC for curtailment of the load as per their requirement.

Tripura, Mizoram and Ar.Pradesh- should also take decision regarding empowerment of shift-in-charge available in the control room to take action for curtailment of loads as per advice of NERLDC instructions.

The sub-Committee noted as above.

D.22 Any Other Item:

D.22.1 Agenda By AEGCL:

1. **Frequent opening of radial feeders of Assam by NERLDC.**

   It is observed recently that NERLDC has made it a regular practice to disconnect and keep open for a long time the radial feeders of Assam fed from Powergrid sub-stations whenever any system exigency arises.

It may be mentioned that most of the time SLDC, Kahilipara tries to maintain a near about schedule keeping a strict vigil on real time ATC parameters. However, it is seen that instead of giving us a minimum period of time to communicate to nearly 46 sub-stations of the state and to reduce overdrawal if any, the very practice of opening of 132 KV Balipara-Depota, 132 KV Nirjuli-Gohpur and 132 KV Jiribam-Pailapool by NERLDC not only causes prolonged power failure in various districts of Assam leading to Public chaos and frustration but also deprived the victimized sub-stations from getting emergency station power.

Assam requested NERLDC to intimate atleast 15 minutes in advance so that suitable action can be taken by them.

GM, NERLDC agreed to the proposal of Assam and the same would be intimated to Assam in advance before opening of above lines

The sub-Committee noted as above.

2. Methodology adopted in calculation of ATC

To get ourselves acquainted with the calculation of ATC, NERLDC is requested to provide us the procedure and methodology adopted for evaluation of ATC for NER. It may be mentioned here that as raised in the last OCC meeting the matter may be discussed elaborately in the forthcoming OCC meeting.

Refer to Item No. D.14.

D.22.2 Agenda By MePTCL:

1. NER ISGS stations are requested to kindly furnish their Declared Capability for FY 2013-14 to facilitate scheduling of ISGS generation.

   Refer to Item No. D.3.

2. Taking into account the need for uninterrupted power supply in Meghalaya during the coming Assembly elections, NERLDC is requested to kindly ensure the same considering the constraints in the 132KV pocket.

   The committee requested NERLDC to co-ordinate for un-interrupted power supply to Meghalaya, Nagaland and Tripura during the election.

D.22.2 Agenda By NHPC:

Load balancing of Loktak-Imphal -I and Loktak- Imphal-II Feeders may be discussed.

NERLDC informed that the as per the recent planning criteria of CEA, the loading of lines may go upto thermal limit. Committee felt that this needs further clarification.

The sub-Committee noted as above.

D.23 Date & Venue of next OCC meeting

It is proposed to hold the 83rd OCC meeting of NERPC on 8th March, 2013 (Friday). NHPC is the host for 83rd OCC meeting. The exact date and venue will be intimated accordingly.

The meeting ended with thanks to the Chair.

****

Annexure-I

List of Participants in the 82nd OCC meeting held on 07/02/2013

SN	Name & Designation	Organization	Contact No.
1.	**No Representative**	Ar. Pradesh	
2.	Sh. M. K. Adhikari, DGM	Assam	
3.	Sh. K. Goswami, AGM	Assam	09864020019
4.	Sh. J. K. Baishya, AGM, SLDC	Assam	09435041494
5.	Sh. A. K. Saikia, AGM	Assam	09864116176
6.	Sh. D. C. Das, Manager	Assam	09435041494
7.	Sh. Shantikumar, EE (SCD-I)	Manipur	0436022381
8.	Sh. A. Kharpan, SE (SLDC)	Meghalaya	09436117802
9.	Sh. F.E. Kharshiing, EE, SLDC	Meghalaya	09863066960
10.	Sh. H.F.Shangpliang, EE (SP)	Meghalaya	09863315562
11.	Sh. T. Gidon, AEE (SLDC)	Meghalaya	
12.	Sh. D.J.Lyngdoh, AEE (SLDC)	Meghalaya	09863063375
13.	Sh. L. Nongkhlaw, AEE (PLCC)	Meghalaya	09863102087
14.	Sh. Saphnehzova, EE (SLDC)	Mizoram	09862626299
15.	Sh. P.C.Vanlalruata, AE (SLDC)	Mizoram	08794542320
16.	Sh. A. Jakhalu, EE (Trans.)	Nagaland	09436002696
17.	**No Representative**	Tripura	
18.	Sh. T. S. Singh, GM	NERLDC	09436302717
19.	Sh. Amresh Mallick, CM	NERLDC	09436302720
20.	Sh. Anupam Kumar, Engineer.	NERLDC	09436335379
21.	Sh. A. Patir, GM	NERTS	
22.	Sh. P. Kanungo, DGM	NERTS	09436302823
23.	Sh. B. Goswami, Sr. Mgr. (E)	NEEPCO	09436163983
24.	Sh. Khanindra M. Sarma, SR. Mgr. (E)	NEEPCO	09435339685
25.	Sh. R. C. Singh, Mgr.(E)	NHPC	09436894889
26.	Sh. Mukul Banerjee, GM (Plant)	OTPC	09899354722
27.	Sh. S.K. Ray Mohapatra, MS I/C	NERPC	09818527857
28.	Sh.B. Lyngkhoi, SE (O)	NERPC	09436163419
29.	Sh. Lalrinsanga, AS	NERPC	09436161886
30.	Sh. D.K. Bauri, EE	NERPC	09863317236
31.	Sh. S. M. Aimol, EE	NERPC	08974002106

ANNEXURE-C.5

Presentation on Grid Security

Issues related to Grid Security :-

1. Tripping of 400 kV Silchar – Killing line

2. Tripping of Machines of Palatana

In case of Tripping of 400 kV Silchar – Killing line, there will be surplus of power in Southern Part of NER Grid.

Carrier signal to be sent to Palatana for tripping of GTG/STG of Palatana to maintain safe loading.

After tripping of GTG/STG of Palatana, if required, identified radial loads to be disconnected manually to maintain safe loading.

In case of tripping of Palatana machine, there will be shortfall of power in Southern Part of NER Grid and also in NER Grid.

132 kV Badarpur – Panchgram and 132 kV Srikona – Panchgram lines are to be kept open.

132 kV Khliehriat – Khliehriat D/C lines, 132 kV Khliehriat – NEHU line, 132 kV Khliehriat – NEIGRIHMS line are to be kept open.

132 kV Rokhia – Udaipur, 132 kV Dharmanagar – P K Bari, 66 kV Udaipur – Gumti lines are to be kept open

132 kV Imphal – Ningthoukhong and 132 kV Kakching – Churachandpur lines are to be kept open

Carrier signals to be sent to Silchar for tripping of 132 kV Silchar – Panchgram and 132 kV Silchar – Dullavcherra radial lines (Assam, Meghalaya and Tripura Load)

Carrier signal to be sent for tripping of 132 kV Palatana – Udaipur radial line (Tripura Load)

Design for tripping of 132 kV Aizwal – Zuangtui radial line (Mizoram Load)

Design for tripping of 132 kV Doyang – Mokokchung radial line(Nagaland Load)

Design for tripping of 132 kV Ranganadi – Ziro radial line (AP Load)

Design for tripping of 132 kV Loktak – Ningthoukhong radial line (Manipur Load).

After disconnection of above loads, if required, identified radial loads to be disconnected manually to maintain safe loading.

Proposed disconnection of loads :-

1. Arunachal Pradesh –
132 kV Ranganadi – Ziro : 10 MW

2. Assam :
Load of Panchgram & Dullavcherra : 40 MW

3. Manipur :
132 kV Loktak – Ningthoukhong : 25 MW

4. Meghalaya :
Load of Khliehriat : 40 MW

5. Mizoram –
132 kV Aizwal – Zuangtui : 25 MW

6. Nagaland :
132 kV Doyang – Mokokchung : 15 MW

7. Tripura :
132 kV Udaipur – Palatana : 15 MW
132 kV Dharmanagar – P K Bari : 10 MW
Totals Tripura – 25 MW

8. NER : 180 MW

Thank you

Annexure-D.4(I)

Automated Defence Plans for secure operation of the Grids

S no	Logic	Control Action
1	Overdrawal > 12% of schedule or 150 MW (PLC based scheme at LDCs)	On day 1, Group 1 load is shed in the first instance of violation followed by Group 2 in the second instance and so on say upto Group 5 if there are five (5) violations On day 2, Group 6 would be shed for the first violation followed by Group 7 and so on. After Group 60, Group 1 would start.
2	Under-drawals > 12% of schedule or 150 MW (PLC based scheme at LDCs)	On day 1, signal would be sent to Power station 'A' in the first instance followed by station 'B' in the second instance and so on say upto Power station 'C' if there are three (3) violations. On day 2, signal would be sent to the Power station 'D' in the first instance and so on.
3	Voltage <200 kV for more than 5 minutes (Local or PLC installed at the nodes identified)	Under Voltage Load Shedding (UVLS) Relays would be installed at each of the twenty nodes. In case of UV at node 1 shed load in Group 1 and if the UV persists, shed Group 2 and so on.
4	ICT/line loading crossing limits (Local or PLC installed at select locations).	Choose appropriate Groups from 1 to 60 for each set of ICTs/lines.
5	Flows crossing TTC and overdrawal (PLC based scheme at RLDCs)	Choose Group 1 in state 1, Group 1 in state 2 and so on for the first instance violation followed by Group 2 in state 1, Group 2 in state 2 and so on Day 1. On Day 2 move to the group following day 1 for the respective states.
6	Loss of generation > 1000 MW. (PLC based scheme installed	Choose appropriate ten (10) groups adjacent to the power station. Further the PLC can also be used to secure the power station in case of depletion of the network

S no	Logic	Control Action
	at power station end)	emanating from the power station.
7	Angular difference (PLC based scheme at RLDC level)	Choose appropriate two groups for each state located downstream of the angle pair.
8	Under-Frequency Relays UFR1: 49.0 Hz UFR2: 48.8 Hz UFR3: 48.6 Hz UFR4: 48.4 Hz	 20% of identified loads for shedding……12 Groups 20% of identified loads”””””””””……12 Groups 30% of identified loads……18 Groups 30% of identified loads……18 Groups
9	Df/dt relays 49.9 Hz with 0.1 Hz/sec slope 49.9 Hz with 0.2 Hz/sec slope	 Overlap with UFR3 above Overlap with UFR4 above
10	Islanding at 47.9 Hz	Power station specific schemes to be formulated.

Annexure-D.4(II)

Grid Security Expert System

The Grid Security Expert System scheme shall take the various inputs as follows:-

- **The load/generation relief expected –** The data of MW,MVAR, KV, Frequency, Voltage, UI calculation available from real-time SCADA system .
- **Simulation study save cases** for various conditions resulting into a knowledge based database for the actions required to be taken based on the prevailing conditions in real-time.
- **Phasor data:- Through PDC installed at RLDC**

The sample diagram for implementation of the above scheme is as follows:-

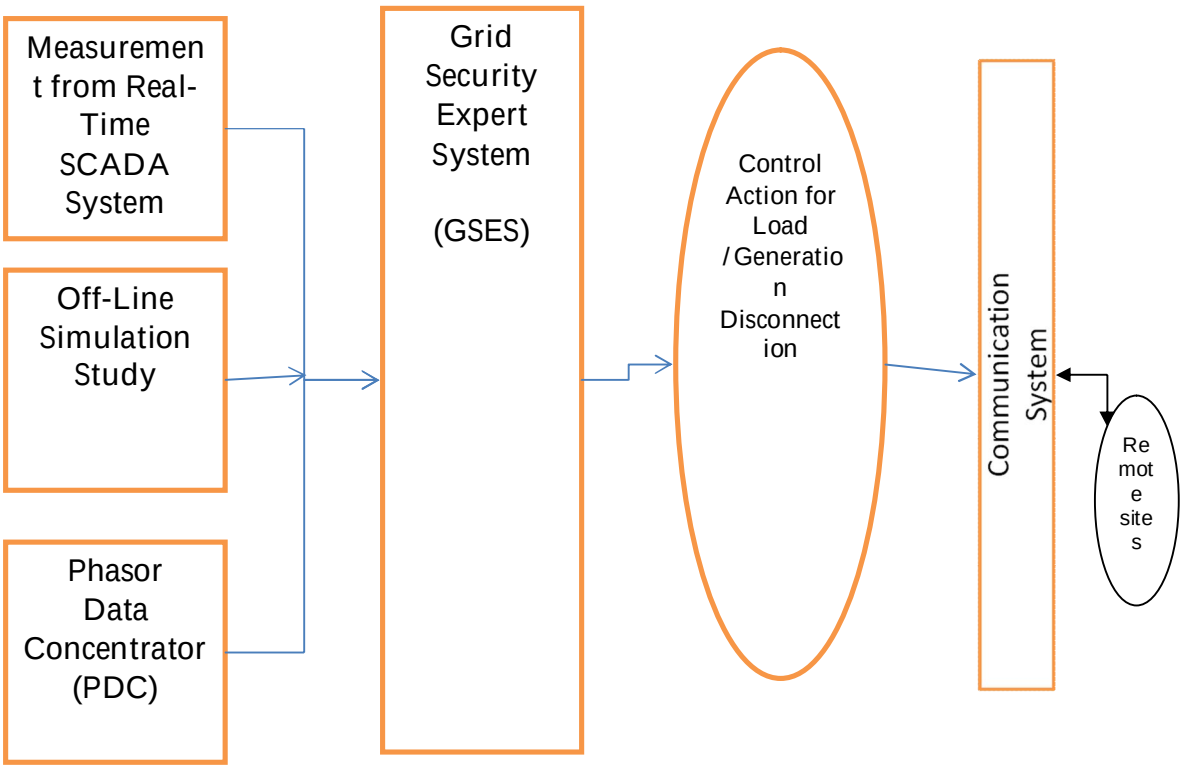


Figure 1.0:- Conceptual Architecture of GSES System

The expert system shall match the loads/generations and sent the command signal to different loads/generation for getting the relief. This experts system is proposed to be deployed at each SLDC and RLDCs. The expert system shall have the knowledge database for different simulation conditions and different logics for disconnection. The SGES system shall match the real-time data with knowledge database and whenever the condition matches it will trigger the command with the best match conditions of the databank. While triggering the command it will check the real-time data for the load/generation to be disconnected. In case of load disconnection the command shall be initiated initially from SLDC. In case of non-functionality of command from

SLDC, RLDC shall execute the command. However in case of disconnection of generator (backing down of generation as being used for SPS) the command shall be executed from RLDC . Further the telemetry provision shall be made for all the identified loads, Digital coupler circuit monitoring through the real-time SCADA system .

2.1. Implementation of Grid Security Expert System

The command from the expert system to load/generator shall be similar to the Special protection Scheme implemented. The PLC shall take the input from SGES and shall operate the circuit breakers of the identified load through Digital protection Couplers which shall require Fiber Optic communication system. To implementation of the above scheme , the following infrastructure shall be a prerequisite:-

- ***Availability of Fiber Optic communication system of identified loads***
- ***Healthiness of trip/close circuits from Control Room to switchyard.***
- ***Availability of telemetry of these identified Loads to the SLDC as well RLDC***
- ***Proper logic check for Authority check in hierarchical manner among Substations, SLDC and RLDC i.e. if RLDC has initiated the operation, the same should not be operated from SLDC or from the substation.***
- ***Off-line simulation tool***
- ***Co-operation from SLDC/Generation Utility and***
- ***The experienced and trained manpower for creating the knowledge bank for Expert system***

2.2. GSES based on WAMS system

After deployment of sufficient Number of PMUs in India Power System, the analytic would be developed to find out the actual state measurement of the system . The state estimator system shall have more accurate result . The GSES system shall be provisioned to take the input from this state measurement system / state estimation system for building and updated its knowledge bank for handling the conditions elaborated above. The action for disconnection of the load/generation should be initiated accordingly.

2.3. Digital Tele Protection Coupler (DTPC) system

Digital Tele Protection Coupler (DTPC) is required to transfer the trip command over Digital communication or receive the command from the Remote stations . The DTPC after receiving the command from either GSES or remote DTPC actuates the contacts of the relays of the loads or the generators. In case of back down of Generators the DTPC system actuates the contacts the MW output generation setting of the generator. According to the Target MW output settings , the Steam bypass (HP/LP) and coal firing is varied and the desired back down is achieved. The schematic diagram of the Command Transfer is shown below

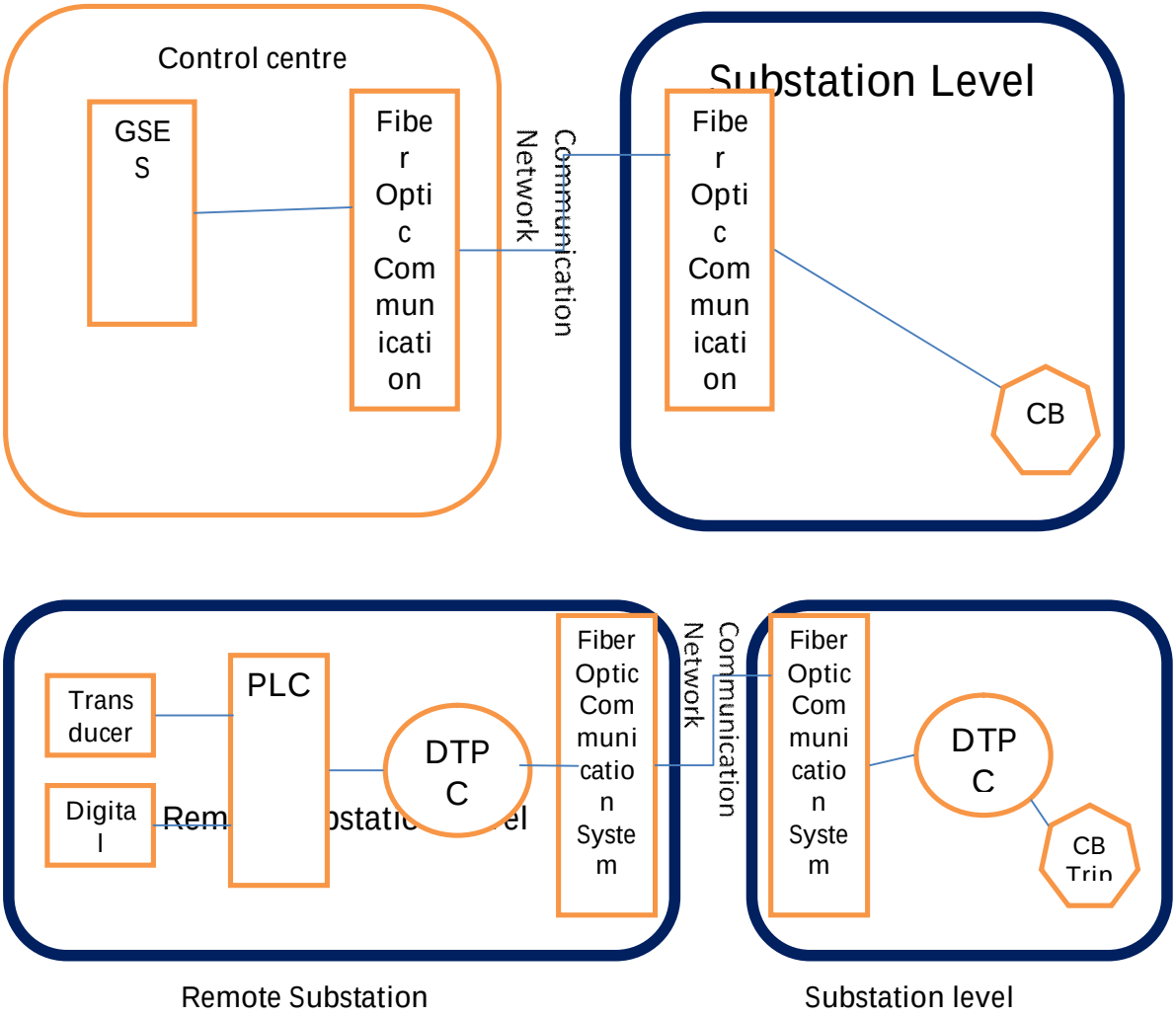


Figure 3.0 Tele Protection System

2.4. PLC System

The Programmable Logic Controller(PLC) shall be defined in the case of measurement the inputs would be taken from the local measurements and the tripping has to be executed on wide area. The typical PLC for the SPS design of Power Plant is given below.

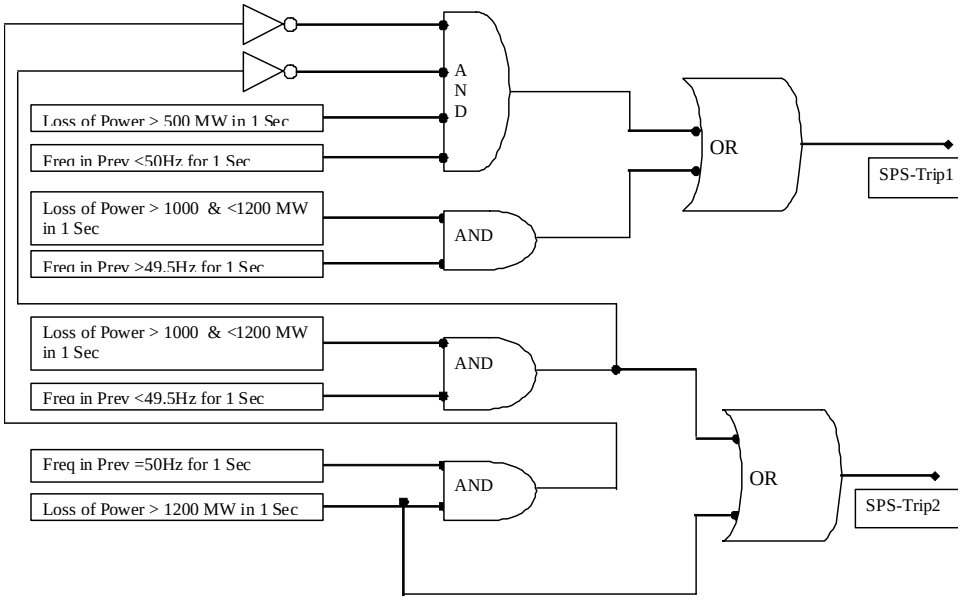


Figure 4.0 Typical PLC system

2.5. Features of Under Frequency Protection:

It is proposed to use Under Frequency Relay (UFR) on 132kV, 66kV and 33kV feeders based on loadability and importance of the feeders and type of load it feeds. The relay shall monitor the frequency of the bus and have a programmable feature to operate different output contacts based on different frequency values. UFR is required to be IEC 61850 complaint and on owner's communication network, a number of relays shall be connected to a server which may cater to requirement of a number of sub-station in the vicinity. This server along with a gateway if required may be located in Area load despatch centre where all the relays in the area shall be connected and monitored. The mode of communication shall be wide band.

2.6. Communication System for GSES system:

The communication system for GSES system shall have to be reliable, dedicated and fully secure system. Further the system shall have to be monitored and operated in real-time and hence a fast and dedicated communication network based on Fiber optics would be required. The alternate communication network based on GSM/GPRS technology is although can be made dedicated for this system. But the drawback of this GSM/GPRS technology is based on IP technology and hence the security of this system shall be major concern wherever the control system is being utilized. Hence the GSM/GPRS communication system shall be limited to monitoring of the system. The Detailed Project Report for the Fiber Optic based communication system is being proposed separately.

Annexure- D.10

Shutdown Programme for February/March, 2013

S.N.	Name of Unit/ Generating Station	Date	Time	Purpose	Areas Affected
A.	**SHUTDOWN PROGRAM FOR NEEPCO:**				
1	Ranganadi U #2	13.02.13 to 23.02.13	Continuous S/D	Annual Maintenance	Ranganadi U #2
B.	**SHUTDOWN PROGRAM FOR NHPC:**				
2	Loktak U #1	20.02.13 to 20.03.13	Continuous S/D	Annual Maintenance	Loktak U #1

ANNEXURE - D.11

Shutdown Programme for February/March, 2013 as approved in the 82nd OCC meeting

SN	Name of Element	Feb/13																				Mar/13									Purpose
		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	1	2	3	4	5	6	7	8	9	
A .	**SHUTDOWN PROGRAMME OF INTER-REGIONAL POWERGRID LINES & ITS ASSOCIATED BAYS: (S/D from Sl. No. 1 to 5 are subject to consent of NLDC & ERLDC**																														
1	132KV Salakati-Gelephug																														Replacement of defectice Insulator Strings identified through PID.
2	220 kV Salakati-Birpara-I																														For fecilitating installation of second numerical Distance Protection Relays on the respective lines. **(from 1000 to 1400 Hrs)**
3	220 kV Salakati-Birpara-II																														
4	400 kV B'Gaon-New Siliguri-I																														
5	400 kV B'Gaon-New Siliguri-II																														
B.	**SHUTDOWN PROGRAMME OF REGIONAL POWERGRID LINES & ITS ASSOCIATED BAYS:**																														
6	132KV Balipara-Khupi line (NEEPCO)											(Subject to consent of Ar. Pradesh)																			For facilitating stringing work of 400KV Balipara-Biswanath Chariali Transmission Line (loc.3/0-3A/0)
7	132KV Aizawl-Zemabawk-I																														For attending hotspots/burnt female contacts of Bus Isolator
8	132KV S/C Rangiya-Sipajhar (AEGCL) line																														For facilitating stringing work of 400KV D/C (quad) Balipara-Bongaigaon III & IV line (section 40/0 - 41/0, 47/0 - 48/0, 64/0 - 64A/0 & 64A/0-65/0
9	132KV S/C Rangiya-Rowta (AEGCL) line																														
10	132KV D/C Rangiya-Kahilipara (AEGCL) line																														
11	132KV Samaguri-Depota-Biswanath Chariali (AEGCL) line																		Subject to consent of Ar. Pradesh												For facilitating stringing work of 400KV Balipara-Biswanath Chariali Transmission Line & LILO of 400KV Ranganadi-Balipara at B'Chariali S/s
12	132KV Balipara-Gohpur (AEGCL)																														
13	132KV Biswanath Chariali-Gohpur (AEGCL)																														
14	220KV S/C Misa-Kopili-III																														For retensioning of the section loc.108-109 (Kopili River Crossing) for maintatining adequate clearance w.r.t. HFL during Summar
15	132KV Jiribam-Loktak-II																														Strengthening of jumpers along the line in view of high loading characteristics of the line.
16	220KV Misa-Samaguri-II																														Replacement of defectice Insulator Strings identified through PID.
17	220KV Balipara-Samaguri																														For facilitating shifting of loc.29 on Pile Foundation
18	132 KV Jiribam-Haflong																														For facilitating the following works: (i) Diversion of vulnerable stretch from loc.131 to 134 affected by heavy landslide (ii) Diversion of loc.300 & 301 on account of Railway Gauge Widening Work.
19	400 kV Misa-Balipara-I																	(1000 to 1400 Hrs)													For installation of second numerical Distance Protection Relay. **(from 1000 to 1400 Hrs)**
20	400 kV Misa-Balipara-II																			(1000 to 1400 Hrs)											For installation of second numerical Distance Protection Relay. **(from 1000 to 1400 Hrs)**
21	400 kV Balipara-B'Gaon-I																		(i)			(ii)	(Subject to consent of NLDC)								**(i)** For construction of Silliguri-III & IV bays at Bongaigaon S/S **(from 0800 to 1600 Hrs)** **(ii)** For installation of 2nd distance protection relay **(from 1000 to 1400 Hrs).**
22	400 kV Balipara-B'Gaon-II																								(Subject to consent of NLDC)						For installation of second numerical Distance Protection Relay. **(from 1000 to 1400 Hrs)**
23	220 kV Misa-Kopili-I																														For installation of second numerical Distance Protection Relay. **(from 1000 to 1400 Hrs)**
24	220 kV Misa-Kopili-II																														For installation of second numerical Distance Protection Relay. **(from 1000 to 1400 Hrs)**
25	220 kV Misa-Kathalguri																														For installation of second numerical Distance Protection Relay. **(from 1000 to 1400 Hrs)**
26	132 kV Aizwal -Kumarghat																														Installation of new CT for upgradation of CT ratio.

ANNEXURE - D.11

Shutdown Programme for February/March, 2013 as approved in the 82nd OCC meeting

SN	Name of Element	Feb/13																						Mar/13									Purpose
		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	1	2	3	4	5	6	7	8	9		
C.	**SHUTDOWN PROGRAMME OF AEGCL LINES & ITS ASSOCIATED BAYS:**																																
27	220 kV Agia-Sarusajai I & II																																Urgent Maintenance work of jumpers, earthing and jungle clearance and emergency maintenance at loc no. 209
28	220 kV Samaguri-Sarusajai-I&II												**(20 MW power from MeECL)**																				Construction work of new 132 kV Jawaharnagar Sub-Station.
D.	**SHUTDOWN PROGRAMME OF POWERGRID SUB-STATIONS / BAYS / ICTS/ REACTORS**																																
	400 KV Bongaigaon Substation																																
1	Balipara 1 Tie Bay																																For fecilitating construction of Silliguri-III & IV bays at Bongaigaon S/S. (extention till 14.03.13)
2	Main Bus 1																																For fecilitating construction of Silliguri-III & IV bays at Bongaigaon S/S (**No element will be affected**).
3	Main Bus 2																																
	220/132 KV Dimapur Substation																																
4	132 kV Dimapur (Nagaland) bay								**(Any convineant day after completion of Dimapur LILO)**																								For Annual Maintenance work.
	132 KV Purba Kanchanbari Substation																																
5	132 kV Main Bus					**(Subject to consent of TSECL)**																											To facilitate erection of Bus Isolators under bay extension work for Silchar Feeder-I & II at PK Bari S/s.
	132 KV Imphal Substation																																
6	132 kV Main Bus				**(09:00 to 12:00 Hrs)**																												For installation of isolator for 20MVAR bus reactor.

Note: 1) : Daytime Shutdown (08:00 to 16:00 Hrs) 2) : Continuous Shutdown

Annex. D.12

POWER GRID CORPORATION OF INDIA LIMITED

OPERATION SERVICE DEPARTMENT, NERTS, SHILLONG

Exception Report

MONTH : JANUARY-13

Sl. No.	Name of the Element	Ckt No	Outage Date	Outage Time	Restoration Date	Restoration Time	Duration of Outage and Attributable To: POWERGRID Hrs.	POWERGRID Mns.	Other Constituents Hrs.	Other Constituents Mns.	Sys.Const/Natural calamities/ Miltant activities Hrs.	Sys.Const/Natural calamities/ Miltant activities Mns.	Outage under categories of Deemed Available Hrs.	Outage under categories of Deemed Available Mns.	Category	Reason of Outage
RCN_AGARTALA		**# 1**														
1			12/01/2013	09:35	12/01/2013	13:47	00	00	00	00	00	00	04	12	SCSD	For attending Old Isolators at TSECL S/s in compliance with deliberations of OCCM
Sub-Total							00	00	00	00	00	00	04	12		
RCN_AGARTALA		**# 2**														
2			13/01/2013	08:42	13/01/2013	15:31	00	00	00	00	00	00	06	49	SCSD	For attending Old Isolators at TSECL S/s in compliance with deliberations of OCCM
Sub-Total							00	00	00	00	00	00	06	49		
AIZWAL_KUMARGHAT																
3			11/01/2013	11:04	11/01/2013	17:07	06	03	00	00	00	00	00	00	OSFT	ESD taken for rectification of snapped E/W between loc 73& 74
4			15/01/2013	18:37	15/01/2013	18:53	00	16	00	00	00	00	00	00	OSFT	H/Tdue to heavy spark at Bus Isolator at AZL end
Sub-Total							06	19	00	00	00	00	00	00		
DIMAPUR_IMPHAL																
5			19/01/2013	20:05	19/01/2013	23:55	00	00	03	50	00	00	00	00	OMSU	Tripped due to opening of jumper in Dimapur(state) bay
Sub-Total							00	00	03	50	00	00	00	00		
DOYANG_DIMAPUR		**# 1**														
6			19/01/2013	20:05	20/01/2013	00:00	00	00	03	55	00	00	00	00	OMSU	Tripped due to opening of jumper in Dimapur(state) bay
7			31/01/2013	10:42	31/01/2013	12:42	02	00	00	00	00	00	00	00	OSFT	ESD availed for topping up Oil in Yph CT
Sub-Total							02	00	03	55	00	00	00	00		
DOYANG_DIMAPUR		**# 2**														
8			08/01/2013	11:00	08/01/2013	13:27	00	00	00	00	00	00	02	27	OSFD	ESD taken by NEEPCO for attending CVT problem
9			19/01/2013	20:05	20/01/2013	00:10	00	00	04	05	00	00	00	00	OMSU	Tripped due to opening of jumper in Dimapur(state) bay
Sub-Total							00	00	04	05	00	00	02	27		
GOHPUR_NIRJULI																
10			22/01/2013	07:14	22/01/2013	10:07	00	00	00	00	00	00	02	53	OSFD	SD taken by AEGCL
Sub-Total							00	00	00	00	00	00	02	53		
JIRIBAM_LOKTAK		**# 2**														

Sl. No.	Name of the Element / Outage Date	Outage Time	Ckt No / Restoration Date	Restoration Time	Duration of Outage and Attributable To: POWERGRID Hrs.	POWERGRID Mns.	Other Constituents Hrs.	Other Constituents Mns.	Sys.Const/Natural calamities/ Miltant activities Hrs.	Sys.Const/Natural calamities/ Miltant activities Mns.	Outage under categories of Deemed Available Hrs.	Outage under categories of Deemed Available Mns.	Category	Reason of Outage
11	31/01/2013	05:40	31/01/2013	05:54	00	00	00	14	00	00	00	00	OMSU	Tripped due to downstream fault
Sub-Total					00	00	00	14	00	00	00	00		
KHANDONG_KOPILI			**# 1**											
12	20/01/2013	14:08	21/01/2013	11:46	00	00	00	00	00	00	21	38	OSFD	SD availed by NEEPCO for attending CB problem at Khandong end
Sub-Total					00	00	00	00	00	00	21	38		
KHLIERIAT_KHLIERIAT														
13	11/01/2013	21:22	12/01/2013	06:50	00	00	00	00	00	00	09	28	LPRD	h/T for power. regu. On RLDC instruction
Sub-Total					00	00	00	00	00	00	09	28		
KUMARGHAT_R C NAGAR														
14	19/01/2013	16:53	20/01/2013	11:27	00	00	00	00	18	34	00	00	LMAC	Tree outside ROW felled by villagers on Ypb Condr betn loc.303-04
15	25/01/2013	11:05	25/01/2013	11:15	00	00	00	10	00	00	00	00	OMSU	KGT_Tripped on power swing due to tripping of Rokhia(state) line
Sub-Total					00	00	00	10	18	34	00	00		
LOKTAK_IMPHAL			**# 2**											
16	31/01/2013	05:40	31/01/2013	06:20	00	00	00	40	00	00	00	00	OMSU	Tripped due to downstream fault
Sub-Total					00	00	00	40	00	00	00	00		
RANGANADI-ZIRO														
17	18/01/2013	09:15	18/01/2013	16:36	00	00	00	00	00	00	07	21	SCSD	SD taken for erection & stringing activities associated woth 20MVAR BR
18	20/01/2013	08:10	20/01/2013	16:57	00	00	00	00	00	00	08	47	SCSD	"
19	30/01/2013	11:07	30/01/2013	13:40	00	00	00	00	00	00	02	33	SCSD	"
Sub-Total					00	00	00	00	00	00	18	41		
SILCHAR-BADARPUR-I			**#1**											
20	25/01/2013	13:30	25/01/2013	17:11	00	00	00	00	00	00	03	41	SCSD	SD availed for checking Auto reclosure scheme
Sub-Total					00	00	00	00	00	00	03	41		
BALIPARA_TEZPUR														
21	08/01/2013	14:39	08/01/2013	15:25	00	00	00	46	00	00	00	00	OMSU	Tripped due to fault outside line jurisdiction
22	20/01/2013	08:20	20/01/2013	18:45	00	00	00	00	10	25	00	00	LNCC	SD taken for facilitating shifting of vulnerable loc 29 on Pile Foundation
Sub-Total					00	00	00	46	10	25	00	00		
MISA_DIMAPUR			**# 1**											
23	19/01/2013	20:05	19/01/2013	23:51	00	00	03	46	00	00	00	00	OMSU	Tripped due to opening of jumper in Dimapur(state) bay

Sl. No.	Name of the Element / Outage Date	Outage Time	Ckt No / Restoration Date	Restoration Time	Duration of Outage and Attributable To: POWERGRID Hrs.	POWERGRID Mns.	Other Constituents Hrs.	Other Constituents Mns.	Sys.Const/Natural calamities/ Miltant activities Hrs.	Sys.Const/Natural calamities/ Miltant activities Mns.	Outage under categories of Deemed Available Hrs.	Outage under categories of Deemed Available Mns.	Category	Reason of Outage
Sub-Total					00	00	03	46	00	00	00	00		
MISA_DIMAPUR			**# 2**											
24	19/01/2013	20:05	20/01/2013	00:05	00	00	04	00	00	00	00	00	OMSU	Tripped due to opening of jumper in Dimapur(state) bay
Sub-Total					00	00	04	00	00	00	00	00		
MISA-KOPILI			**# 1**											
25	03/01/2013	08:56	03/01/2013	17:52	00	00	00	00	08	56	00	00	LNCC	SD taken for replacement of Defective Insulator strings identified by PID
26	04/01/2013	08:51	04/01/2013	17:41	00	00	00	00	08	50	00	00	LNCC	"
27	05/01/2013	09:18	05/01/2013	18:14	00	00	00	00	08	56	00	00	LNCC	"
28	06/01/2013	08:20	06/01/2013	18:44	00	00	00	00	10	24	00	00	LNCC	"
29	22/01/2013	09:05	22/01/2013	18:18	00	00	00	00	09	13	00	00	LNCC	"
Sub-Total					00	00	00	00	46	19	00	00		
MISA_KOPILI			**# 2**											
30	07/01/2013	08:26	07/01/2013	19:07	00	00	00	00	10	41	00	00	LNCC	SD taken for replacement of defective Insulator strings
31	08/01/2013	08:28	08/01/2013	18:10	00	00	00	00	09	42	00	00	LNCC	SD taken for replacement of defective Insulator strings
32	09/01/2013	08:58	09/01/2013	18:12	00	00	00	00	09	14	00	00	LNCC	"
33	10/01/2013	09:17	10/01/2013	18:57	00	00	00	00	09	40	00	00	LNCC	"
34	11/01/2013	09:27	11/01/2013	17:48	00	00	00	00	08	21	00	00	LNCC	"
35	12/01/2013	09:15	12/01/2013	17:58	00	00	00	00	08	43	00	00	LNCC	"
36	16/01/2013	09:15	16/01/2013	18:07	00	00	00	00	08	52	00	00	LNCC	"
37	19/01/2013	09:26	19/01/2013	18:28	00	00	00	00	09	02	00	00	LNCC	"
38	20/01/2013	09:29	20/01/2013	18:02	00	00	00	00	08	33	00	00	LNCC	"
39	21/01/2013	09:51	21/01/2013	16:19	00	00	00	00	06	28	00	00	LNCC	"
Sub-Total					00	00	00	00	89	16	00	00		
MISA_SAMAGURI			**# 1**											
40	08/01/2013	14:39	08/01/2013	14:58	00	00	00	19	00	00	00	00	OMSU	Tripped on downstream fault
Sub-Total					00	00	00	19	00	00	00	00		
MISA_SAMAGURI			**# 2**											

Sl. No.	Name of the Element / Outage Date	Outage Time	Ckt No / Restoration Date	Restoration Time	Duration of Outage and Attributable To: POWERGRID Hrs.	POWERGRID Mns.	Other Constituents Hrs.	Other Constituents Mns.	Sys.Const/Natural calamities/ Miltant activities Hrs.	Sys.Const/Natural calamities/ Miltant activities Mns.	Outage under categories of Deemed Available Hrs.	Outage under categories of Deemed Available Mns.	Category	Reason of Outage
41	08/01/2013	14:39	08/01/2013	15:04	00	00	00	25	00	00	00	00	OMSU	tripped on downstream fault
Sub-Total					00	00	00	25	00	00	00	00		
BALIPARA_BONGAIGAON			**# 2**											
42	16/01/2013	08:08	16/01/2013	16:02	00	00	00	00	00	00	07	54	SCSD	SD taken for erectionof gantry structure at BLP end in connection with construction of
43	17/01/2013	08:26	17/01/2013	16:05	00	00	00	00	00	00	07	39	SCSD	"
44	18/01/2013	08:22	18/01/2013	15:46	00	00	00	00	00	00	07	24	SCSD	"
45	19/01/2013	08:25	19/01/2013	15:15	00	00	00	00	00	00	06	50	SCSD	"
46	20/01/2013	10:30	20/01/2013	10:45	00	00	00	15	00	00	00	00	OMSU	Line patrolled, no abnormality found
47	25/01/2013	12:14	25/01/2013	12:26	00	12	00	00	00	00	00	00	LEFT	Transient E/F
Sub-Total					00	12	00	15	00	00	29	47		
MISA_BALIPARA			**# 1**											
48	20/01/2013	14:08	20/01/2013	14:44	00	36	00	00	00	00	00	00	LEFT	Tripped on transient fault
Sub-Total					00	36	00	00	00	00	00	00		
MISA-BALIPARA			**#2**											
49	20/01/2013	14:08	20/01/2013	14:19	00	00	00	00	00	00	00	11	GOMD	Tripped on transient fault, Line kept open as per instruction of NERLDC
Sub-Total					00	00	00	00	00	00	00	11		
BALIPARA-RANGANADI			**# 1**											
50	01/01/2013	00:00	03/01/2013	18:12	00	00	00	00	00	00	66	12	LVRD	h/T for vol. regu. On RLDC instruction vide code 2117
51	10/01/2013	21:27	16/01/2013	18:37	00	00	00	00	00	00	141	10	LVRD	h/T for vol. regu. On RLDC instruction vide code 2245
52	25/01/2013	22:00	01/02/2013	00:00	00	00	00	00	00	00	146	00	LVRD	h/T for vol. regu. On R LDC instruction vide code 2422
Sub-Total					00	00	00	00	00	00	353	22		
BALIPARA-RANGANADI			**# 2**											
53	03/01/2013	21:15	10/01/2013	18:37	00	00	00	00	00	00	165	22	LVRD	h/T for vol. regu. On RLDC instruction vide code 2196
54	16/01/2013	22:25	25/01/2013	19:40	00	00	00	00	00	00	213	15	LVRD	h/T for vol. regu. On RLDC instruction vide code 2300
Sub-Total					00	00	00	00	00	00	378	37		
Grand Total					**09**	**07**	**22**	**25**	**164**	**34**	**831**	**46**		

Annexure-D.13

GRID DISTURBANCE ON

20.01.13 at 1408 hrs

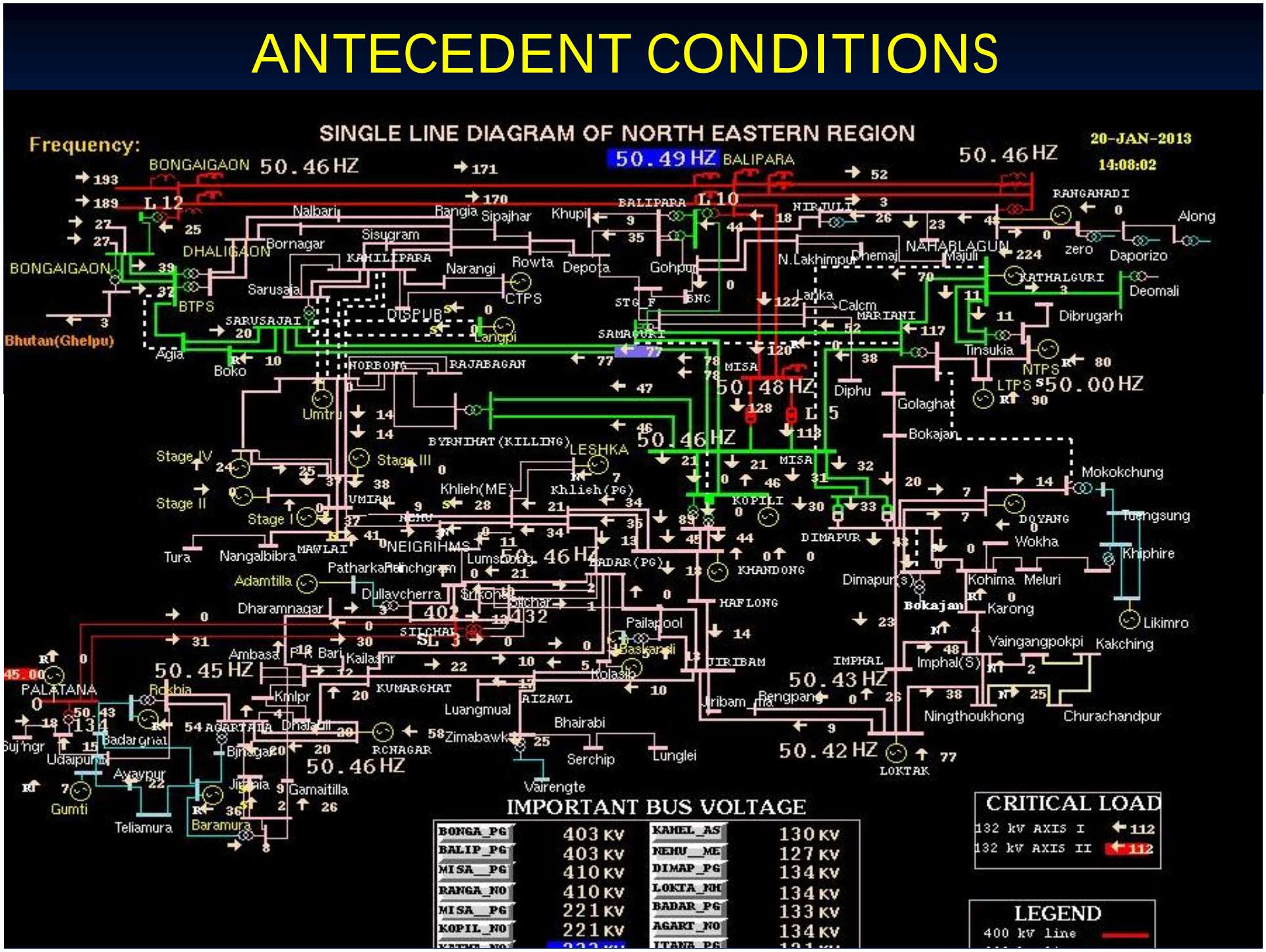
Category – GD-V

ANTECEDENT CONDITIONS

NER Grid was connected with N-E-W Grid through

- 400KV Bongaigaon-New Siliguri D/C
- 220KV Birpara – Salakati D/C.

ANTECEDENT CONDITIONS



ANTECEDENT CONDITIONS

FRQ. 50.49 HZ

20-JAN-2013
14:08:02

CS DC, SCHEDULE /ACTUAL GENERATION (IN MW)

PLANT	DC	SCHGEN	ACTGEN	DEV	% OF DEV AGNST SCH
AGBPP	+ 212	+ 212	+ 206	– 6	0.0
AGTPP	+ 74	+ 74	+ 58	– 16	0.0
RHEP	N.A	+ 0	+ 0	+ 0	–1.4
KOPILI	N.A	+ 49	+ 46	– 3	0.0
KHANDONG	N.A	+ 0	+ 0	+ 0	1.8
KOPILI–II	N.A	+ 0	+ 0	+ 0	0.0
DHEP	N.A	+ 0	+ 0	+ 0	0.0
LOKTAK	N.A	+ 75	+ 77	+ 2	6.0
PALATANA	+ 0	+ 0	+ 0	+ 0	
TOTAL		+ 410	+ 387	– 23	
EXCHANGE		SCHD	ACT	DEVTN	
NER–ER		– 378	– 439	– 61	

IMPORT TTC	+ 450	EXPORT TTC	+ 600
IMPORT ATC	+ 415	EXPORT ATC	+ 500

FREQUENCY (B´para) 50.49 HZ

CURRENT UI RATE 0.0

ANTECEDENT CONDITIONS

FRQ. 50.44 HZ

20-JAN-2013
14:08:02

NER STATE OVERVIEW

STATE	DRAWAL SCH (MW)	ACTUAL DRAWAL (MW)	DEVIATION MW	OWN GEN (MW)	DEM MET MW
ASSAM	↑ 423	↑ 427	↑ 4	185	612
SOUTH ASSAM		↑ 63			
MEGHALAYA	↑ 144	↑ 148	↑ 4	24	172
MEGH (KHT)		↑ 56			
TRIPURA	↑ 12	↓ 8	↓ 20	97	89
MANIPUR	↑ 56	↑ 87	↑ 31	NIL	87
NAGALAND	↑ 45	↑ 60	↑ 15	0	60
MIZORAM	↑ 32	↑ 42	↑ 10	0	42
AP	↑ 41	↑ 54	↑ 13	NIL	54
TOTAL NER	754		- 56		1116

NER injection LOSS(Current week) 0.00

NER withdrawal Loss(Current week) 0.00

2.00
(Real Time loss)

Description of incident –

1) NER Grid was connected with N-E-W Grid through 400KV Bongaigaon-New Siliguri D/C and 220KV Birpara – Salakati D/C.

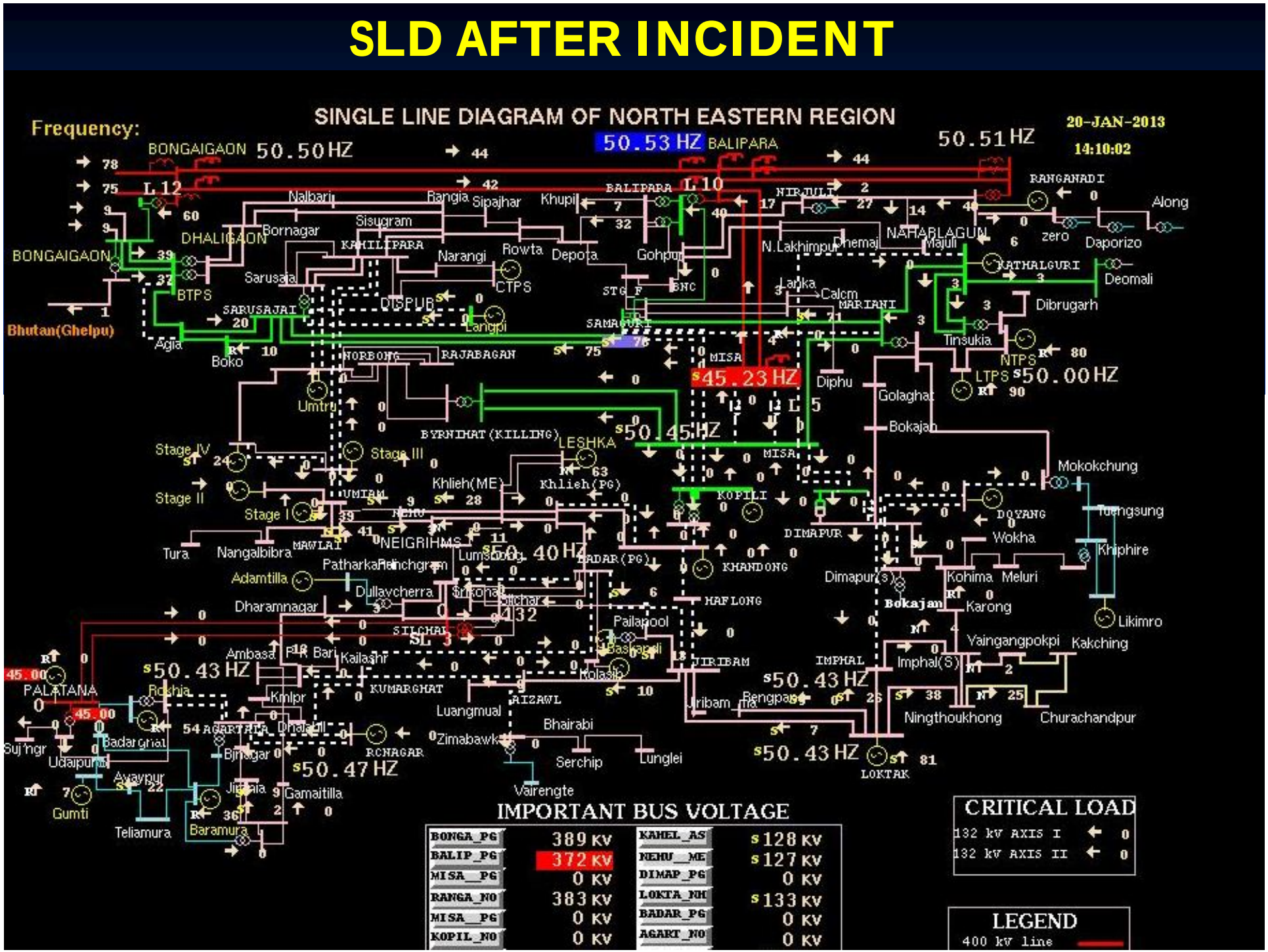
2) 220 kV Agia - Sasusajai- I & II and 220 kV Samaguri - Balipara was under S/D.

3) At 1408 Hrs, both the Ckts of 400 kV Misa - Balipara tripped [Ckt-I:- Misa- D/P, Y-N, Z-1, Z-2, 75.18 km (M-1); Y-N, Z-2(M-2) & Balipara: D/P, Y-N(M-1); B-N, Z-1(M-2). Ckt-II:- Misa: N/T & Balipara: D/P, Z-2(M-1).

4) Due to this, part of Assam, Meghalaya, Manipur, Mizoram, Nagaland and Tripura got isolated from the N-E-W Grid and collapsed due to load-generation mismatch.

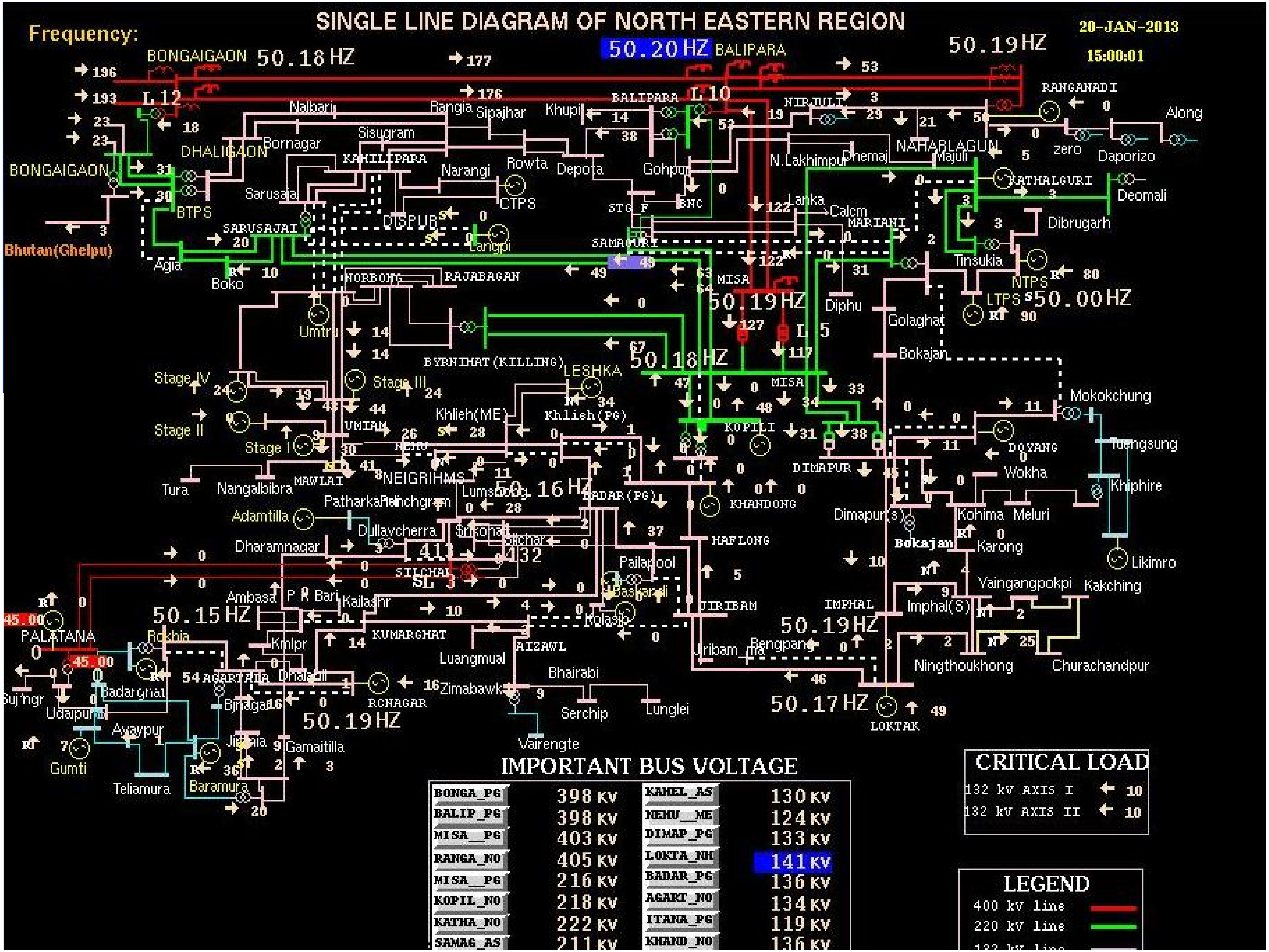
5) NER System was fully restored by synchronizing at Dimapur at 1543 Hrs through 132 kV Dimapur – Imphal Line.

SLD AFTER INCIDENT

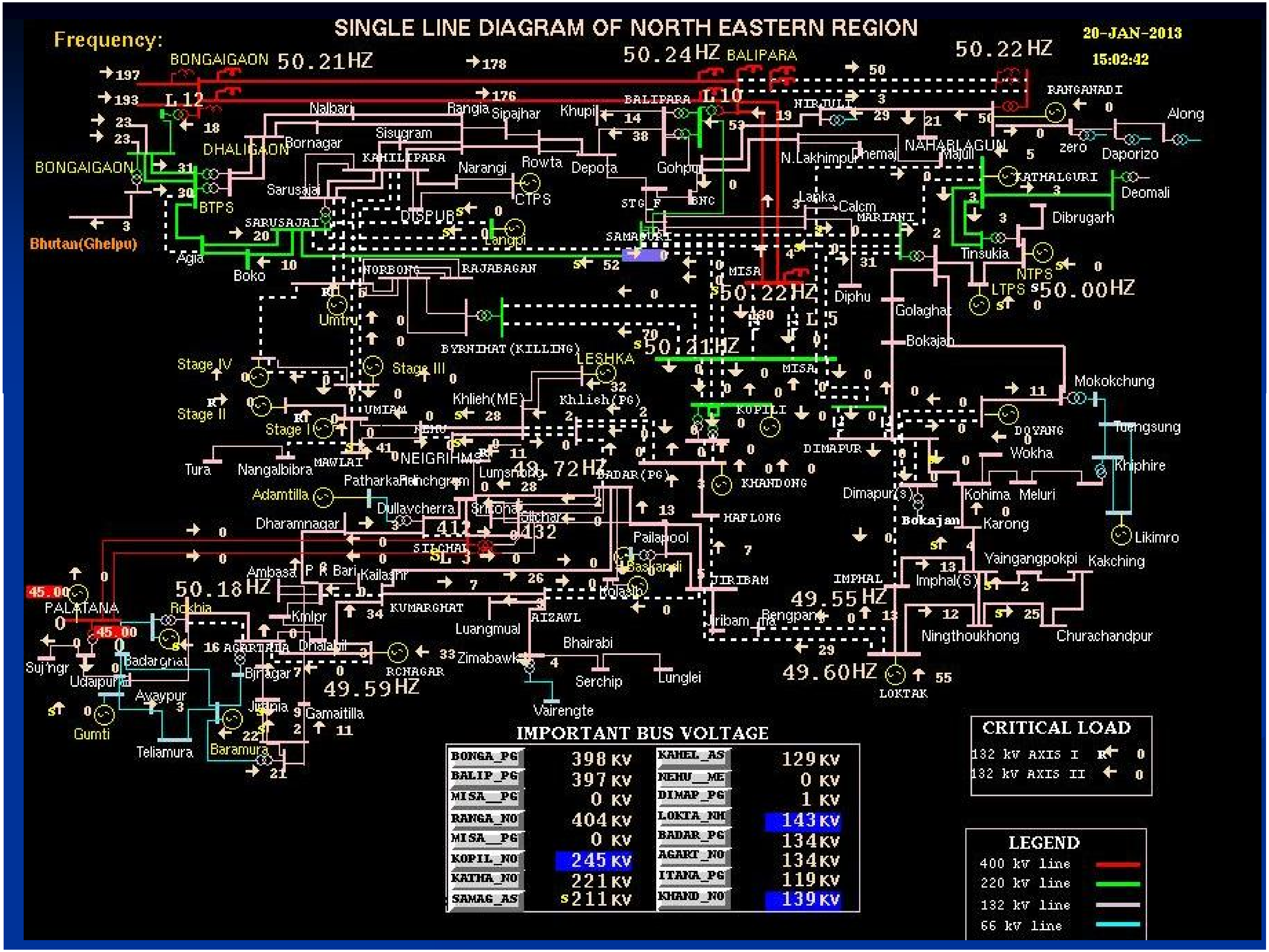


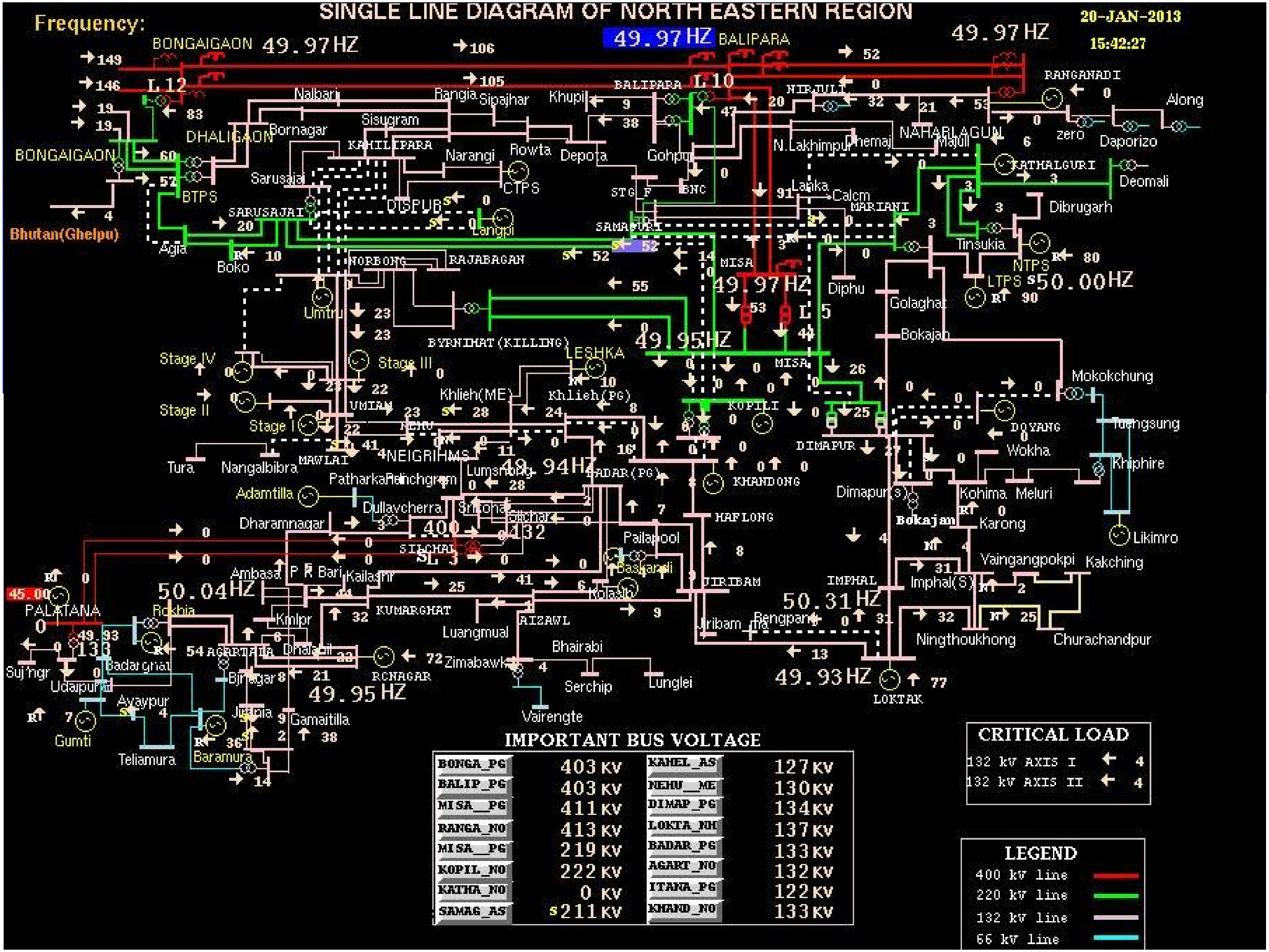
1)Again at 1501 Hrs both the Ckts of 400 kV Misa - Balipara tripped [Ckt-I:- Misa- D/P, R-N, Z-1, Power Swing, 0.655 km & Balipara- D/P, R-N, Z-2, 112 km(M-1). Ckt-II:- Misa: N/T & Balipara: D/P, R-N, Z-2, SOTF, 112 km] and the restored system got separated.

2)However this separated system (except Nagaland and part of Assam) survived along with Loktak, AGTPP and Tripura state generation.



SINGLE LINE DIAGRAM OF NORTH EASTERN REGION
Frequency:
20-JAN-2013
15:00:01
BONGAIGAON 50.18 HZ
50.20 HZ BALIPARA
50.19 HZ
IMPORTANT BUS VOLTAGE
BONGA_PG 398 KV
BALIP_PG 398 KV
MISA_PG 403 KV
RANGA_NO 405 KV
MISA_PG 216 KV
KOPIL_NO 218 KV
KATHA_NO 222 KV
SAMAG_AS 211 KV
KAHEL_AS 130 KV
NEHU_ME 124 KV
DIMAP_PG 133 KV
LOKTA_NH 141 KV
BADAR_PG 136 KV
AGART_NO 134 KV
ITANA_PG 119 KV
KHAND_NO 136 KV
CRITICAL LOAD
132 kV AXIS I 10
132 kV AXIS II 10
LEGEND
400 kV line
220 kV line


SINGLE LINE DIAGRAM OF NORTH EASTERN REGION
Frequency:
20-JAN-2013
15:02:42
BONGAIGAON 50.21HZ
50.24 HZ BALIPARA
50.22 HZ
RANGANADI
Along
Daporizo
NIRJULI
NAHARLAGUN
KATHALGURI
Deomali
Dibrugarh
Tinsukia
NTPS
LTPS 50.00HZ
BONGAIGAON
Bhutan(Ghelpu)
DHALIGAON
BTPS
Nalbari
Bornagar
Sisugram
Rangia
Sipajhar
Khupi
KAHILIPARA
Narangi
Rowta
Depota
Gohpur
CTPS
Sarusajai
SARUSAJAI
DISPUR
Langpi
SAMAGURI
Agia
Boko
NORBONG
RAJABAGAN
MISA
50.22 HZ
Diphu
Golaghat
Bokajan
Umtru
BYRNIHAT(KILLING)
LESHKA
50.21HZ
Stage IV
Stage III
Stage II
Stage I
UMIAM
NEHU
Khlieh(ME)
Khlieh(PG)
KOPILI
DIMAPUR
Mokokchung
Tuensang
DOYANG
Wokha
Kiphire
Tura
Nangalbibra
MAWLAI
NEIGRIHMS
Lumshnong
49.72 HZ
BADAR(PG)
KHANDONG
Dimapur(S)
Kohima
Meluri
Adamtilla
Pathkarkandi
Panchgram
Dullavcherra
Srikona
Silchar
Dharamnagar
HAFLONG
Bokajan
Karong
Likimro
SILCHAR
Pailapool
Yaingangpokpi
Kakching
45.00
PALATANA
50.18 HZ
Rokhia
Ambasa
P K Bari
Kailashr
Baskandi
Kolasib
JIRIBAM
IMPHAL
49.55 HZ
Imphal(S)
Kmlpr
KUMARGHAT
AIZAWL
Luangmual
Jiribam
Rengpang
Ningthoukhong
Churachandpur
Sujingr
Udaipur
Badarghat
16 AGARTALA
Dhalabil
RCNAGAR
Zimabawk
Bhairabi
Serchip
Lunglei
49.60HZ
LOKTAK
49.59HZ
Ayaypur
Teliamura
Gumti
Baramura
Bijnagar
Jirania
Gamaitilla
Vairengte
IMPORTANT BUS VOLTAGE
BONGA_PG 398 KV
BALIP_PG 397 KV
MISA_PG 0 KV
RANGA_NO 404 KV
MISA_PG 0 KV
KOPIL_NO 245 KV
KATHA_NO 221 KV
SAMAG_AS 211 KV
KAHEL_AS 129 KV
NEHU_ME 0 KV
DIMAP_PG 1 KV
LOKTA_NH 143 KV
BADAR_PG 134 KV
AGART_NO 134 KV
ITANA_PG 119 KV
KHAND_NO 139 KV
CRITICAL LOAD
132 kV AXIS I 0
132 kV AXIS II 0
LEGEND
400 kV line
220 kV line
132 kV line
66 kV line


SINGLE LINE DIAGRAM OF NORTH EASTERN REGION
Frequency:
20-JAN-2013
15:42:27
BONGAIGAON 49.97 HZ
49.97 HZ BALIPARA
49.97 HZ
RANGANADI
Along
Daporizo
Deomali
Dibrugarh
Tinsukia
NTPS
LTPS 50.00 HZ
BONGAIGAON
DHALIGAON
BTPS
Bhutan(Ghelpu)
Agia
Boko
SARUSAJAI
Nalbari
Rangia
Sipajhar
Khupi
Sisugram
Bornagar
KAHILIPARA
Narangi
Rowta
Depota
Gohpur
CTPS
DISPUR
Langpi
SAMAGURI
NORBONG
RAJABAGAN
MISA 49.97 HZ
49.95 HZ
MISA
Diphu
Golaghat
Bokajan
Mokokchung
Tuengsung
Khiphire
Likimro
Umtru
BYRNIHAT(KILLING)
LESHKA
Stage IV
Stage III
Stage II
Stage I
UMIAM
Khlieh(ME)
Khlieh(PG)
KOPILI
DOYANG
Wokha
Kohima
Meluri
Karong
Tura
Nangalbibra
MAWLAI
NEIGRIHMS
Lumshnong
49.94 HZ
BADAR(PG)
KHANDONG
DIMAPUR
Dimapur(S)
Adamtilla
Pathkandi
Panchgram
Dullavcherra
Srikona
Silchar
132
400
SILCHAR
HAFLONG
Dharamnagar
Pailapool
Baskandi
JIRIBAM
IMPHAL
Imphal(S)
Yaingangpokpi
Kakching
Ambasa
P K Bari
Kailashar
50.04 HZ
Kolasib
50.31 HZ
PALATANA
Rokhia
Kmlpr
KUMARGHAT
AIZAWL
Luangmual
Jiribam
Rengpang
Ningthoukhong
Churachandpur
Sujngr
Udaipur
Badarghat
AGARTALA
Dhalabil
Bijnagar
Zimabawk
RCNAGAR
Bhairabi
Serchip
Lunglei
49.93 HZ
LOKTAK
Ayaypur
Jirania
Gamaitilla
49.95 HZ
Vairengte
Gumti
Teliamura
Baramura
IMPORTANT BUS VOLTAGE
BONGA_PG 403 KV
BALIP_PG 403 KV
MISA__PG 411 KV
RANGA_NO 413 KV
MISA__PG 219 KV
KOPIL_NO 222 KV
KATHA_NO 0 KV
SAMAG_AS 211 KV
KAHEL_AS 127 KV
NEHU__ME 130 KV
DIMAP_PG 134 KV
LOKTA_NH 137 KV
BADAR_PG 133 KV
AGART_NO 132 KV
ITANA_PG 122 KV
KHAND_NO 133 KV
CRITICAL LOAD
132 kV AXIS I 4
132 kV AXIS II 4
LEGEND
400 kV line
220 kV line
132 kV line
66 kV line

GENERATION AFFECTED

	MW	MU
Assam	88	0.26
Meghalaya	30	0.07
Tripura	104	0.05
Nagaland	8	0.01
Total State	230	0.39
Kopili	49	0.1
Loktak	105	0.045
AGTPP	58	0.047
AGBPP	212	0.7
Total CS	424	0.88
Total	654	1.27

LOAD AFFECTED

State	MW	MU
Arunachal Pradesh	0	0.0
Assam	300	0.38
Manipur	81	0.04
Meghalaya	174	0.24
Mizoram	39	0.04
Nagaland	57	0.09
Tripura	115	0.035
Total	766	.83

Thank U

Annexure-D.14

Issue related to Congestion in ER-NER Corridor during Lean Hydro period

Constraints in TTC calculation

- **During lean hydro period, loading of 400 kV Farakka – Malda D/C lines is main concern for feeding power to North Bengal, Bhutan, Sikkim, North Bihar (Purnia) , NR & NER.**

- During this period, generation of Teesta and Rangit in ER & generation of Tala, Chukha and Kurichu in Bhutan reduced considerably.

- **Loading problem of 400 kV Farakka – Malda D/C lines aggrevated later part of this period when generation of these plants is at the minimum level during peak hours.**

Basis for ER-NER TTC calculation

- **For the purpose, power transfer from ER to NER, the congested corridor is 400 kV Farakka – Malda D/C lines.**

- During lean hydro period, with 300 MW export to NER and 2100 MW export to NR, and only one circuit of 400 kV Purnea - Muzaffarpur in service (with Purnea FSC bypassed), the power flow on 400 kV Farakka – Malda D/C lines observed 460 MW / ckt at base case.

- **Under this condition, outage of a single circuit *(N – 1 contingency)* causes the power flow through the other ckt to rise to *852 MW* (thermal loading limit), which is the maximum allowable power to avoid a further contingency.**

- 10% of normal thermal loading under emergency condition may be allowed following a N-1 Contingency i.e. 110% of 852 MW = ***940 MW*** (approx.)

- **With this enhanced line loading limit, studies reveal that around *450 MW* export to NER and *2350 MW* export to NR is possible.**

Representative Load Generation Scenario

- **Power availability of North Bengal, Bhutan, Sikkim, North Bihar (Purnia) , NR & NER :**
  - 400 kV Farakka – Malda D/C **: 940 MW**
    (Considering N-1 of one circuit and 110 % loading of other circuit)
  - Tala Generation **: 170 MW**
  - Rangit Generation **: 20 MW**

  Total availability of Power : ***1130 MW***

- **Load of North Bengal, Bhutan, Sikkim & North Bihar (Purnia) :**
  - North Bihar(Purnia) : **230 MW**
  - Bhutan receipt : **60 MW**
  - Sikkim : **60 MW**
  - North Bengal : **220 MW**

  Total load : 570 MW

- **Power available for export to NER and NR (Simultaneous) equals 1140 MW minus 570 MW i.e.** *560 MW*

- **Considering sensitivity of 400 kV Farakka – Malda D/C line loading, 80% is towards import of NER and 20% is towards import of NR.**

  TTC of NER = 80% of 560 MW = *450 MW* **(approx.)**

Thank you