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 - ७९३००३
Nongrim Hills, Shillong – 793003.

ISO 9001:2008

Ph. No: 0364 - 2520050
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Website: www.nerpc.nic.in

No. NERPC/SE (O)/OCC/2013/***7013-46*** Dated: January, 29 2014

To,

1. Managing Director, AEGCL, Bijuli Bhawan, Guwahati – 781 001
2. Managing Director, APDCL, Bijuli Bhawan, Guwahati – 781 001
3. Managing Director, APGCL, Bijuli Bhawan, Guwahati – 781 001
4. Director (Generation), Me. PGCL, Lumjingshai, Short Round Road, Shillong – 793 001
5. Director (Distribution), Me. ECL, Lumjingshai, Short Round Road, Shillong – 793 001
6. Director(Transmission), Me. PTCL, Lumjingshai, Short Round Road, Shillong – 793 001
7. CGM, (LDC), SLDC Complex, AEGCL, Kahilipara, Guwahati-781 019
8. Chief Engineer (WE Zone),Department of Power ,Govt. of Arunachal Pradesh, Itanagar- 791 111
9. Chief Engineer (EE Zone),Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791 111
10. Chief Engineer (TP&MZ),Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791 111
11. Engineer-in-Chief (P&E), Department of Power, Govt. of Mizoram, Aizawl – 796 001
12. Chief Engineer (P), Electricity Department, Govt. of Manipur, Keishampat, Imphal – 795 001
13. Chief Engineer (P), Department of Power, Govt. of Nagaland, Kohima – 797 001
14. General Manager, TSECL, Agartala – 799 001
15. Regional ED (East –II), NTPC, 3rd Floor, OLIC Bldg., Pl No- N.17/2, Nayapalli, Bhubaneswar-12
16. ED (O&M), NERTS, PGCIL, Dongtieh-Lower Nongrah, Lapalang, Shillong -793 006
17. ED (O&M), NEEPCO Ltd., Brookland Compound, Lower New Colony, Shillong-793003
18. ED (Commercial), NEEPCO Ltd., Brookland Compound, Lower New Colony, Shillong-793003
19. ED (O&M), NHPC, NHPC Office Complex, Sector-33, Faridabad,Haryana-121003
20. GM (Plant), OTPC, Badarghat Complex, Agartala, Tripura - 799014
21. GM, NERLDC, Dongtieh, Lower Nongrah, Lapalang, Shillong -793 006
22. Member Secretary, ERPC, 14 Golf Club Road, Tollygunge, Kolkata-700033
23. Chief Engineer, GM Division, Central Electricity Authority, New Delhi – 110066

Sub: Minutes of the 93rd OCC & 17th PCC Meetings - Reg.

Sir,

The Minutes of the 93rd OCC & 17th PCC Meetings of NERPC held on 21.01.2014 at "Hotel Sun View, Guwahati is enclosed for favour of kind information and necessary action please**.**

Any comments or observations may kindly be communicated at the earliest.

With warm regards,

Encl: As above

भवदीय / Yours faithfully,

बि. लिंगखोइ / B. Lyngkhoi
अधीक्षण अभियंता / **Superintending Engineer**
प्रचालन / **Operation**

Copy to:

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

वी. लिंगखोई

अधीक्षण अभियंता / **Superintending Engineer**

North Eastern Regional Power Committee

MINUTES OF THE 93rd OPERATION COORDINATION SUB-COMMITTEE MEETING OF NERPC

Date : 21/01/2014 (Tuesday)
Time : 10:00 hrs
Venue : "Hotel Sun View", Guwahati.

The List of Participants in the 93rd OCC Meeting is attached at **Annexure – I**

Shri S.K. Ray Mohapatra, Member Secretary (I/C), NERPC welcomed all the delegates of constituents to the 93rd OCC meeting & wished them Happy New Year 2014. He mentioned that 2014 has brought many good news to the region and some of those was highlighted by him. He informed that SR grid was synchronized with NEW grid on 31.12.2013 forming one grid, i.e. National Grid. Further, OTPC has declared CoD of Unit #1 (363.3MW) on 04.01.2014 and with the commissioning of Unit #1 (363.3MW) at Pallatana, great relief to power shortage is expected in NER. Also the decisions of 14th TCC have been approved by all the NERPC members and the same has been circulated & made available in the website of NERPC. Hence, POWERGRID can now go ahead with works associated with SLDCs for four states (Ar. Pradesh, Manipur, Mizoram & Nagaland), upgradation of SCADA / EMS in other three states (Assam, Meghalaya & Tripura) and establishment of OPGW link in the region. He also informed that consolidated project proposal amounting to Rs. 816.00 crores viz. "Rectification of various deficiencies including renovation and modernization of protection system in existing substations and generating stations of 132kV and above class", prepared by NERPC, on behalf of the region, has been submitted by Chairman, NERPC & Hon'ble Power Minister, Govt. of Tripura to Ministry of Power (Govt. of India) & Ministry of DoNER. Further he mentioned that after detail discussion in the recent meeting of Assam, ERPC, ERLDC, NERPC & NERLDC at Kolkata on 09-01-2014, it has been agreed that exiting MoU between Royal Govt. of Bhutan & PTC will be amended to include Rangia (in Assam) as another power delivery point for generation from Bhutan to NER in India at 132kV level (through 132 KV Motonga – Rangia 132kV line) in addition to the delivery point at Salakati at 220kV level. He also mentioned about approval of number of

NER system improvement proposals during the joint Standing Committee Meeting of ER & NER held on 03.01.2014 at Guwahati. He expressed concern about forced shutdown of generating Units of Kopili due to damage of machine and leakage in water conductor system and in the process about 200-250MW of central sector generation is in danger and over all capacity addition by OTPC virtually comes down to 100MW only. He highlighted about some of the important issues to be discussed in the meeting viz. SPS, Islanding scheme and UFR based load shedding etc. He requested all the constituents to actively participate in the discussion in the meeting for fruitful outcome.

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

SE(O), NERPC informed that this meeting is joint meeting of OCC & PCC since many of the items are common in nature.

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 92nd MEETING OF OPERATION SUB-COMMITTEE OF NERPC.

S.E (O) informed that the minutes of 92nd meeting of Operation Sub-committee held on 6th December, 2013 at Guwahati were circulated vide letter No. NERPC/SE (O)/OCC/2013/6613-6635 dated 19th December, 2013.

CONFIRMATION OF MINUTES OF 16th MEETING OF PROTECTION SUB-COMMITTEE OF NERPC.

Similarly, the minutes of 16th meeting of Protection Sub-committee held on 6th December, 2013 at Guwahati were circulated vide letter No. NERPC/SE (O)/PCC/2013/6636-6658 dated 31st December, 2013.

The Sub-committee confirmed the minutes of 92nd OCCM & 16th PCCM of NERPC as no observations or comments were received from the constituents.

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

The presentation as given by NERLDC is given as below:

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 DEC' 13

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

NER PERFORMANCE DURING DECEMBER, 2013

	Energy Met (MU)			Energy Reqr. (MU)		
States	**Dec-13**	**Nov-13**	**% inc(+)/dec(-)**	**Dec-13**	**Nov-13**	**% inc(+)/dec(-)**
Ar. Pradesh	49	**41.83**	17	51.791	**44.93**	15
Assam	557	**563.83**	-1	591.314	**580.29**	2
Manipur	47	**43.54**	8	50.446	**46.46**	9
Meghalaya	147	**136.82**	7	168.186	**156.87**	7
Mizoram	42	**37.77**	11	43.022	**39.25**	10
Nagaland	48	**42.78**	12	50.36	**44.49**	13
Tripura	101	**99.58**	1	105.696	**104.35**	1
Region	**990**	**966.15**	2	**1060.81**	**1016.64**	4

	Demand Met (MW)			Demand in (MW)		
States	**Dec-13**	**Nov-13**	**% inc(+)/dec(-)**	**Dec-13**	**Nov-13**	**% inc(+)/dec(-)**
Ar. Pradesh	124	120	3	125	120	4
Assam	1065	1155	-8	1153	1169	-1
Manipur	129	123	5	130	124	5
Meghalaya	313	298	5	312	300	4
Mizoram	79	65	22	80	66	21
Nagaland	104	96	8	105	96	9
Tripura	191	207	-8	194	208	-7
Region	**1890**	**1966**	-4	**2009**	**2046**	-2

REGIONAL GENERATION & INTER-REGIONAL EXCHANGE IN MU

Month---->	**Dec-13**	**Nov-13**
Total Generation in NER (Gross)	729.890	763.05
Total Central Sector Generation (Gross)	441.697	471.97
Total State Sector Generation (Gross)	288.193	291.08
Inter-Regional Energy Exchange		
(a) NER-ER	14.83	12.37
(b) ER-NER	283.76	225.99
© Net Import	268.92	213.62

AVERAGE FREQUENCY (Hz)

Month---->	**Dec-13**	**Nov-13**
	% of Time	% of Time
Below 49.7 Hz	1.91	1.17
Between 49.7 to 50.2 Hz	89.5	91.23
Above 50.2 Hz	8.6	7.6
Average	50.02	50.02
Maximum	50.69	50.51
Minimum	49.33	49.48

From the above table, it is seen that energy demand met and peak met of the region have decreased respectively. The import from ER has also increased considerably.

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

State	A (<49.8 Hz)		B (<49.7 Hz)		C (<49.7 Hz) Persistent Overdrawal		**Total**	
	Nov'13	Dec'13	Nov'13	Dec'13	Nov'13	Dec'13	Nov'13	Dec'13
Ar. Pradesh	01	04	00	01	00	00	01	05
Assam	01	05	00	01	00	00	01	06
Manipur	01	04	00	00	00	00	01	04
Meghalaya	01	04	00	00	00	00	01	04
Mizoram	01	00	00	00	00	00	01	00
Nagaland	01	06	00	00	00	00	01	06
Tripura	00	05	00	01	00	00	00	06

The Sub-committee noted as above.

FOLLOW UP ACTION

C.1 Synchronization of Pallatana Module -I

During the 92nd OCC meeting, the representative of OTPC informed that ONGC has already carried out 4th round of pigging, Performance Heater Test is under progress and the same will be completed soon. He also intimated that cyclone separator will be installed by 15th December, 2013. For installation of cyclone separator, shut down of machine for 4-5 days is normally required. However, he mentioned that without waiting for installation of cyclone separator, the Unit#1 will be synchronized on 10-12-2013 and PPA test including other trial run operations would be carried out so that CoD can be achieved within 31st December, 2013. He requested all the constituents to extend their support during PPA test.

All the constituents had agreed to extend their support to OTPC and this lean hydro season is very much suitable for achieving the maximum generation required for trial operation / PPA tests. The committee requested OTPC to co-ordinate with NERLDC for ensuring smooth operation of the grid during PPA tests and to intimate NERLDC about the schedule of tests / trial operation at least one week in advance.

Deliberation of the Committee

The representative of OTPC informed that the trial run operations and tests as per PPA has been carried out successfully from 26.12.2013 to 30.12.2013 and thanked all the constituents for their co-operation during the crucial period. The CoD of Unit # 1 was declared on 04.01.2014. Further, he informed that 2nd Gas Booster Compressor (GBC) has been received from M/s BHEL and the 3rd GBC is still in BHEL's factory at Hyderabad. The trail run of 2nd GBC would be carried out on 22nd January 2014 and the CoD for Unit # 2 is expected in the month June 2014.

DGM, NERLDC requested OTPC to ensure SCADA integration prior to commissioning / synchronization of 2nd Block. OTPC agreed for the same.

NERLDC also informed that

1. As per Clause 1 (12) of CERC Tariff Regulations 2009-14, Pallatana U-I (363.3 MW) demonstrated the Maximum Continuous Rating (MCR) or the Installed Capacity through a successful trial run on 3rd January, 2013.

2. Out of 363.3 MW Installed Capacity of Unit-I, 49 MW is merchant quantum and balance 314.3 MW is contracted with NER states which is the contracted capacity.

3. As per provision of clause 6.2 of the PPA between OTPC and buyers of North Eastern States, the performance test (PPA test) of 363.3 MW block-I of Pallatana GBCC project with continuous operation of 72 consecutive hours at or above 95% of contracted capacity) was conducted from 1200 hrs of 26.12.2013 upto 1800 hrs of 30.12.2013. During this period generation was maintained between 303 MW to 320 MW.

4. In line with these, OTPC declared commercial operation of Unit-I w.e.f. 0000 hrs of 04.01.2014

5. As per (3) above, tested capacity was more than 100% contracted capacity.

6. In day ahead scheduling, available capacity for the constituents are declared accordingly.

The Sub-committee also reviewed the status of commissioning of second unit of OTPC at Pallatana & following Transmission lines. The status as informed by OTPC and POWERGRID is as follows:

SN	Items	Present status
1	Trial operation of Unit -II of OTPC at Palatana	June, 2014
2	400KV D/C Silchar - Melriat line	June, 2014
3	400KV D/C Silchar - Imphal line	June, 2014
4	220KV D/C Mariani (New) – Mokokchung	March, 2014
5	400KV D/C Byrnihat-Bongaigaon line	March, 2014 (Byrnihat-Ajara section likely to be completed by January 2014)
6	400kV Balipara – Bongaigaon D/C line # 3 & 4 with FSC	March, 2014 [FSC commissioned on 11.01.2014]

The Sub-committee noted as above.

C.2 Independent third party audit of protection system:

During 92nd OCC meeting, Member Secretary I/C requested all constituent states of the region to take up the issue with their respective Power Ministry for approaching the Ministry of Power, Govt. of India so that fund is made available from NLCPR-Central at the earliest and the schemes is implemented early for smooth operation of the grid for the benefit of the region as well as for the country.

Deliberation of the Committee

SE (O) informed that as decided in 14th TCC meeting, project proposal amounting to Rs. 816.00 crores viz. "Rectification of various deficiencies including renovation and modernization of protection system in existing substations and generating stations of 132kV and above class", prepared by NERPC, on behalf of the region, has been submitted by Chairman NERPC & Hon'ble Power Minister, Govt. of Tripura to Ministry of Power (Govt. of India) and Ministry of DoNER vide letter dated 10.01.2014 requesting to look into the matter and to take necessary step for getting the project sanctioned under NLCPR (Central).

The constituent states are requested to take up the matter with their respective Power Ministry so that funding for execution of above work is made available from NLCPR-Central to the constituent states of the region at the earliest. The up-gradation of protection system / renovations of substations / generating stations are essential for safety, security and reliable operation of the system. Hence subcommittee requested that based on the protection audit report, initiative should be taken by constituent states of the region for taking up essential activities in some of the sub stations / generating stations at their own expenses without waiting for funding to avoid unwarranted tripping / system isolation.

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 14th TCC meeting, the quantum of UFR based load shedding has been approved by the Committee as decided in the 88th & 13th PCC meeting as given below:

SN	Stages	Frequency (in Hz)	State-wise Load Shedding	Total Load shedding (in MW)
1	Stage-I	49.2	Arunachal = 5 MW Assam = 55 MW Manipur = 5 MW Meghalaya = 15 MW Mizoram = 5 MW Nagaland = 5 MW Tripura = 10 MW	100
2	Stage-II	49.0	Arunachal = 5 MW Assam = 55 MW Manipur = 5 MW Meghalaya = 15 MW Mizoram = 5 MW Nagaland = 5 MW Tripura = 10 MW	100
3	Stage-III	48.8	Arunachal = 5 MW Assam = 55 MW Manipur = 5 MW Meghalaya = 15 MW Mizoram = 5 MW Nagaland = 5 MW Tripura = 10 MW	100
4	Stage-IV	48.6	Arunachal = 5 MW Assam = 55 MW Manipur = 5 MW Meghalaya = 15 MW Mizoram = 5 MW Nagaland = 5 MW Tripura = 10 MW	100
			Total load shedding	**400**

During 92nd OCC meeting, the Committee reviewed the list of feeders identified for UFR based load shedding by the constituent states of the region. In the meeting the representative of Nagaland also submitted the list of feeders identified for UFR based load shedding. Assam was requested to ensure that feeders / loads considered under four staged (49.2 Hz, 49.0 Hz, 48.80Hz, 48.60Hz) UFR based load shedding should not form part of proposed islanded pocket. Assam, Meghalaya & Nagaland informed that the implementation of UFR based load shedding for 1st & 2nd Stage would be completed by January, 2014 and Mizoram by February, 2014. The status pertaining to Ar. Pradesh, Manipur & Tripura could not be updated since no representative was present. All constituent states of the region, except Ar. Pradesh and Manipur, have identified the feeders for UFR based load shedding.

Deliberation of the Committee

The Committee reviewed the status of UFR based load shedding:

Ar. Pradesh: Status could not be updated as no representative from Ar. Pradesh was present.

Assam: UFRs based load shedding for 220MW have been implemented and UFRs have been made operational in all identified feeders (i.e. 100% implementation).

Manipur: The identification of the feeders for the required quantum of UFR based load shedding at different stages will be implemented by January 2014.

Meghalaya: The Sub-committee requested Meghalaya to utilize the existing stand alone UFRs for Stage – I & II of revised UFR based load shedding. Meghalaya agreed to complete the installation of above UFRs by February, 2014.

Mizoram: Status could not be updated as no representative from Mizoram was present.

Nagaland: UFRs required for Stage – III is already in place, installation of UFRs for Stage – I & II will be completed by January, 2014 and installation of UFRs for Stage – IV will be completed soon.

Tripura: The Sub-committee requested Tripura to utilize the existing stand alone UFRs for Stage – I & II of revised UFR based load shedding. Tripura agreed to complete the installation of above UFRs by February, 2014.

The installation of UFRs in various states for remaining Stages will be completed soon after completion of procurement process. The details of UFR based load shedding is given at **Annexure – C.3.**

The Sub-committee noted as above.

C.4 Lines under long outages

During the 93rd OCC meeting, the issue for restoration of these lines was reviewed by the committee and the status was as follows:

a) 220kV BTPS – Agia line (one ckt) – [Since Nov'97]: Material has already been procured and the target for completion of work is **June, 2014.**

b) 132kV Mariani – Mokokchung line - [Since Apr'02]

SDO, DoP, Nagaland informed that the work associated with replacement of insulators in the section of line within Nagaland territory has been completed and the line was test charged in January, 2014 from Mokokchung till Langtho (the border point of Nagaland) and now the remaining portion from Langtho – Mariani, which is under the jurisdiction of Assam, has to be completed by Assam.

Assam stated that since no communication was received from DoP, Nagaland regarding charging of the line, the same will be verified by them. Assam requested Nagaland to write to their concern Authority so that the line can be revived at the earliest. The Sub-committee requested Nagaland to give a copy of communication to NERPC Secretariat so that the same can be pursued by them with Assam. Nagaland agreed. AGM of Assam requested Nagaland to check the adequacy of CT ratio at Mokokchung end and enquired about the test charging voltage level.

DGM, POWERGRID stated that charging of 132 KV insulators at lower voltage (say 33 KV or 11kV) for a prolonged period may hamper the strength of insulators as there is experience of shattering of insulators when the line is charged at rated voltage (132kV). Also he requested Nagaland to check their CT ratio before charging the above line.

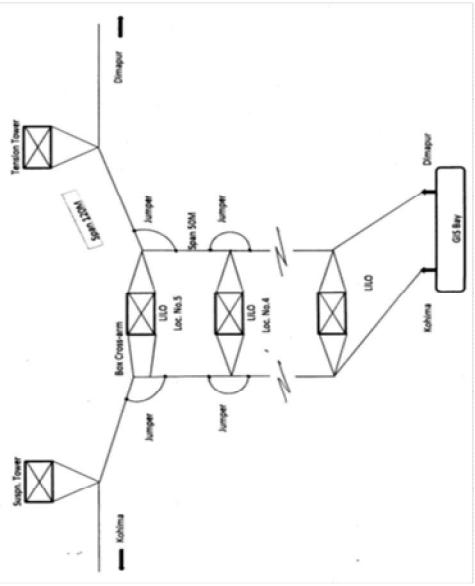
The representative of Nagaland informed that he will revert back in next OCC meeting.

c) 39km of 132kV Rengpang – Jiribam line – [Since Oct'02]

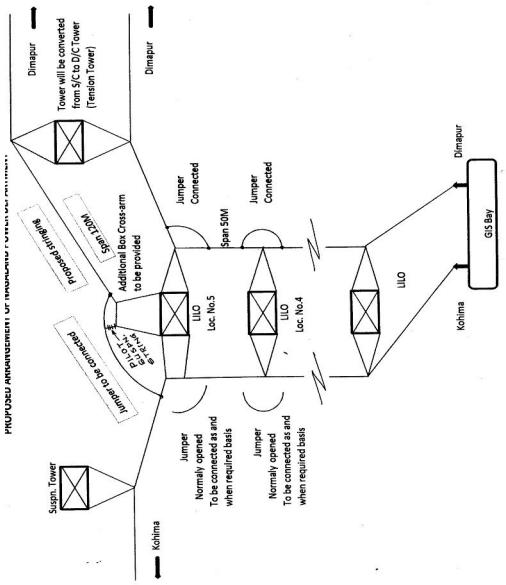
EE, DoP, Manipur informed that site for relocation of new tower (due to ground clearance problem caused due to road cutting by BRTF) has been identified and the work is likely to be completed and line will be charged by February, 2014.

d) LILO of 132 kV Dimapur (Nagaland) – Kohima (Nagaland) line at 220/132 kV Dimapur (PGCIL) Substation- [Since Aug'11]:

The Sub-committee enquired from POWERGRID about the status of approval of proposed modification (i.e. incorporation of additional Box Cross Arm at Tower Location No. 5) as submitted by Nagaland.



Before Modification



After Modification

DGM, POWERGRID stated that the project proposal for suggested modification have already been sent to their corporate office at Gurgaon for approval (i.e. incorporation of additional Box Cross Arm at Tower Location No. 5). Further, he informed that the corporate office is insisting for connectivity with Kohima through LILO arrangement at POWERGRID's GIS substation at Dimapur.

The subcommittee also suggested DoP, Nagaland to utilize the LILO arrangement at GIS substation at Dimapur for the connectivity to Kohima. Nagaland agreed to highlight the issue to higher authority.

The Sub-committee noted as above.

C.5 SPS scheme for Pallatana

The following four (4) System Protection Scheme (SPS) associated with generating Unit#1 (363.3MW) of OTPC at Palatana has been planned for NER and are under implementation.

Case 1: Tripping of generating unit of OTPC at Palatana

Case 2: Tripping of 400 kV D/C Palatana- Silchar line (with generation from OTPC's plant at Palatana)

Case 3: Tripping of 400 kV Silchar-Byrnihat line (with generation from OTPC's plant at Palatana)

Case 4: Tripping of 400 KV Silchar – Byrnihat line (without generation from OTPC's plant at Palatana)

The scheme for all the four cases will be as follows:

Case 1: <u>When Palatana unit trips:</u>

i. When generator at Palatana trips a signal will be generated from trip relay of the unit.

ii. This signal should trip the CB of 132 kV Silchar – Srikona D/C & 132 kV Silchar – Panchgram lines at Silchar.

iii. Subsequent to tripping of 132 kV Silchar – Panchgram line, the CB at Badarpur of 132 kV Badarpur – Panchgram line should be tripped.

iv. After these trippings an instant load of 80 MW will be relieved during off-peak hours & 130 MW will be relieved during peak hours which will prevent the system from cascade tripping

v. Then manual demand disconnection/management should be imposed.

Case 2: <u>When 400 kV Palatana-Silcher (D/C) lines trip</u>

i. When both the ckts of 400 kV Palatana – Silchar lines trips, a signal will be generated from trip relays at Silchar

ii. This signal should trip the CBs at Silchar end of 132 kV Silchar – Srikona D/C & 132 kV Silchar – Panchgram lines.

iii. Subsequent to tripping of 132 kV Silchar – Panchgram line, the CB at Badarpur end of 132 kV Badarpur – Panchgram line should be tripped.

iv. After these trippings an instant load of 80 MW will be relieved during off-peak hours & 130 MW will be relieved during peak hours which will prevent the system from cascade tripping

v. Then manual demand disconnection/management should be imposed.

Case 3: 400 kV Silchar – Byrnihat line (with generation at Pallatana)

When 400 kV Byrnihat – Silchar lines trip, signal will be generated from trip relays at Silchar

i. This signal should trip CB of GTG/STG of Generating Unit at Palatana. But unit may run in Full Speed No Load (FSNL) condition.

ii. An instant relief of load of 230/130 MW will prevent the system from cascade tripping.

iii. Then manual demand disconnection/management should be imposed.

Case 4: When 400 kV Silchar – Byrnihat line trip(without generation at Pallatana)

i. When 400 KV Byrnihat – Silchar line trips, a signal will be generated from trip relays at Silchar.

ii. This signal should trip the CB of 132 kV Silchar – Srikona D/C & 132 kV Silchar – Panchgram lines at Silchar.

iii. Subsequent to tripping of 132 kV Silchar – Panchgram line, a signal will be generated from trip relay of 132 KV Silchar – Panchgram line. This signal should trip the CB at Badarpur of 132 kV Badarpur – Panchgram line.

iv. After these trippings an **instant load relief** of around **95 MW in Peak Hours** which will prevent the system from cascade tripping.

v. Then manual demand disconnection/management may be imposed, if necessary.

Deliberation of the Committee

NERLDC informed that at present, Unit # 1 of OTPC at Palatana is generating around 350 MW round the clock. Without the SPS in place the 132 kV Pocket always remains in venerable condition. Therefore, proposed SPS should be in place as soon as possible to avoid security threat to the system due to high generation. It has been observed that SPS-1 did not operate after tripping of Unit #1.

The Sub-committee reviewed the status of implementation of the scheme and the current status is as follows:

Case I: OTPC stated that necessary action at their end has already been completed and the scheme is now operational. He cited that on 21.01.2014 when the Unit tripped, the Sequence of Event (SOE) recorder indicated operation of SPS. POWERGRID, however, informed that no signal was received at Silchar end. The subcommittee requested OTPC to co-ordinate with POWERGRID so that the SPS can be made operational. OTPC informed that there may be some problem with communication link which will be sorted out soon in consultation with POWERGRID.

Case 2-3: OTPC stated that for implementation of SPS -2 & 3 mentioned above, BHEL & OTPC have already discussed in detail and finalized the scheme in the meeting held at Palatana on 17.01.2014. The scheme will be implemented soon after procurement of hardware required for the SPS. The SPS will come into picture only when generation is more than 200MW. The Sub-committee has decided to circulate the approved SPS wiring diagram submitted by OTPC & POWERGRID along with the Minutes and the same is at **Annexure – C.5**.

The representative of OTPC requested the forum for following:

(a) SPS at OTPC end should not be modified with commissioning of 2nd Circuit of Silchar _ Bongaigaon 400kV line.

(b) Trip command from two different sources should be available to desynchronize the machine to avoid unwarranted tripping of generating Unit when the generation is more than 200MW. Subcommittee suggested OTPC for getting input from Circuit breakers at both ends of the line (Silchar & Byrnihat) through communication link and to discuss the matter with POWERGRID.

(c) Two out of three logics [i.e inputs from circuit breaker (s), master trip relay (s) etc.] shall be utilized for desynchronisation of Gas Turbines. Subcommittee suggested OTPC to discuss the matter with POWERGRID.

Case – 4: Has already been implemented by POWERGRID and tested ok.

Further, POWERGRID confirmed that the work associated with all four (4) SPS have already been completed at their end.

The Sub-committee expressed concern about early implementation of SPS -2 & 3 and noted as above.

C.6 Implementation of islanding scheme in NER

The implementation of Islanding scheme was one of major recommendations of enquiry committee in order to restore the system fast in case of grid disturbance. In NER most of generating plants are either hydro based or gas based plant. The frequency at which the Gas based generating Units trip is generally much higher than islanding frequency i.e. 47.9Hz recommended by the enquiry committee. During discussion in OCC and PCC forum it was brought to notice that the frequency setting for tripping of the Gas based generating Units of NTPS is 48.72 Hz. Similarly the frequency setting at which generating Units of AGBPP are likely to trip is 47.5 Hz (for M/s Mitsuibisi make unit) and 48.0 Hz (for M/s BHEL make unit) and that of AGTPP is 48.0 Hz. & Gas based generating Units of OTPC at Palatana is 47.8 Hz (for M/s BHEL make Unit). After deliberation in OCC, PCC and TCC forums following islanding scheme and associated frequencies levels for creation of islands in NER was planned.

SN	Islanding Scheme	Lines required to be opened	UFR Location	Implementing Agency
1	**ISLAND AT 48.80 Hz:** Island comprising of generating units of AGBPP (Gas), NTPS (Gas) & LTPS (Gas) and loads of Upper Assam system & Deomali area (Ar. Pradesh) **[Total Generation: 380-400MW and load: 200MW (off peak)-300MW (peak)]**	(a) 220 kV New Mariani (PG) – AGBPP	UFR-1 [At New Mariani (PG)]	**POWERGRID**
		(b) 220 kV New Mariani (PG) – Misa		
		(c) 220 kV Mariani – Misa	UFR-2 [At Mariani, Samaguri of AEGCL]	**AEGCL**
		(d) 220 kV Mariani – Samaguri		
		(e) 132 kV Mokukchung – Mariani		
		(f) 132 kV Dimapur (PG) – Bokajan	UFR-3 [At Dimapur (PG)]	**POWERGRID**
2	**ISLAND AT 48.20 Hz:** Island comprising of generating units of AGTPP (Gas), generating units at Baramura (Gas), Rokhia (Gas) & Gumati (Hydro) and loads of Tripura system & Dullavcherra area (Assam) **[Total Generation: 150-160MW and load: 110MW (off-peak)-150MW (peak)]**	132 kV Palatana – Udaipur	UFR-1 [At Palatana]	**OTPC**
		132 kV Palatana – Surjamani Nagar		
		132 kV Silchar – Dullavcherra	UFR-2 [At Silchar]	**POWERGRID**
		132 kV AGTPP – Kumarghat	UFR-3 [At Kumarghat]	**POWERGRID**
		132 kV P K Bari – Kumarghat		

3	**ISLAND AT 47.90 Hz:** Isolation of NER from NEW grid at ER-NER boundary with rest of the generation and load of NER	To be decided after system study

The deliberation / decisions in the 1st meeting of the subgroup on the Islanding Scheme which was held on 29.11.2013 at SLDC, Kahilipara was as follows:

1. NERLDC gave brief presentation on system studies carried out in connection with 1st and 2nd islanding schemes. NERLDC informed that in case of 1st islanding scheme, in general the generation (in the proposed islanded pocket) will be more (of the order of 100-150MW) than the connected load depending on peak/off-peak and summer/winter/monsoon condition. Similarly in case of 2nd islanding scheme the generation (in the proposed islanded pocket) will be more (of the order of 30 - 50MW) than the connected load under off-peak condition and less (of the order of 20 - 25MW) than the connected load under peak condition. The gap between expected generation and load will vary and hence proper load generation balance would be required for survival of islanded pocket.

2. It was decided to focus on implementation of 1st Islanding scheme comprising of generating units of AGBPP (Gas), NTPS (Gas) & LTPS (Gas) and associated load of Upper Assam System, Deomali Area of Arunachal Pradesh.

3. The representatives of NEEPCO, AEGCL & Tripura were requested to send the machine data to IIT, Guwahati & NERLDC by 1st week of December 2013. In case relevant information is not available with the generating companies, standard values may be assumed for the studies.

4. Professor Tripathy of IIT, Guwahati was requested to carry out relevant system studies associated with the proposed islanding schemes based on the relevant machine data provided by LTPS, NTPS, AGPPP, AGTTP, and Tripura. Simulation should be carried out by opening unit (s) of AGBPP / NTPS / LTPS to see the behavior of the system. NERLDC will also carry out similar exercise in consultation with Prof. Tripathy and the result of study will be discussed in OCC/PCC meetings.

5. Feeders / loads considered under four staged (49.2 Hz, 49.0 Hz, 48.80Hz, 48.60Hz) UFR based load shedding /any manual shedding should not form part of proposed islanded pocket.

6. During discussion it was brought to notice that machines at Namrup, Lakwa and AGBPP are quite old, unit sizes are also quite different and of different make. Moreover, being gas based machines, reduction in generation by way of reducing fuel/gas input may not practically feasible and hence de-synchronization / isolation of generating unit (s) one after the other, operating with own house load, will be done to balance load and generation. It was decided that the de-synchronization / isolation of generating unit (s) of AGBPP will be followed by units of Namrup and Lakwa as per requirement to achieve required load and generation balance.

7. UFR may also be installed in feeders / loads for automatic load shedding.

8. Programmable Logic Controller (PLC), UFR and df/dt relays etc. may be required at generating stations and substations for automatic balancing of load and generation.

9. The scheme will be formulated by NEEPCO and PGCIL in association with NERLDC and the target date of implementation of 1st Islanding Scheme proposed at 48.8Hz is January 2014.

10. The Committee also decided that the 2nd Islanding Scheme proposed at 48.2Hz will be implemented soon in similar line after implementation of 1st islanding scheme.

11. In general, the house was of the opinion that proposed 3rd islanding scheme (the isolation of NER from ER at 47.9Hz) should not be considered for the time being as most of the time NER is importing power from ER except during high hydro season. The isolation of NER from ER could be detrimental for NER Grid and NER grid may not survive after isolation.

The deliberation / decisions in the meeting of representative (s) of Assam, NEEPCO, POWERGRID, NERLDC & NERPC on the Islanding Scheme, which was held on 19-12-2013 at NERLDC, Shillong was as follows:

1. For 1st islanding Scheme at 48.8 Hz [comprising of AGBPP, NTPS & LTPS and associated loads], UFRs, inbuilt feature of numerical relays, will be activated at New Mariani (PG) & Dimapur (PG) substations by POWERGRID (for opening of two 220kV lines and one 132kV line) and at Mariani and Samaguri substations by AEGCL (for opening of two 220kV lines and one 132kV line).

2. For 1st islanding Scheme at 48.8 Hz [comprising of AGBPP, NTPS & LTPS and associated loads], UFRs, inbuilt feature of numerical relays, will be activated at New Mariani (PG) & Dimapur (PG) substations by POWERGRID (for opening of one 220kV lines and one 132kV line) and at Mariani and Samaguri substations by AEGCL (for opening of two 220kV lines and one 132kV line).

3. Similarly for 2nd islanding Scheme at 48.2 Hz [comprising of AGTPP, Baramura, Rokhia & Gumati and associated loads], UFRs, inbuilt feature of numerical relays, will be activated at Silchar & Kumarghat substations by POWERGRID (for opening of four 132kV lines) and at Palatana substation by OTPC (for opening of two 132kV lines).

4. Two UFRs (one as back up) need to be activated at above locations.

5. The time delay for operation of UFRs at all these locations will be 5 secs.

6. Based on operational experience, it is expected that after formation of island, the frequency in the islanded pocket is likely to rise suddenly as expected generation will be more than load in the pocket. Hence, it was decided to use UFRs at AGBPP of NEEPCO for de-synchronization / isolation of one GT and one ST from each of two modules, which are in operation, leading to reduction of generation of about 80-90 MW [i.e each module will contribute to reduction of about 40-45MW (GT:30MW+ST:15MW)]. Accordingly UFRs, inbuilt feature of numerical relays, will be also activated at AGBPP of NEEPCO. In addition to above AGBPP has to develop logic to identify the Units, which are in service / operation so that these modules are de-synchronized/ isolated from the system in order to achieve the load and generation balance.

7. After reduction in generation at AGBPP by de-synchronization of two GTs and two STs from two modules, if further reduction in generation is required, then generation reduction of about 20 -30 MW would be carried out at NTPS / LTPS or both.

8. Automatic Governor Control of each module of AGBPP shall also be activated.

9. In case the load is more than generation in islanded pocket of 1st Islanding scheme, UFRS (inbuilt feature of numerical relays) are to be activated at Jorhat, Tinsukia substations by AEGCL for disconnection of radial load of 30MW (off-

peak) and 50MW (peak) by opening of 132kV Jorhat – Bokakhat line (at 48.5Hz), 66kV Tinsukia – Rupai S/C line (at 48.6Hz) and 132kV Tinsukia – Ledo S/C line (at 48.7Hz). UFRs are to be set at three different frequencies as indicated above without any time delay for operation.

10. In next stage, automated scheme would be devised to achieve the load and generation balance. For implementation of such scheme, inputs from SCADA, Programmable Logic Controller (PLC), df/dt and additional UFR etc. may be required at generating stations and substations.

Deliberation of the Committee

DGM, POWERGRID informed the scope of works pertaining to implementation of **Islanding scheme in NER** (i.e. Island-1 at 48.80Hz with 5 Sec delay and Island-2 at 48.50 Hz with 5 Sec delay) has been completed through activation of Under Frequency Relays (inbuilt to different DPRs) for tripping of identified lines and was communicated to NERPC vide email dated 11.01.2014. The detail is enclosed at **Annexure-C.6.**

Island - 1

The sub-committee discussed about implementation of 1st Islanding scheme (proposed at 48.8Hz with 5 sec delay). Subcommittee decided that the opening of 220kV New Mariani (PG) – Misa line is not required for 1st Islanding scheme. Accordingly POWERGRID was requested to modify the logic in UFR / communication link so that 220kV New Mariani (PG) – Misa line is not disconnected.

The representative of NEEPCO informed that the UFR, inbuilt to different DPRs of the 220kV line, will be utilized for desynchronisation of Gas Turbine (s) in each module at AGBPP. In addition to above, subcommittee advised NEEPCO to use the UFR of the generators as back up for desynchronisation of Gas Turbine (s). NEEPCO has also agreed to develop logic to identify the Units, which are in service / operation so that these modules are de-synchronized/ isolated from the system in order to achieve the load and generation balance and to activate the Automatic Governor Control of each module. NEEPCO has agreed to complete the work associated with 1st islanding scheme by February 15, 2014.

Assam informed that UFRs of identified lines (220kV lines) associated with 1st Islanding scheme has been made operational / activated. Assam was requested to active the UFRs of identified lines (at 132kV level) for required load shedding at 48.5Hz, 48.6Hz and 48.7Hz. Assam has agreed to complete the work associated with 1st islanding scheme by February 15, 2014. With completion of above works by NEEPCO, POWERGRID and Assam, the 1st Islanding scheme will be in place.

Island - 2

The sub-committee discussed about implementation of 2nd Islanding scheme (proposed at 48.5Hz with 5 sec delay). POWERGRID and OTPC confirmed that UFRs of identified lines associated with 2nd Islanding scheme has been activated. With completion of these works, 2nd Islanding scheme is considered to be in place.

After incorporating above decisions of the sub-committee, the modified Islanding schemes would be as follows:

SN	Islanding Scheme	Lines required to be opened	UFR Location	Implementing Agency
1	**ISLAND AT 48.80 Hz with 5 Sec delay :** Island comprising of generating units of AGBPP (Gas), NTPS (Gas) & LTPS (Gas) and loads of Upper Assam system &Deomali area (Ar. Pradesh) **[Total Generation: 380-400MW and load: 200MW (off peak)-300MW (peak)]**	(a) 220 kV New Mariani (PG) – AGBPP	UFR-1 [At New Mariani (PG)]	**PGCIL**
		(b) 220 kV Mariani – Misa	UFR-2 [At Mariani, Samaguri of AEGCL]	**AEGCL**
		(c) 220 kV Mariani – Samaguri		
		(d) 132 kV Mokukchung – Mariani		
		(e) 132 kV Dimapur (PG) – Bokajan	UFR-3 [At Dimapur (PG)]	**PGCIL**
		(f) Generators to be desynchronized for reduction of generation [if Generation > Load in the islanded pocket]		
		(g) De-synchronization / isolation of one GT and one ST from each of two modules of AGBPP, which are in operation, leading to reduction of generation of about 80-90 MW [i.e each module	At AGBPP [UFRs of line bays & Generator to be used]	**NEEPCO**

		will contribute to reduction of about 40-45MW (GT:30MW+ST:15MW)].		
		(h) Lines required to be opened for load shedding of of 30MW (off-peak) and 50MW (peak) (i) **[if load > generation in the islanded pocket]**		
		(j) 132kV Tinsukia – Ledo S/C line (at 48.7Hz instantaneous).	UFR [At Tinsukia]	**AEGCL**
		(k) 66kV Tinsukia – Rupai S/C line (at 48.6Hz instantaneous)		**AEGCL**
		(l) 132kV Jorhat – Bokakhat line (at 48.5Hz instantaneous)	UFR [At Jorahat / Bokakhat]	**AEGCL**
2	**ISLAND AT 48.50 Hz with 5 Sec delay :** Island comprising of generating units of AGTPP (Gas), generating units at Baramura (Gas), Rokhia (Gas) &Gumati (Hydro) and loads of Tripura system &Dullavcherra area (Assam) **[Total Generation: 150-160MW and load: 110MW (off-peak) &–170-180MW (peak)]**	132 kV Palatana – Udaipur	UFR-1 [At Palatana]	**OTPC**
		132 kV Palatana – Surjamani Nagar		
		132 kV Silchar – Dullavcherra	UFR-2 [At Silchar]	**PGCIL**
		132 kV AGTPP – Kumarghat	UFR-3 [At Kumarghat]	**PGCIL**
		132 kV P K Bari – Kumarghat		
3	**ISLAND AT 47.90 Hz:** Isolation of NER from NEW grid at ER-NER boundary with rest of the generation and load of NER	To be decided after system study		

Subcommittee also decided that two UFRs (one as back up) need to be activated at Mariani (by POWERGRID & Assam), Samaguri (by Assam), Dimapur (by POWERGRID), Palatana (by OTPC), Silchar (by POWERGRID), and Kumarghat (by POWERGRID) instead of one UFR as decided earlier.

In future, in case any problem arises, both islanding schemes will reviewed and modified as per system requirement.

The Sub-committee noted as above.

C.7 Installation of Harmonic Filters:

During the 91st OCC meeting, SE (E), DoP, Ar. Pradesh informed that installation of harmonic filters will be completed by November, 2013.

Deliberation of the Committee

Since no representative from DoP, Ar. Pradesh was present; the status could not be updated. However, DGM, POWERGRID stated that once the installation of Harmonic filter is done, the conformity tests will have to be carried out.

The Sub-committee noted as above.

C.8 Frequent Tripping Of 33kV System of DOP, AP at Nirjuli and Ziro:

The status of tripping of 33kV Feeders at Nirjuli and Ziro Sub Station, as informed by POWERGRID, is as below:

(a) Tripping 33kV Feeders at Ziro

SN	Feeder	Jan'10 – Jun'13		Tripping in Aug'13	
		Nos.	Nos. / Month	Nos.	Nos. / Month
1	Kurung- Kamey	766	18.23	19	19
2	Old Ziro Feeder	440	10.47	3	3
3	Kimin Feeder	1208	28.76	61	61

(b) Tripping 33kV Feeders at Nirjuli

SN	Feeder	Jan'10 – Jun'13		Tripping in Aug,13	
		Nos.	Nos. / Month	Nos.	Nos. / Month
1	AP – 1	262	6.23	7	7
2	AP – 2	590	14.07	17	17
3	AP – 4	82	1.95	2	2

In OCC/PCC/TCC forum, the committee has expressed concern for frequent tripping in 33kV system of Ar. Pradesh. POWERGRID informed that such repeated tripping resulted in failure of transformers at Ziro & Nirjuli substation. The 5MVA, 132/33kV (Y-Phase) ICT of 132kV Ziro Sub Station failed on 10.09.2013 causing

complete power supply disruption at Ziro. The supply was restored at Ziro on 15.09.2013 by replacing the failed unit with available spare unit. This has commercial impact on the constituents of the region. The representative of Assam re-iterated that on request of Ar. Pradesh all constituents had agreed to include augmentation of transformation capacity at above substations as the regional project although Ar. Pradesh was the exclusive beneficiary. Hence committee desired that Ar. Pradesh should look into the matter seriously to reduce the frequent tripping in 33kV system so that unwarranted failure of transformers is not repeated.

The details of failure of transformers and status of tripping of 33kV Feeders at Nirjuli and Ziro Sub Station, as informed by POWERGRID, was discussed in detail in 91st OCC/15th PCC meeting. Similarly the frequent tripping at Deomali substation of Ar. Pradesh due to fault in their 33KV side was also discussed in above meetings. Subcommittee also reiterated that if tripping is not reduced failure of major equipments cannot be prevented.

CE, DoP, Ar. Pradesh had assured the forum that all efforts will be made to improve the situation and had also informed that he would organize a separate meeting with officials of POWERGRID, NEEPCO and NERPC to discuss and resolve the issue.

Deliberation of the Committee

Since no representative from DoP, Ar. Pradesh was present; the status could not be updated.

The Sub-committee noted as above.

C.9 T- Connection of Lekhi & Bhalukpong sub-Station

During 91st OCC meeting, SE (E) DoP, Ar. Pradesh informed that the LILO at Lekhi will be completed by December, 2013 as stated earlier and the LILO works (tower structure & control room etc.) at Bhalukpong is under progress and the same will be completed by March, 2014.

DGM, POWERGRID informed that a section of the existing 132 KV S/C Nirjuli – Dikrong line [Section covering location No. 1 to 23 including location 134 (common

tower for NDTL & GITL)] near Doimukh area is required to be diverted/shifted on account of construction of a new Railway Line. POWERGRID has been given a time schedule of two years (i.e. up to May, 2015) by the District Administration to complete the diversion work. Preliminary works towards this realignment have already been taken up by POWERGRID. During diversion/shifting, the LILO is to be disconnected from its existing position (in between the location No. 10 & 11).

CE, DoP, AP informed that he would organize a separate meeting with officials of POWERGRID and NERPC to discuss and resolve the issue.

Deliberation of the Committee

Since no representative from DoP, Ar. Pradesh was present; the status could not be updated.

DGM, POWERGRID stated that since diversion work of Railways at Lekhi will take place, POWERGRID will go ahead with NIT and work will be carried out by them accordingly.

The Sub-committee noted as above.

C.10 Bay Owner Details of Inter-State Transmission Lines:

During the 92nd OCC meeting, NERLDC requested all the constituents to provide the Owner detail of Bays at both ends of all Inter-State Transmission Lines at the earliest for ensuring proper co-ordination among all concerned. All constituents agreed.

Deliberation of the Committee

DGM, NERLDC informed that only POWERGRID have submitted the bay ownership details till date, and once again requested the constituents to submit at the earliest for better operation of the grid.

All the constituents agreed to provide the above information to NERLDC at the earliest.

The Sub-committee noted as above.

C.11 Power Atlas for NER and States of NER:

The Power Atlas of NER and States of NER in pdf format and in AutoCAD format was circulated to all SLDCs of NER for checking before finalization. You are requested to kindly suggest modifications, if any. The Power Atlas is to be finalized after incorporating your comments before 31st December, 2013.

The Power Maps may be used at SLDC level for better visualization.

In the 92nd OCC meeting, DGM, NERLDC requested all the constituents to go through the SLDs forwarded by them and give their observations/modifications at the earliest. He also requested the constituents to nominate the Nodal Officer for the same.

The name of nodal officers as decided by the Sub-committee is as follows:

Ar. Pradesh	: Sh. Tarik Mize, EE, SLDC (09774007853)
Assam	: Sh. B.C. Bordoloi, DGM, SLDC (09435045675)
Manipur	: Sh Birjit Singh, SE (09436065214)
Meghalaya	: Sh. F.E. Kharshiing, SE, SLDC (09863066960)
Mizoram	: Sh. Lalrema, SE, SLDC (09436140353)
Nagaland	: Sh. A. Jakhalu, EE, SLDC (09436002696)
Tripura	: Sh. R. Debbarma, DGM, SLDC (09436130960)

Deliberation of the Committee

DGM, NERLDC informed that observations/modifications have received from Tripura & Mizoram. During the meeting Assam had also submitted the above information. He once again requested all the constituents to go through the SLDs forwarded by them and give their observations/modifications at the earliest.

Tripura informed that new DGM, SLDC have joined recently and the name of the nodal officer is to be updated. The same has been corrected accordingly.

The Sub-committee noted as above.

C.12 Formation of Study Group:

In the 91st OCC meeting, MS I/C informed that P&E Dept, Govt. of Mizoram has already formed a System Study Group and requested other State constituents to follow the same. He stressed upon the importance of the study group. The objective of formation of study group is to develop the capability of each state to carry out various studies relating to their own transmission network as well as for regional network independently for different contingencies so that corrective measures can be taken accordingly. The soft copy of relevant files including SLD for the existing network of each state (compatible to PSSE software) was also handed over to the participants during the first meeting of system study group of NER, organized on 20.08.2013 at NERLDC, Shillong so that system studies for different conditions can be carried out by them independently. NERLDC has also agreed to provide all kind of support to State constituents for system studies. Constituents are also requested to study their network for reactive power management. Member Secretary I/C informed that Prof. P. Tripathi, IIT, Guwahati has been included as the member of the study group of NER to assist the constituents in various system studies relating to NER region as well as constituent states. Faculty from NITs of respective states may also be included in their system study group.

During 92nd OCC meeting, the Sub-committee had requested all the constituents to to form their own study group at the earliest for their benefit.

Deliberation of the Committee

Member Secretary (I/C) highlighted that the study group of each state is supposed to carry out various studies relating to their own transmission network as well as for regional network. Further he requested constituent states of the region to study their network for reactive power management and plan the requirement of capacitors banks at distribution level. The Sub-committee requested all constituents to form their own study group at the earliest for their benefit.

The Sub-committee noted as above.

C.13 Monthly MU requirement & availability of each state of NER as per format:

As per 2013-14 LGBR of NER, monthly estimated MU requirement & availability of NER states are as per format below. The figures are to be reviewed/confirmed.

Requirement

Name of State	Jan14	Feb14	Mar14	Apr14	May14
Ar. Pradesh	54.78	51.60	49.31	43.81	
Assam	607.09	574.81	478.68	538.87	
Manipur	53.75	58.29	44.99	45.06	
Meghalaya	168.46	185.86	165.68	168.29	
Mizoram	36.44	37.05	32.44	38.08	
Nagaland	47.33	53.83	44.08	46.74	
Tripura	106.16	112.21	112	112	
NER	**1074.01**	**1073.64**	**900.02**	**984.67**	

Availability

Name of State	Jan14	Feb14	Mar14	Apr14	May14
Ar. Pradesh	34.39	31.22	27.83	33.17	
Assam	420.20	389.88	353.85	389.73	
Manipur	49.97	46.97	42.79	48.00	
Meghalaya	135.61	122.77	107.65	112.41	
Mizoram	41.83	40.33	37.53	40.98	
Nagaland	39.05	35.31	32.20	35.54	
Tripura	100.90	96.91	87.85	97.09	
NER	**821.94**	**763.38**	**689.71**	**756.92**	

These data required for system study, daily report, computation of TTC-ATC and preparation of reports for various meetings of Ministries, CEA, Constituents etc.

Deliberation of the Committee

DGM, NERLDC requested all the constituents to furnish the above data at the earliest.

All the constituents agreed.

The Sub-committee noted as above.

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 January - May, 2014.

The sub-Committee reviewed & finalized the anticipated peak demand/energy requirement/Availability for the months of January - April, 2014.

A. Peak Demand

SN.	State	Peak Demand (MW) Jan' 14	Peak Demand (MW) Feb' 13	Peak Demand (MW) Mar' 14	Peak Demand (MW) Apr' 14	Peak Demand (MW) May' 14
1	Ar. Pradesh	130	120	95	95	95
2	Assam	1350	1300	800	800	800
3	Manipur	130	120	105	105	105
4	Meghalaya	300	280	230	230	230
5	Mizoram	85	75	55	55	55
6	Nagaland	120	100	80	80	80
7	Tripura	260	230	155	155	155
	Region	2355	2245	1520	1520	1520

B. Peak Availability

SN.	State	Peak Availability (MW) Jan' 14	Peak Availability (MW) Feb' 14	Peak Availability (MW) Mar' 13	Peak Availability (MW) Apr' 13	Peak Availability (MW) May' 14
1	Ar. Pradesh	100	100	100	100	100
2	Assam	850	830	830	830	830
3	Manipur	110	110	110	110	110
4	Meghalaya	240	240	240	240	240
5	Mizoram	65	60	60	60	60
6	Nagaland	95	85	85	85	85
7	Tripura	180	160	160	160	160
	Region	1600	1585	1585	1585	1585

The Committee noted as above.

D.3 <u>Generation Planning (ongoing and planned outages)</u>

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

Khandong – 0.454 MU
Kopilli – (NEEPCO will co-ordinate with NERLDC)
Ranganadi - Subject to inflow
Doyang – 0.692 MU
Loktak – 2.520 MU

The Committee discussed and approved the following proposed shutdown by Generating Stations.

1. <u>Complete Shutdown of Kopili for Emergency works</u>:

NEEPCO had intimated that severe leakage in the dam as well Penstock had occurred, unless the corrective measure is taken place it might lead to disaster. Hence requested to avail complete shutdown of Kopili HEP from 22.01.2014 for 45 days.

The Sub-committee approved.

2. Shutdown of GTG #4:

NEEPCO had intimated that R&M of control system of GT Unit GTG #4 is planned from 15.02.2014 for 25 days. Further, they informed that during the proposed shutdown of above Unit, generation would be 200 MW to 210 MW depending on ambient temperature & quantity of gas supply.

The Sub-committee approved.

D.4 (A) Outage Planning Transmission elements

After detail discussion the sub-committee approved the shutdown as proposed by POWERGRID & Assam (AEGCL) for January, 2014 to March, 2014 as given in Annexure – D.4.

SE (O) informed that it has been observed in many occasions that shutdown availed by the executing agency is not returned in time which caused inconvenience to the constituents. He requested the members to deliberate on the issue.

After detailed discussion, the Sub-committee had decided that in case of delay of return of shutdown, the executing agency has to give proper justification else NERPC Secretariat shall deduct the period of delay in return of shutdown from their Transmission Availability Certificate (TAC) of that particular month.

D.4 (B) Line outages Planned vs. Implemented:

SE (O) stated that the planned outages (transmission & generating elements) approved by the OCC Sub-committee has to be complied by the executing agency and in case the same is not availed or deferred, the same has to be intimated with reasons why the shutdown could not be availed so that proper planning can be made by NERLDC/NERPC. Further, once the shutdown is completed the same should be informed to NERPC/NERLDC. The same will be monitored henceforth.

The sub-Committee noted as above.

D.5 (A) Power Cut/Restrictions on Industries:

a) All industries are allowed to run their units on all days of week & if they want to avail staggered holiday, then they will have to stagger on notified day only & cannot avail as per their choice.

b) All industries are required to keep their recess timings staggered.

Name of State	Details	Quantum of power cut (MW)	Restriction Timing		Total Energy cut (MUs/day)
			From	To	
	(a) Power restrictions (evening peak hour) on non continuous process HT/LT Industries (b) Load shedding				
	(c) Other information 1. Weekly off 2. Staggering of power supply				

D.5 (B) Power supply to Agricultural Sector:

Name of State	Details	From Date	To Date	Supply Hours per day		
				Max (hrs)	Min (hrs)	Average (hrs)
	3-phase supply (DLF)					
	3-phase supply (Irrigation)					

Deliberation of the Committee

Assam stated that all the above information is available with Distribution Company (DISCOM) and requested NERPC to write to them. The same was supported by Meghalaya & Tripura. The Sub-committee requested all the concerned constituents to forward the information to their respective Distribution Divisions and at the same time NERPC will also pursue with their DISCOMs.

The Committee noted as above.

D.6 SEM at 132 KV Nangalbibra - Agia

Meghalaya informed that the Inter-State meters installed by CTU at 132 KV Nangalbibra – Agia feeder was not working since commissioning. Further, the DCD was defective since 25.11.2013**.**

NERLDC stated that they have taken up the matter with CTU.

D.7 SEM at 400 KV Byrnihat – Silchar line:

Meghalaya informed that meter installed at 400 KV Byrnihat S/S was defective since charging of the line. Energy Accounting for Meghalaya was based from the meter installed at 400 KV Silchar S/S.

Deliberation of the Committee

DGM, POWERGRID informed that it has not been brought to their notice and further, he stated that constituents should directly approach NERLDC in case of any defect or difficulty encountered with meters / DCDs. In turn, NERLDC will inform POWERGRID for necessary action. He stated that the issue of Para D.6 will be sorted out by 07-02-2014. However, NERLDC will review the issue of Para D.7 for initiating further course of action.

The Committee noted as above.

D.8.1 TGBPP at Monarchak (101MW):

SE (O) informed that during the recent visit by NERPC to TGBPP, it has been observed that gas pipeline of Monarchak power station is lying uncovered/uncared at different locations for which commissioning of project may be disrupted. He also cited that earlier the same problem was being faced by Pallatana GBPP.

Deliberation of the Committee

Member Secretary I/C, informed that the report of the visit has been prepared by NERPC and submitted to Chairman, NERPC & Hon'ble Power Minister, Govt. of Tripura. He requested Tripura to look into the matter. Tripura agreed.

The Committee noted as above.

D.8.2 Deviation Settlement issued by CERC:

A. TSECL stated that it is necessary to implement requisition based drawal schedule in the region as it is being implemented through the country.

B. TSECL stated that withdrawal losses & injection losses are directly deducted from the schedule of Pallatana. Quantum of losses is not reflected in the revision.

C. TSECL stated that Regulation on deviation settlement issued by CERC on 06.01.2014 has adverse impact on NER states.

NERLDC also informed that these regulations shall come into force w.e.f. 17.2.2014. The charges for the Deviations for all the time-blocks shall be payable for over drawal by the buyer and under-injection by the seller and receivable for under-drawal by the buyer and over-injection by the seller and shall be worked out on the average Frequency of a time-block at the rates specified in this regulation.

Deliberation of the Committee

The Sub-committee expressed concern about the Regulation on Deviation Settlement issued by CERC. In absence of adequate transmission network, the implementation of the regulation will have adverse commercial impact on the constituents of the region. NERPC/NERLDC was requested to organize a meeting at the earliest to discuss about the pros and cons of this regulation.

Tripura informed that they have already filed a petition with CERC on this matter and the response is awaited. They requested NERPC/NERLDC to arrange the workshop at the earliest. NERPC agreed and the members decided that the items A & C above will be discussed in the upcoming workshop.

Tripura highlighted that withdrawal losses & injection losses are directly deducted from the schedule of Pallatana and quantum of losses is not reflected in the revision. They requested NERLDC to indicate the quantum of losses in the excel sheet.

DGM, NERLDC stated that it would be very difficult to indicate the quantum of losses in the excel sheet. Moreover, constituents can get the respective station-wise losses from the NERLDC website.

The Sub-committee enquired from other constituents if they faced any problem in this regard. All the constituents stated that no such problem is encountered by them.

The Sub-committee requested Tripura & NERLDC to discuss the issue and resolve bilaterally.

The Committee noted as above.

D.9 Issuance of CERC (Indian Electricity Grid Code) (Second Amendment) Regulations, 2014:

DGM, NERLDC informed that these Regulations shall come into force with effect from 17.2.2014 and the frequency band will be changed to 49.95-50.05 Hz. CERC has tightened the frequency band for better grid discipline in the country.

For kind information only.

D.10 Evacuation of TGBPP at Monarchak & Pallatana Power (Two Modules):

The Sub-committee expressed concern and discussed in detail about the above issue and felt that after commissioning of Module II of Palatana & Monarchak power station, it is required to evacuate 704 MW from Palatana & 98 MW from Monarchak. System Study was conducted by NERLDC shown that for peak and off peak scenarios of Jun14 with these machines & 400 kV Silchar – Imphal D/C (Charged at 132 kV) lines. It is observed that a maximum of around 410 MW during off peak and 590 MW during peak can be evacuated from Palatana & Monarchak plants with present network & 400 kV Silchar – Imphal D/C (Charged at 132 kV) (Limitation : High loading of 220 kV Misa-Byrnihat I & II – 160 MW on each circuit). These Studies were conducted without taking N-1 criteria of 400 kV Byrnihat-Silchar, 220 kV Misa-Byrnihat D/C & 220 kV Misa-Samaguri D/C lines. Hence the forum expressed that it is very important that 400 kV line from Silchar to Bongaigaon is commissioned at the earliest.

Deliberation of the Committee

Adviser, OTPC informed that DLN tuning of Unit #2 is likely to start in March, 2014 and requested POWERGRID for commissioning of Silchar – Bongaigoan 400kV line before commencement of DLN tuning.

DGM, POWERGRID stated that as informed earlier, the target date for commission of 400 KV Silchar – Bongaigoan is March, 2014.

DGM, NERLDC also requested OTPC that all telemetry system should be in place before cranking the Unit #2.

The Committee noted as above.

D.11 Operation Co-ordination with Manipur:

The issue of operation co-ordination & empowerment of Shift in-charges of SLDCs was raised by NERLDC in earlier occasions also. It has been observed that shift personnel of Manipur are on several occasions asking NERLDC to contact their higher officials for effecting any real time requirement of the grid, like reduction of drawal. This is resulting in delay in effecting corrective actions for system security.

Deliberation of the Committee

EE, DoP, Manipur informed that since full fledged SLDC is yet to be in place and at the same time the present shift-in-charge in the control room does not have expertise and hence consent from higher authority is being taken by them. Moreover, the Electricity Department of Manipur will be unbundled from 1st February 2014

The Sub-committee suggested Manipur to identify priority & non-priority feeders and the shift-in-charge may be authorized to open non priority feeders based on the direction of NERLDC so that effective corrections can be taken at the right time. EE, DoP, Manipur appreciated the suggestion of the Sub-committee and assured that he will take up the matter with concern authority.

The Committee noted as above.

D.12 Synchronization Problem:

DGM, NERLDC informed that recently on few occasions rough/hard synchronizations have been taken place during synchronization of separated systems. He stated that this is a very serious issue and hence all concerned are requested to maintain the synchronizing facilities in good conditions and also to train the operation personnel in this regard to avoid such occurrences in future.

Deliberation of the Committee

DGM, POWERGRID stated that the communication between NERLDC and site needs to be strengthened and better co-ordination in situation can help to overcome this type of wrong synchronisation.

The Committee noted as above.

D.13 Furnishing of Technical & Commercial Data for computation of PoC Charges & Losses for April – June, 2014:

DGM, NERLDC informed that Designated ISTS Customers (DICs) are requested to submit the data for New Transmission Assets, Yearly Transmission Charges (YTC), Forecast Injection and Withdrawal and Node-wise Injection/Withdrawal data as per Format I, Format II & Format III (Formats are available in http://posoco.in/transmission_pricing/formats) to the Implementing Agency (NLDC, POSOCO) along with copy to NERLDC for computation of PoC Charges and Losses for Apr14-Jun14 at the earliest. Soft copy of these filled up formats are also to be sent to the Implementing Agency (NLDC, POSOCO) along with copy to NERLDC at the earliest. Letter for submission of these data as per formats was e-mailed to all DICs on 10.01.14.

Assam stated that only the Format – III is to be provided by the constituents, whereas Format I & II are to be provided by ISTS licensee.

NERLDC requested all concerned to ensure submission of data by January 31, 2014. Constituents agreed.

The Committee noted as above.

D.14 LGBR for 2014 - 2015:

The draft LGBR for 2014 -15 (regarding the demand and availability in MWs & MUs) for NE Region has been prepared by NERPC and the same is given at **Annexure – D.14**.

Constituents are requested to verify the data given in the Annexure above also all the power utilities are requested to furnish outage planning [both generator and transmission line elements] so that Final LGBR can be issued at the earliest.

DGM/NERLDC requested NERPC to finalise LGBR as well as Outage planning at the earliest.

The Committee noted as above.

D.15 Estimated Transmission Availability Certificate (TAC) for the month of December, 2013.

The Estimated Transmission System Availability for the month of December, 2013, furnished by PGCIL, is **99.9820%.** The detail outage data for calculation of Transmission System Availability furnished by PGCIL is at **Annexure D.15.** NER constituents are requested to kindly communicate their views and observations, if any, by 28th January, 2014 so that Final TAC for the month of December, 2013 may be finalized by NERPC Secretariat.

The Sub-committee noted as above.

D.16 Major grid disturbances in the previous month (December, 2013)

As intimated by NERLDC, there was no major grid disturbance during the month of December, 2013 pertaining to NER.

Members may kindly note.

D.17 Grid strengthening for safe and secure operation of NER grid:

Capacity of the following elements required to be enhanced/added for safe and secure operation of NER Grid :-

a. Transformation Capacity of 400/220 kV Bongaiagon S/S to be enhanced as there is only one ICT of capacity 315MVA, 400/220kV at 400/220 kV Bongaiagon S/S. N-1 criteria is not fulfilling. Moreover, load of downstream area of this sub-station increased due to load growth & shifting of load of Nangalbibra area to this area. At 1743 Hr on 19.12.13, Lower Assam, Capital Load of Assam, Nangalbibra Load of Meghalaya, Langpi Generation (Part of NER Grid), Birpara Load (Part of ER Grid) & East Bhutan Load, West Bhutan Load along with Chukha System was collapsed due to tripping of 400/220 kV, 315 MVA ICT at Bongaigaon on overloading (450 MW).

Please refer to Item No. D. 19.2.

b. Transformation Capacity of 400/220 kV Balipara S/S to be enhanced as there is only one ICT of capacity 315MVA, 400/220kV at 400/220 kV Balipara S/S. N-1 criteria is not fulfilling. Moreover, load of downstream area of this sub-station increased due to load growth.

Please refer to Item No. D. 19.2.

c. Transformation Capacity of 220/132 kV Kopili PS to be enhanced as there is only one ICT of capacity 160MVA, 220/132kV at 220/132 kV Kopili PS. N-1 criteria is not fulfilling.

Please refer to Item No. D.19.2.

d. 220 kV BTPS (NTPC)-BTPS (AEGCL) D/C lines are required for enhancement of transfer capability of this corridor. It was observed that loading of 220 kV Salakati-BTPS D/C is more than 140 MW in each circuit during certain period of peak hour. Under this condition, power supply to Dhaligaon area & Capital area (Assam) & Nangalbibra area (Meghalaya) may be disrupted in case of tripping of any one circuit of 220kV Salakati-BTPS D/C lines.

Assam informed that the line has already been planned by NTPC.

The Sub-committee noted as above.

a. 400 kV Bongaigaon-Byrnihat, 400 kV Bongaigaon-Kukurmara, 400 kV Kukurmara-Silchar lines and Kukurmara S/S to be commissioned at the earliest for safe & secure operation of Southern Part of NER Grid. Southern Part of NER Grid may become vulnerable in case of tripping of 400 kV Silchar-Byrnihat line or 220 kV Misa-Byrnihat D/C lines.

b. 220 kV BTPS(NTPC)-Rangia D/C, 220/132 kV, 2x100 MVA ICT at Rangia, LILO of 132 kV Rangia – Sishugram at Kamakhya, LILO of 132 kV Rangia – Kahilipara at Kamakhya, 400/220 kV, 315 MVA at Kukurmara, 220/132 kV, 2x50 ICTs at Kukurmara, 132 Kukurmara-Azara line to be commissioned at the earliest so that loading problem of 220 kV Misa-Samaguri D/C can be solved. It was observed that loading of 220 kV Misa-Samaguri D/C is more than 130 MW in each circuit during certain period of peak hour. Under this condition, power supply to Dhaligaon area & Capital area (Assam) & Nangalbibra area (Meghalaya) may be disrupted in case of tripping of any line of Misa-Samaguri lines.

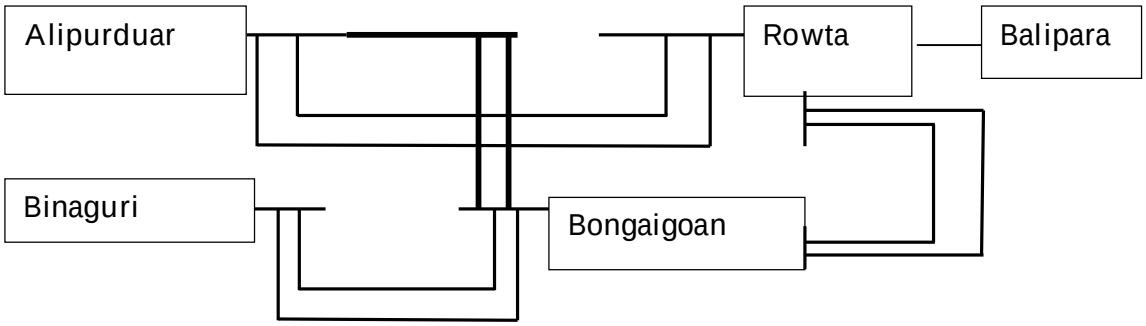
c. 400 kV Silchar-Imphal D/C (Charged at 132 kV) line needs to be commissioned at the earliest for safe & secure operation of Southern Part of NER Grid. It was observed that 132 kV Loktak-Ningthoukhong overloaded during certain period of peak hours.

DGM, POWERGRID informed that 400 KV Silchar – Imphal will be completed by June, 2014.

The Sub-committee noted as above.

d. More in feed points need to be planned and implemented for improving reliability and security of NER Grid. At present NER Grid is connected to rest of NEW Grid through Bongaigaon and Salakati Sub-Station. As per Master Plan of HEPs in Arunachal Pradesh of CEA, there will be +/- 800 kV HVDC Sub-Station at Rowta and LILO of 400 kV Balipara – Bongaigaon I & II and LILO of 400 kV Balipara – Bongaigaon III & IV will at Rowta. AC part of +/- 800 kV Rowta HVDC S/S along with these LILO arrangements may be programmed for early completion. The 400 kV Rowta – Bongaigaon III & IV may be modified as 400 kV Rowta – Alipurduar D/c and 400 kV Alipurduar - Bonaigaon D/c for creating one more in feed point for NER.

Thus proposed scheme drawing is as follows:



With above modification, NER will have one more connectivity with ER, in case there is any problem (say bus fault) at Bongagoan Sub-station.

The Sub-committee requested the constituents to give their comments so that the same can be discussed in the next OCC meeting.

The Sub-committee noted as above.

D.18 Grid connectivity to Tawang areas of Ar. Pradesh:

It has been brought to notice that power supply position in Tawang area is very erratic and most of the time the area is without power supply. Moreover, Tawang, being a very important place as far as country's defense establishment is concerned, is not connected with the NER grid. At present the small /mini/micro hydro generating stations in and around Tawang is feeding the area at 33kV level. Entire stretch from Bomdila – Dirang - Sela Pass-Tawang - Bomula (China border) is occupied predominately by National army**.** Considering the importance of Tawang as it is situated close to International border, 132 kV D/C link from existing Khupi / Kimi Sub-station to Tawang via Bomdila / Dirang may be desirable so that reliable power supply can be extended to these areas and beyond.

During 92nd OCC meeting, the Sub-committee discussed the matter in detailed about the importance of extending reliable power supply to Tawang considering the strategic importance of Tawang as far country's defense establishment is concerned. In absence of the representative of Ar. Pradesh, the action plan of Ar. Pradesh for extending reliable power supply to Tawang could not be known. The forum is of the opinion that as the line has to pass through difficult terrain, dense

forest and high altitude snow bound areas, the design/construction of such line would be very difficult for state utility and 132 kV D/C link from existing Khupi / Kimi Sub-station to Tawang via Bomdila / Dirang and associated substations may be treated as regional project. However, the view of Ar. Pradesh in this regard would be required.

Deliberation of the Committee

Since no representative from Ar. Pradesh was present, the issue could not be discussed.

The Committee noted as above.

D.19 Any other item:

D.19.1 General Network Access (GNA) vis-à-vis existing Approach

The concept General Network Access (GNA) vis-à-vis the existing approach was discussed in the joint Standing Committee Meeting of North Eastern Region and Eastern Region for Power System Planning held at Guwahati on 03-01-2014. Members of NER wanted further discussion on the concept of GNA.

Deliberation of the Committee

The decisions of the Sub-committee are given below:

1. The basic concept of GNA is good from planning point of view.

2. But the financial / commercial impact on small states of NER (state-wise) needs to be worked out/studied and clarity / transparency has to be there unlike the concept of PoC, which has not been understood by most of the constituents.

3. STOA service at premium rate, for any power transfer beyond the GNA capacity, is not acceptable to constituents of NER.

4. Further detail discussion on the concept of GNA is required in TCC/RPC forum before implementation in the region.

The Committee noted as above.

D.19.2 Proposal agreed by Members in the joint Standing Committee Meeting of North Eastern Region and Eastern Region for Power System Planning held at Guwahati on 03-01-2014

Member Secretary I/C briefed the forum about the outcome of the Standing Committee Meeting held on 003.01.2014. He informed that most of the issues pertaining to system strengthening in the region, approved in OCC forum, was discussed in above meeting. The following proposals have been agreed and approved by the Standing Committee.

1. Additional 1x315 MVA, 400/220 kV transformer at Bongaigaon Sub-Station:

The present transformation capacity at Bongaigaon (PG) 400/220 kV sub-station is 315 MVA which comprises of 4 no. single phase units of 105 MVA. Assam draws power over Bongaigaon(PG)-Salakati(PG)-BPTS-Agia 220 kV D/C line due to which the loading on the ICT becomes very critical and is expected to increase further with the growing demand. Further, tripping of the ICT restricts the import capability of NER on ER-NER transmission links which becomes very critical during low hydro condition. The addition of 2nd ICT at Bongaigaon was agreed in 90th OCC meeting of NER constituents at Guwahati held on 04-10-2013.

POWERGRID stated that as per norm, the addition of 2nd ICT at Bongaigaon need to be associated with 2 no of 220kV bays which would be helpful for Assam and Meghalaya to draw additional power. At present, Bongaigaon transformer is extended through 500m long line to Salakati substation, however there is no 220kV bay arrangement at Bongaigaon substation. The Salakati substation also does not have space for future 220kV line bays. Accordingly, the 2nd ICT at Bongaigaon need to be associated with new 220kV bus arrangement at Bongaigaon which would accommodate 220 kV bays for existing ICT and the proposed ICT, 220kV D/c Bongaigaon- Salakati line as well as 2 nos. of 220kV line bays for additional 220kV lines for drawal of power by Assam / Meghalaya. This 220kV bus arrangement would be carried out on GIS in view of space constraint. For accommodation of 220kV line bay at desired location of Salakati substation, necessary re-arrangement / shifting of existing 220kV bays also need to be carried out. For 220kV Bongaigaon-Salakati D/c line, fibre optic based protection shall be provided in view of severe ROW problem. Further, in order to have 2nd reliable auxiliary power supply, 1 No of 1 MVA, 33/0.44 kV Transformer is also to be installed in the

tertiary of new proposed ICT, which was also agreed in 91st OCC meeting by NER Constituents held on 15.11.2013.

Therefore, in order to improve reliability, it has been agreed to install second 1x315 MVA 400/220 kV (3 phase) transformer along with 220kV GIS bus arrangement (Double main) accommodating 2 bays for existing and the proposed ICT, 2 bays for 220kV D/c lines to Salakati and 2 bays for 220kV additional line at Bongaigaon (PG) and necessary re-arrangement / shifting of bays at Salakati substation for accommodating 220kV line bay.

The members have concurred to the above proposal to be implemented by POWERGRID under regulated tariff mechanism.

2. Replacement of existing 60MVA 220/132kV ICT by 1x160 MVA 220/132 kV ICT at Kopili HEP of NEEPCO.

Initially 60 MVA (4 no. 1 phase units of 20 MVA) 220/132kV transformer at Kopili sub-station of NEEPCO which was later augmented by 1x160 MVA three phase transformer by POWERGRID. At present, the 60 MVA transformer at Kopili is not in operation. The 220/132 kV transformer at Kopili and 132 kV Kopili-Khandong 2xS/C lines are important links for power supply to South Assam, Mizoram, Tripura and Manipur. In the event of outage of this 1x160 MVA transformer, the power supply to South Assam, Manipur and Mizoram gets severely affected.

Therefore, in order to improve the reliability, second 1x160 MVA 220/132 transformer was proposed at Kopili by replacement of the existing 60MVA 220/132kV ICT. The above proposal was agreed in 90th OCC meeting of NER constituents at Guwahati on 04-10-2013.

POWERGRID stated that the 220/132kV 2nd ICT at Kopili need to be associated with upgradation of 132kV bus scheme at Kopili from single bus to double main scheme for complete 132kV switchyard and the same need to be carried out on GIS due to space constraint. At 220kV side, the bay equipments of existing 60 MVA ICT needs to be replaced. Further, for 220kV double bus bar switching scheme, new bus bar protection along with LBB to be provided for the complete substation.

Members concurred the proposal of replacement of existing 60MVA, 220/132kV ICTs by 1x160 MVA 220/132 kV ICT at Kopili HEP of NEEPCO by POWERGRID along with upgradation/replacement of complete 132kV bus scheme including switchgear etc with GIS and 220kV bay equipments (AIS) & protection scheme under regulated tariff mechanism.

3. Replacement of existing 2x50MVA, 220/132kV ICTs by 2x160MVA, 220/132kV ICT at 400/220/132KV Balipara Substation of POWERGRID.

At present there are 2 no. of 50 MVA, 220/132kV ICTs installed at Balipara substation of POWERGRID, one owned by NEEPCO and the other by AEGCL. These ICTs are very important for supply of power to both Assam and Arunachal Pradesh. It has been observed that in most of the cases both the ICTs are fully loaded and tripping of one ICT often results in tripping of the other ICT. Tripping of these ICTs due to overload or due to maintenance results severe shortfall of power to both Arunachal and Assam.

Therefore, the proposal of replacement of existing 2x50MVA, 220/132kV ICTs by 2x160MVA, 220/132kV ICTs along with replacement of 132 kV equipments (with suitable capacity) at 400/220/132KV Balipara Substation by POWERGRID under regulated tariff mechanism has been agreed by members.

4. System strengthening Scheme in NER-II (NERSS-II)

The following works were agreed by NER constituents as "System strengthening Scheme in NER-II" in the meeting to review the inter-state works of Comprehensive Scheme for Strengthening of Transmission System in NER & Sikkim held at Guwahati on 30-10-2012 :

i) 2nd 400/220 kV, 315 MVA transformer at Balipara (PG)
ii) LILO of 2nd ckt. of Silchar - Bongaigaon 400 kV D/c line at Byrnihat (MeECL)
iii) Silchar - Misa 400kV D/c line (Quad) line
iv) NER PP (Biswanath Chariyalli) – Itanagar (Ar. Pradesh) 132 kV D/C line (Zebra conductor).
v) Replacement of existing 132/33kV, 2x10MVA ICT at Nirjuli by 2x50MVA ICT

vi) Ranganadi HEP-Nirjuli (PG) 132kV D/c line with one ckt. LILOed at Itanagar S/s (Ar. Pradesh) or routed via Itanagar.

vii) Imphal (PG) – New Kohima (Nagaland) 400kV D/c line (to be initially operated at 132kV)

The Empowered Committee on transmission in its 31st Meeting on February 18, 2013 at CERC, New Delhi had suggested CTU to obtain firm commitment from Me.ECL, Department of Power (DoP) Arunachal Pradesh, NEEPCO and DoP Nagaland for the availability of space for the bays for the termination of the above lines.

Subsequently, Me.ECL has intimated that there is no space at Byrnihat for termination of LILO of 2nd ckt. of Silchar - Bongaigaon 400 kV D/c line at Byrnihat (Me.ECL). Department of Power (DoP) Arunachal Pradesh confirmed that at Itanagar (Ar. Pradesh), there is space for 2 no. 132 kV line bays only. In view of above the scheme was modified and revised System strengthening Scheme in NER-II is given below:

i) 2nd 400/220 kV, 315 MVA transformer at Balipara (PG)

ii) Silchar - Misa 400kV D/c line (Quad) line

iii) NER PP (Biswanath Chariyalli) – Itanagar (Ar. Pradesh) 132 kV D/C line (Zebra conductor).

iv) Replacement of existing 132/33kV, 2x10MVA ICT at Nirjuli by 2x50MVA ICT

v) Ranganadi HEP-Nirjuli (PG) 132kV D/c line

vi) Imphal (PG) – New Kohima (Nagaland) 400kV D/c line (to be initially operated at 132kV)

The i) and iv) elements (transformers at Balipara & Nirjuli) of the modified scheme would be implemented by POWERGRID under regulated tariff mechanism and remaining elements would be implemented through TBCB. In addition, POWERGRID would provide

a) 2 no. of 132kV line bays each at Biswanath Chariyalli (PGCIL), Nirjuli (PGCIL) and Imphal (PGCIL)

b) 2 no. of 400kV line bays each at Silchar (PGCIL) and Misa (PGCIL)

c) 1x80MVAR bus reactor at Misa

d) 1x80 MVAR switchable line reactors at Misa end on each circuit of the Silchar–Misa 400kV D/c line

e) 2 no. of 132kV line bays at Itanagar S/s of DoP, Arunachal Pradesh

f) 2 no. of 132 kV line bays (GIS) at Ranganadi Switchyard of NEEPCO

g) 2 no. of 132kV line bays at its New Kohima S/s of DoP, Nagaland

Bays at Silchar and Misa substations shall be equipped with GIS due to space constraint.

Members of standing committee have agreed to the above proposal

The subcommittee noted as above and new proposals will be put up to TCC / NERPC forum for approval.

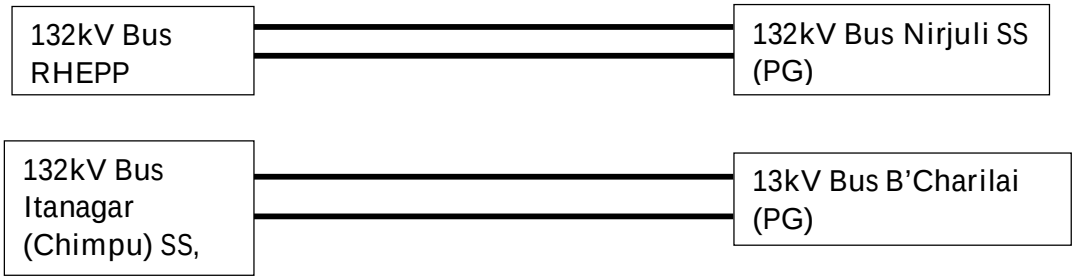
D.20 Re-arrangement of proposed 132 KV D/C Ranganadi – Nirjuli T/L and 132 KV D/C Itanagar (Chimpu) to B'Chariali under NER SSS – II Scheme

In recently concluded joint Standing Committee Meeting of North Eastern Region and Eastern Region for Power System Planning held at Guwahati, following transmission lines have been agreed by the members:

i) NER PP (Biswanath Chariyalli) – Itanagar (Ar. Pradesh) 132 kV D/C line (Zebra conductor).

ii) Ranganadi HEP-Nirjuli (PG) 132kV D/c line

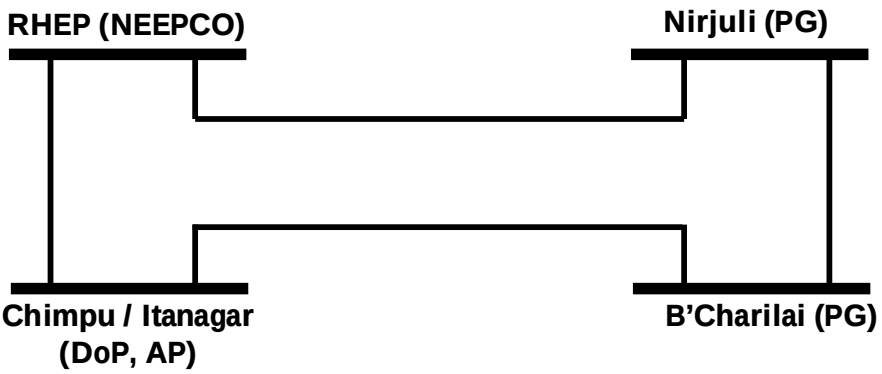
Thus present scheme drawing is as follows:



To have better connectivity & reliability between above four substations (Biswanath Chariyalli, Itanagar, Ranganadi & Nirjuli) it is proposed to carry out minor modification in one of the circuits of above two D/C lines without increasing the number of bays at any of these substations so that a ring is formed between Biswanath Chariyalli – Nirjuli - Ranganadi – Itanagar. In the process Itanagar will be connected to both substations at Biswanath Chariyalli and Ranganadi (instead of only one substation at Biswanath Chariyalli). Similarly & Nirjuli will be

connected to both substations at Biswanath Chariyalli and Ranganadi (instead of only one substation at Ranganadi).

According the modified scheme would be as below:



Deliberation of the Committee

The Sub-committee discussed the above modification and approved the same as it has better connectivity & reliability between above four sub-stations without increasing the number of bays. The proposal will be put up to TCC / NERPC forum for approval.

The Committee noted as above.

D.21 Workshop / Seminar on emerging issues funded from Reactive Pool Account

It is proposed to arrange workshop / seminars on emerging issues for the benefit of NER constituents. The funds will be made available from Reactive Pool Account after approval by NERPC board. NERPC / NERLDC may organize such workshop / seminars at different places in NER.

Deliberation of the Committee

The Sub-committee felt that seminars / workshops on emerging issues are very much essential for the benefit of NER constituent and requested NERPC to work out the methodology and funding requirement for organizing such seminars/workshops so that the same can be finalized in the next OCC meeting.

The Committee noted as above.

D.22 Standardization of Protection Scheme for Generating stations in NER:

During 13th PCC meeting, the Sub-committee had suggested that Generator protection Philosophy including protection for Generator Transformer (GT), Unit Auxiliary Transformer (UAT), Station Auxiliary Transformer (SAT), Excitation Transformers should also be prepared and requested all the Central sector and State sector Generating companies in NER (NEEPCO, NHPC, NTPC & OTPC; Assam, Meghalaya, Tripura) to furnish their practices at the earliest so that Draft can be prepared for discussion in the next PCC meeting. ***All Central sector and State Sector generating companies agreed to furnish the information.***

During 17th PCC meeting, the subcommittee reviewed the following Protection Philosophy for Generator [Hydro / Thermal (Coal / Gas based) Generator], Generator Transformer (GT), Unit Auxiliary Transformer (UAT), Station Auxiliary Transformer (SAT) / Station Supply Transformer (SST), Excitation Transformer:

A: GENERATOR PROTECTION

SN	Protection	Purpose of Protection and Setting
1	Generator Differential Protection (87G1 &87G2)	Generator Differential Protection is provided for internal short circuit fault in generator. Trip
2	95% Stator Earth Fault Protection (64G1) for Unit size less than 100MW	Stator Earth Fault protection is provided for stator phase to earth fault. This protection is limited to approximately 95% of the stator winding. Trip Time delay: 0.3 to 0.5 Secs.
3	100% Stator Earth Fault Protection (64G2) for Unit size 100MW & above	Stator Earth Fault protection is provided for stator phase to earth fault. This protection covers the whole stator winding and the generator neutral. Trip Time delay: 2.0 Secs.
4	Negative Phase Sequence Protection(46G)	Negative Phase Sequence (NPS) protection current can appear due to unbalanced single phase loads or transmission line unsymmetrical faults. This protection safeguards the generator rotor against overheating. The relay should be set to the NPS capability of the generator. Time delay for Alarm at 50% of continuous withstands capability of the machine: 3 sec.

5	Low forward Power (for thermal machines) / Reverse Power Protection (for hydro machines) (32G / 37G) [To be duplicated for large generators]	Low forward Power (for thermal machines) / Reverse Power Protection (for hydro machines) is provided to prevent motor mode of operation. Trip
6	Loss of field Excitation Protection (40G) [To be duplicated for Unit size of 500MW and above]	Loss of Excitation protection is provided to prevent synchronous generator to act as an induction generator. Trip
7	Over Voltage Protection (59G)	Over Voltage provides protection against over voltage on the terminals of the generator, which can damage the insulation. Stage # I: V_{S1}= 1.15 x V_n & T_{S1}= 10 Sec. [**5 Sec. (NTPC)]** Stage # II: V_{S2}= 1.3 x V_n & T_{S2}= 0.5 sec. [**100 ms. (NTPC)]**
8	Generator Over Load Protection (for Hydro machines) (51G)	Generator Over load protection is provided as an additional check of the stator winding temperature. Alarm Time delay: 2.5 to 25 Sec.
9	Generator Over Fluxing Protection (99G) [To be duplicated for Unit size of 500MW and above]	Generator Over Fluxing Protection provides protection against operation at flux densities which may cause accumulative damage to the core. Trip with time delay
10	Generator Under frequency Protection (81G)	Generator Under Fluxing Protection prevents generator from operating for long time at reduced frequency. Alarm Time delay: 2 Sec. Trip
11	Dead machine protection / Accidental back energisation (27G/50G) [Generally recommended for Units of size of 100MW and above]	Dead machine Protection provides protection against inadvertent energisation of generator while at stand still or on turning gear. The generator and rotor may get damaged beyond repair under this condition. Trip

12	Generator Pole slip protection / Out of step protection (98G) [Generally recommended for thermal Units of size of 100MW and above. For hydro machines, utilities can decide the Unit size depending upon machine parameters]	Generator pole slip / out of step detects all pole slips leading to an increase in rotor angular position beyond the generator transient stability limits protection provides protection against inadvertent energisation of generator while at stand still or on turning gear. The generator and rotor may get damaged beyond repair under this condition. Trip
13	Back up impedance protection- 3pole (21G) **Or (This should be treated as separated item – NEEPCO)** Over Current / Under Voltage Protection (51G / 27G)	Backup impedance Protection operates for phase faults. Trip
14	Rotor Earth fault protection (64F1, 64F2)	Rotor Earth fault is provides protection against ground fault of field winding and field short circuit. Alarm (First Rotor Earth fault), Time delay: 1 Sec. Trip (Second Rotor Earth fault), Time delay: 5 Sec. But it is recommended that the machine is taken out of service at the earliest opportunity after the occurrence of first earth fault. **Rotor O/L & O/C protection trip (NTPC)**
15	Generator winding and bearing temperature protection (49G)	Generator winding and bearing temperature protection prevents generator winding / bearing from high temperature operation. Alarm **Trip in place of winding warm gas temp high (NTPC)** The temperature settings shall be as per manufacturer's recommendations.
16	Generator Circuit Breaker Failure Protection(50ZGCB) [To be provided Generators provided with Generator Circuit Breaker (GCB)]	Generator Circuit Breaker Failure operated in case of failure of GCB. Trip

17	Condition Monitoring of Hydro-Turbine generator	Online condition monitoring system shall be provided for monitoring of radial & axial vibration, phasor diagram, air gap and Partial Discharge.
18	Process Control	Process Control is to be provided for sequential operation.
19	Disturbance Recorder (DR), Event Logger (EL) and Fault locator (FL)	To be provided as a standard practice. DR, EL & FL, being inbuilt feature in Numerical Relays, such features should also be used.
20	Time Synchronizing Equipment (TSE)	To be provided as a standard practice.
21	Overall Differential Protection (87OA) for Generator and Generator Transformer	Overall Differential Protection is provided for internal short circuit fault in generator and Generator transformer **& Unit Transformer (NTPC).** Trip
	Grouping of Protection	The Protection of Generator could be divided into two groups (Group-A & Group-B) and each group should be connected to separate DC source. Both Group-A & Group-B protection shall give trip impulse to circuit breaker of Generator bay. The Group-A should include Generator Differential protection (87G), back up Back up impedance protection- 3pole (21G) **[Or** Over Current / Under Voltage Protection (51G / 27G)], overload protection (51G), 100% stator earth fault protection(64G2), Rotor Earth fault protection (64F1/64F2), Low forward Power / Reverse power protection (32G / 37G), and Over voltage protection (59G). The Group-B should include Overall differential protection (87OA), 95% stator earth fault (64G1) protection, loss of excitation protection(40G), pole slip protection (98G), under frequency protection (81G) and over fluxing protection (99G).

(B) Bus bar and LBB Protection

SN	Protection	Setting
1	LBB protection and bus bar protection	Bus bar & LBB protection to be provided at 400kV, 220kV, 132kV/66kV level for Generating stations. LBB current should be in pick up condition always **picking up more than 20%. (NTPC)** LBB Time delay = 200ms.

A: Protection for Generator Transformer (GT)

SN	Protection	Purpose of Protection and Setting
1	Generator Transformer Differential protection (87GT)	Differential Relay is provided for Internal Fault in Transformer Trip
2	Restricted Earth Fault (REF) protection (64GT)	REF to be provided for Internal Earth Fault in Transformer **No REF for 500MW unit, only 87 HV protection in place of REF- (NTPC)**
3	Generator Transformer back up IDMT O/C protection of HV winding (51GT)	Back up protection to be provided for Internal and external Fault. **Trip No O/C protection for GT – (NTPC).**
4	Generator Transformer back up Earth Fault protection of LV winding (51NGT)	Back up protection to be provided for Internal and external Fault. Trip
5	Over Fluxing (OF) protection (99GT)	Over Flux Relay be provided for protection from Over Fluxing (V/f)=1.1 for alarm & (V/f)=1.4 for tripping
6	HV winding cum overhang differential protection (87HV / 87 NT)	HV winding cum overhang differential protection is a unit type protection which operates for earth faults on the generator transformer HV side and also covers a large portion of the HV winding and the HV terminals upto the HV current transformers. **Alarm & Trip contacts both hooked up for TRIP – (NTPC).**
6	Buchholz protection	Buchholz Relay to be provided for detection of incipient internal fault in Transformer Tripping for both stages (The contacts for both stages shall be paralleled so that tripping command goes to CB(s) in both stages.) However, the existing practice of two stage tripping may be reviewed by utilities.
7	Winding Temperature Indicator (WTI)	WTI to be provided for preventing the transformer winding from High Temperature Operation. Cooling, Alarm **Trip with time delay – (NTPC)** The temperature settings shall be as per manufacturer's recommendations.

8	Oil Temperature Indicator (OTI)	OTI to be provided for preventing the transformer oil from High Temperature Operation. Alarm **Trip with time delay – (NTPC)** The temperature settings shall be as per manufacturer's recommendations.
9	Pressure Relief Device (PRD)	PRD to be provided for protection of transformer tank from blasting due to development of high internal pressure during heavy internal fault Trip
10	Magnetic Oil Gauge (MOG)	MOG to be provided for Low oil level Alarm. Alarm
11	Surge Arresters	Gapless Surge Arresters shall be provided on both primary and secondary sides of transformers.
	Grouping of Protection	The Protection of Generator Transformer could be divided into two groups (Group-A & Group-B) and each group should be connected to separate DC source. Both Group-A & Group-B protection shall give trip impulse to circuit breaker of Generator bay. The Group-A should include Transformer Differential protection (87GT) and back up Earth Fault protection of LV winding (51NGT). The Group-B should include REF protection (64GT), back up IDMT O/C protection of HV winding (51GT) and HV winding cum overhang differential protection (87HV / 87 NT).

(D) <u>Protection for Unit Auxiliary Transformer (UAT) and Station Auxiliary Transformer (SAT)</u>

SN	Protection	Purpose of Protection and Setting
1	Differential protection (87T)	Differential Relay to be provided for Internal Fault in Transformer Trip
2	Restricted Earth Fault (REF) protection(64)	REF to be provided for Internal Earth Fault in Transformer Trip
3	Back up IDMT O/C protection of HV winding (51)	Back up protection to be provided for Internal and external Fault. Trip

4	Back up Earth Fault protection of LV winding (51N)	Back up protection to be provided for Internal and external Fault. Trip
5	Buchholz protection	Buchholz Relay to be provided for detection of incipient internal fault in Transformer Tripping for both stages (The contacts for both stages shall be paralleled so that tripping command goes to CB(s) in both stages.) However, the existing practice of two stage tripping may be reviewed by utilities.
6	Winding Temperature Indicator (WTI)	WTI to be provided for preventing the transformer winding from High Temperature Operation. Cooling, Alarm **Trip with time delay – (NTPC)** The temperature settings shall be as per manufacturer's recommendations.
7	Oil Temperature Indicator (OTI)	OTI to be provided for preventing the transformer oil from High Temperature Operation. Alarm **Trip with time delay – (NTPC)** The temperature settings shall be as per manufacturer's recommendations.
8	Pressure Relief Device (PRD)	PRD to be provided for protection of transformer tank from blasting due to development of high internal pressure during heavy internal fault Trip
9	Magnetic Oil Gauge (MOG)	MOG to be provided for Low oil level Alarm. Alarm
10	Surge Arresters	Gapless Surge Arresters shall be provided on both primary and secondary sides of transformers, located outdoors with overhead connection.
	Grouping of Protection	The Protection of Unit Auxiliary Transformer (UAT) could be divided into two groups (Group-A & Group-B) and each group should be connected to separate DC source. Both Group-A & Group-B protection shall give trip impulse to circuit breaker of Generator bay. The Group-A should include Transformer Differential protection (87T) and back up Earth Fault protection of LV winding (51N). The Group-B should include REF protection (64GT) and back up IDMT O/C protection of HV winding (51).

(E) Protection for Excitation Transformer

SN	Protection	Purpose of Protection and Setting
1	Restricted Earth Fault (REF) protection (64)	REF to be provided for Internal Earth Fault in Transformer Trip. **No REF, Short Circuit Protection provided for excitation transformer – (NTPC).**
2	Instantaneous and IDMT O/C protection of HV winding (51)	Back up protection to be provided for Internal and external Fault. Trip
3	Winding Temperature Indicator (WTI)	WTI to be provided for preventing the transformer winding from High Temperature Operation. Cooling, Alarm Trip The temperature settings shall be as per manufacturer's recommendations.

Deliberation of the Committee

The Sub-committee requested NHPC and OTPC to prepare protection philosophy for Generator, GT, UAT & SAT separately for Hydro Power Plants and Gas Based Power Plants respectively taking the help of above document and the same will be discussed in next PCC meeting.

The Committee noted as above.

D.23 T- Connection at various points in NER Grid:

Some of the lines in NER are being tapped (i.e. operating with T-connections) to feed radial loads. ***To ensure more reliability and security of these lines, LILO of these lines need to be done at those locations.***

In 17th PCC meeting, the status as informed by Assam and Nagaland in the meeting is given below:

i. 220 kV Samaguri – Sarusajai I (Jawharnagar) - **Completed**
ii. 220 kV Sarusajai – Langpi I (Star CemenT)
iii. 132 kV Balipara – Depota (Ghoramara)
iv. 132 kV Samaguri – Depota (Pavoi)
v. 132 kV Srikona – Panchgram – **Dec'13**
vi. 66 kV Dimapur – Bokajan (Singrijan, Power House & Dairy Farm) – **Representative of Nagaland** stated that they will refer to the case higher Authority.

Assam stated that the above lines are radial feeders and LILO arrangement would be provided in future.

The Committee noted as above.

D.24 Installation of 2nd Distance Protection Relay (DPR) for 220KV and above System

The status of installation of 2nd DPR in respect of following lines as given in 14th PCC is as follows:

SN	Station	Line	Utility	Status
1	Samaguri SS	220 KV Balipara	AEGCL	**Nov, 2013**
2	BTPS SS	220 KV Salakati # I	AEGCL	Oct, 2013
3	BTPS SS	220 KV Salakati # II	AEGCL	Oct, 2013

During the 11th PCC meeting, the committee advised Assam to install Main –II (Distance protection) at Tinsukia end of Kathalguri-Tinsukia 220kV D/c line.

During 12th PCC meeting Assam had informed that they intend to install the relays, handed over by POWERGRID, at Samaguri Sub Station (for 220kV Balipara – Samaguri line) and Tinsukia Sub Station (for 220kV Kathalguri – Tinsukia line).

During 16th PCC meeting, sub-committee had requested Assam to inform the status of implementation of 2nd DPR at Samaguri substation for 220kV Balipara – Samaguri line and action plan for installation of Line Differential relays for BTPS – Salakati 220kV lines in next PCC meeting.

Deliberation of the Committee

Assam informed that three DPRs are available at Tinsukia end and one DPR & one back up O/C relay are available at Kathalguri end and three (3) more DPRs would be procured soon for providing two distance protection (Main-I & II) for 220kV Tinsukia – Kathalguri D/c line.

Being a very short line, for the time being, the relay setting of for BTPS – Salakati 220kV lines would be rechecked and suitably modified, if required. The installation of Line Differential relays for BTPS – Salakati 220kV lines will be considered in future, if required.

The Committee noted as above.

D.25 400 KV Bus Arrangement at Ranganadi:

It has been observed that 400 KV Bus at Ranganadi is operated in single bus mode and it is connected at Bus-B. As per information from Ranganadi, reason for keeping in single bus is due to failure of one of the Bus CT.

As per CEA's Technical Standard for Construction of Electrical Plants and Electric Lines Regulations, it is suggested that at 400kV level, layout of Air Insulated Substation shall be either one or half breaker scheme or double main and transfer bus scheme depending on the importance of the station.

Considering the importance of Ranganadi station, it is requested that bus arrangement at 400kV may be corrected at the earliest and both buses at 400kV should be available in service all the time and feeders/ICTs distributed at each bus accordingly.

During 16th PCC meeting, DGM, NERLDC requested NEEPCO to restore the bus coupler bay at the earliest for enhancing reliability of the system with two buses. NEEPCO agreed to that.

Deliberation of the Committee

Sr. Mgr., NEEPCO informed that materials have arrived at site and the work will be completed by March, 2014.

The Committee noted as above.

D.26 Replacement of 220 KV Current Transformers (3-core) with suitable 5 core Current Transformer by NEEPCO:

Replacement of 220kV, 3-Core Current Transformers with suitable 5(five) core Current Transformer by NEEPCO for incorporation of 220kV Bus Bar Protection at Kopili station. During last standing committee meeting Dtd.03.01.14, it has been decided to replace existing 60MVA ICT-1(20x3) by new 160MVA ICT by POWERGRID along with installation of 220KV Bus bar protection for 220kV Bus scheme at Kopili HEP, NEEPCO. However, to make Bus Bar protection operational, NEEPCO has to change all 220KV CT of all 200kV bays (except ICT-1/2 bay) connected to 220kV bus at Kopili HEP, NEEPCO.

Deliberation of the Committee

Sr. Mgr., NEEPCO informed that replacement of 220kV, 3-Core Current Transformers with 5(five) core Current Transformer of suitable rating will be carried out by them at the earliest so that bus bar protection can be provided at 220kV level.

The Committee noted as above.

E. NEW ITEMS

E.1 Major Grid Disturbances during December, 2013:

There was no grid disturbance during the month of December, 2013**.**

For kind information only.

E.2 Major Events in North-Eastern Regional Grid during the period December, 2013

A. Tripping of 220 kV Misa-Byrnihat lines:

220 kV Misa-Byrnihat I & II lines tripped at 1423 Hr on 31.12.13 & 1320 Hr on 02.01.14. 220 kV Misa-Byrnihat I line tripped at 0551 Hr on 05.01.14, 0613 Hr on 06.01.14, 0016 Hr on 09.01.14 & 0247 Hr on 09.01.14.

Tripping of 220 kV Misa – Byrnihat I & II lines **at 1423 Hr on 31.12.13** led to overloading of 132 kV Badarpur - Khliehriat, 132 kV Jiribam - Haflong and 132 kV Imphal - Dimapur lines which tripped on O/C. This caused isolation of Southern part of NER Grid from rest of NER Grid. Frequency of this islanded system shot up to 51.40 Hz causing tripping of STG 1 of Palatana.

Load Loss: 10 MW & Generation Loss: 174 MW

Tripping of 220 kV Misa – Byrnihat I & II lines **at 1320 Hr on 02.01.143** led to overloading of 132 kV Badarpur – Khliehriat line. 20 MW generation of AGTPP reduced to reduce loading of 132 kV Badarpur - Khliehriat line & for safe, secure & reliable operation of Southern Part of NER Grid.

Due to tripping of 220 kV Misa – Byrnihat I line at **0016 Hr on 09.01.14** & **0247 Hr on 09.01.14,** 50 MW generation of Palatana reduced for safe, secure & reliable operation of Southern Part of NER Grid.

The representative of Meghalaya informed that trippings on 31-12-13 & 02-01-14 were due to false carrier tripping associated with DC supply. The problem was accordingly rectified and since then, there has been no false tripping.

The tripping on 09-01-14 was attributed to earth fault at location 11.4km from Killing end as there was dense fog in that area on that day.

B. <u>Disturbance in Manipur System</u>:

At 1830 Hr on 11.12.13, 132 kV Dimapur-Imphal, 132 kV Loktak-Imphal & 132 kV Loktak-Ningthoukhong lines tripped. Due to tripping of these elements, 45 MW generation of Loktak reduced for safe, secure & reliable operation of Southern Part of NER Grid.

At 1158 Hr on 02.01.14, 132 kV Dimapur-Imphal, 132 kV Loktak-Imphal & 132 kV Loktak-Ningthoukhong lines tripped. Due to tripping of these elements, power supply to Manipur (except Jiribam & Rengpang load) disrupted.
Load Loss: 69 MW

NERLDC requested NERTS to check the healthiness of relay at Imphal(PG) end of 132 kV Imphal(PG)-Ningthoukhong Line & ensure proper operation of the same to avoid above nature of incidence. NERTS agreed for the same.

At 1446 Hr on 12.01.14, 132 kV Loktak-Imphal & 132 kV Loktak-Ningthoukhong lines tripped. Due to tripping of these elements, there was 20 MW loss of generation in Loktak.

C. Disturbance in part of Tripura System:

At 1136 Hr on 14.12.13, 132 kV R C Nagar-Agartala I & II, 132 kV Agartala-Rokhia I, 132 kV Agartala-Dhalabil and 66 kV Udaipur-Gumti lines tripped. Due to tripping of these elements, there was **48 MW loss of generation & 12 MW loss of load**.

D. Disturbance in Capital Area(Assam) & Lower Assam Area and Nangalbibra Area (Meghalaya):

Lower Assam Area, Capital Area (Assam) & Nangalbibra Area (Meghalaya), Langpi Generation (Part of NER Grid), Birpara Load (Part of ER Grid), East Bhutan Load, West Bhutan Load, Chukha System was connected with rest of NEW Grid through 220 kV Birpara - Binaguri I & II, 220 kV Samaguri - Sarusajai I & II & 400/220 kV, 315 MVA ICT at Bongaigaon as 400/220 kV (200 MVA ICT at Malbase was not in service).

Before the incident, NER Grid was importing around 460 MW through 400 kV Bongaigaon – Binaguri D/C lines and 42 MW through 400 kV Salakati – Birpara D/C lines. **At 17:40:30 Hrs on 19.12.13**, 220 kV Birpara – Binaguri I tripped on DP, Z-I, B-E, 46.85 km, 58.56% from Birpara while power flow was 144 MW from Binaguri. This resulted in overloading of 220 kV Birpara – Binaguri II (222 MW power flow from Binaguri), which subsequently tripped at 17:43 Hrs. As a result, entire power flow shifted through 400 kV Binaguri – Bongaigaon D/C (794 MW) line causing overloading of the 400/220 kV 315 MVA ICT at Bongaigaon, which tripped on HV side Over Current Protection (450 MW loading) 67R at 17:43:40 Hrs. At 17:43:50 Hrs, 220 kV Balipara – Samaguri Line tripped at Samaguri (164 MW flow from Balipara) on over current. At 17:43:53.629 Hrs, the 220 kV Misa – Samaguri II tripped at Misa on Over Current (165 MW from Misa) Protection 67B. At 17:43:53.832 Hrs, 220 kV Misa – Samaguri I tripped at Misa on Over Current (165 MW from Misa) Protection 67B. This resulted in tripping of 220 kV D/C Samaguri – Sarusajai line at Samaguri on overloading. Tripping of all these elements resulted in blackout of power of above system. There was, however, no tripping of 220 kV Samaguri – Mariani S/C line.

Load Loss: 358 MW & Generation Loss: 40 MW

E. Disturbance in Mizoram System:

At 0923 Hr on 24.12.13, 132 kV Kumarghat-Aizwal, 132 kV Jiribam-Aizwal & 132 kV Kolasib-Aizwal lines tripped. Due to tripping of these elements, power supply to Mizoram (except Kolasib Load) disrupted.

Load Loss: 36 MW

F. Disturbance in Capital Area (Assam):

At 1105 Hr on 11.01.14, 220 kV Sarusajai-Samaguri I & II lines tripped. At 1110 Hr on 11.01.14, 220 kV Sarusajai-Agia & Sarusajai-Boko lines tripped. Due to tripping of these elements, power supply to Capital Area (Assam) disrupted.

Load Loss: 200 MW

G. Disturbance in Nagaland System:

At 0908 Hr on 25.12.13, 132 kV Dimapur - Dimapur line tripped. Due to tripping of this element, power supply to Nagaland (except Mokokchung load) disrupted.

Load Loss: 53 MW

NERLDC requested NERTS to enhance loadability of 132 kV Dimapur-Dimapur S/C line through replacement of existing CTs with higher capacity CT

H. Islanding Schemes of NER:

The matter on finalization of implementation of Islanding Schemes of NER was discussed at the meeting on 29.11.13 at SLDC, Kahilipara & 20.12.13 at NERLDC.

It is suggested that machine data for conducting Inertial Load Flow Study, Governor Response Power Flow Study and Dynamic Study to understand the dynamic behavior of the island may kindly be provided at the earliest to expedite the process of implementation of discussed Islanding Schemes.

H: Machine Inertia Constant in p.u. on Machine Base (including turbine inertia)
R: Governor Permanent Droop in p.u.
D: Turbine Damping Factor/Co-efficient in p.u. on Machine Base
Pmax: Maximum Generator Active Power Output (in MW)
Pmin: Minimum Generator Reactive Power Output (in MW)

If these data are not readily available then respective utilities may collect these data from the manufacturers of the machines. In case of non-availability of these data, on-site testing of generators may be taken up.

Though gas based units are exempted from operation in Free Governor Mode of Operation, machines of the islanded control areas are to be kept in Free Governor Mode (FGMO) considering the importance of Governor Response to control frequency in the island.

Deliberation of the Committee

Constituents of NER informed that no further data are available with them and NERLDC may assume standard values with reasonable approximation for system study purposes.

The Committee noted as above.

I. Major Events in North-Eastern Regional Grid

List of multiple tripping of elements and tripping of important elements in North-Eastern Regional Grid during the period w.e.f. 02nd December, 2013 to 12th January, 2014 is enclosed herewith at **Annexure - I.**

Deliberation of the Committee

The Sub-committee discussed the trippings in details and necessary actions have been highlighted to all the constituents for safe and secure of the grid.

The Committee noted as above.

J. New SPS

At 1426 Hr on 31.12.13, Southern Part of NER Grid was separated from rest of NER Grid due to tripping 220 kV Misa-Byrnihat D/C lines. SPS5 for Palatana (with Generation from Palatana) is required in case of tripping of 220 kV Misa-Byrnihat D/C lines (both circuits).

Deliberation of the Committee

DGM/NERLDC highlighted the necessity of additional SPS (**Case-5**) for system security in case of tripping of both the circuits of 220 kV Misa-Byrnihat D/C line. The scheme will be similar to **Case-3** of approved SPS. He also requested NERTS to look into the matter urgently for finding out Signal flow channels for implementation of the scheme.

The Sub-committee requested NERLDC & NERTS to prepare the scheme for further discussion in the next OCC meeting.

The Committee noted as above.

Date & Venue of next OCC meeting

It is proposed to hold the 94th OCC meeting of NERPC in second / third week of February, 2014. The exact date & venue will be intimated in due course.

The meeting ended with thanks to the Chair.

****

Annexure-I

List of Participants in the 93rd OCC & 17th PCC meetings held on 21/01/2014

SN	Name & Designation	Organization	Contact No.
	No Representatives	**Ar. Pradesh**	
1.	Sh. H.C. Phukan, CGM, SLDC	Assam	09435559447
2.	Sh. P. K. Sarma, GM (Com-T)	Assam	09435344083
3.	Sh. F.K. Sarma, GM	Assam	09435140964
4.	Sh. B. C. Bordoloi, DGM, SLDC	Assam	09435045675
5.	Sh. A. Barkakati, DGM	Assam	09954005110
6.	Sh. J. K. Baishya, AGM, SLDC	Assam	09435041494
7.	Sh. A. K. Saikia, AGM, SLDC	Assam	09864116176
8.	Sh. G.K. Bhuyan, AGM, (Protection)	Assam	09954055295
9.	Sh. K. Sarma, AGM	Assam	09435013532
10.	Sh. B. Bordoloi, DM	Assam	09435558545
11.	Sh. B. C. Sharma, EE (SCD-II)	Manipur	09436020911
12.	Sh. A. Kharpan, ACE	Meghalaya	09436117802
13.	Sh. R. Majaw, SE	Meghalaya	09436110871
14.	Sh. F.E. Kharshiing, SE, SLDC	Meghalaya	09863066960
15.	Sh. D.J. Lyngdoh, EE	Meghalaya	09863063375
16.	Sh. S. Saha, AE, PLCC	Meghalaya	09436112798
	No Representatives	**Mizoram**	
17.	Sh. Rokobeito Iralu, SDO	Nagaland	09436832020
18.	Sh. Ratan Debbarma, DGM, SLDC	Tripura	09436130960
19.	Sh. Debabrata Paul, Sr. Mgr (Com)	Tripura	09436500244
20.	Sh. N. R. Paul, DGM (SO –I)	NERLDC	09436302723
21.	Sh. Anupam Kumar, Engineer	NERLDC	09436335379
22.	Sh. P. Kanungo, DGM	NERTS	09436302823
23.	Sh. Diganta Goswami, Sr. Mgr.	NEEPCO	09435577655
24.	Sh. Dinabandhu Bbaishya, Sr. Mgr	NEEPCO	09435339966
25.	Sh. Subhash Medhi, Dy. Mgr (E)	NHPC	09435534564
26.	Sh. Pranay Kumar, Engineer (E)	NHPC	09436894887
27.	Sh. Parshuram Saha, Advisor(O&M)	OTPC	08974728670
28.	Sh. R. Ranjan Das, Mgr (E)	OTPC	
29.	Sh. S.K. Ray Mohapatra, MS I/C	NERPC	09818527857
30.	Sh.B. Lyngkhoi, SE (O)	NERPC	09436163419
31.	Sh. S. M. Jha, EE (O)	NERPC	09831078162

Annexure - C. 3

SN	Name of State	Total Quantum of Load Shedding required	Location where URF installed (Feeder's Name)	Stage	Load in each feeder	Quantum of Load shedding (MW) implemented	Additional quantum of load shedding required
1	Ar. Pradesh	**20**	**At Satyam Ispat** (11 KV Banderdewa - Satyam Ispat)	Stage - I (49.2 Hz)		**3.5**	**1.5**
			To be identified	Stage - II (49.0 Hz)		**0**	**5**
			To be identified	Stage - III (48.8 Hz)		**0**	**5**
			To be identified	Stage - IV (48.6 Hz)		**0**	**5**
2	Assam	**220**	**At Gauripur** (132 KV Dhaligoan - Gossaigoan - Gauripur)	**Stage - I (49.2 HZ)**	16	**54.5**	**0**
			At Sipajhar (132 KV Depota - Rowta - Sipajhar)		10		
			At Dhemaji (132 KV Gohpur - Nalkata - Dhemaji)		11		
			At Majuli (132 KV Nalkata - Majuli)		2.5		
			At Baghjap (132 KV Kahilipara - Chandrapur - Baghjap)		15		
			At Diphu (132 KV Samaguri - Sankardev - Diphu)	**Stage - II (49.0 Hz)**	11	**61**	**0**
			At Gohpur (132 KV Samaguri - B. Chariali - Gohpur)		8		
			At Rupai (132 KV Tinsukia - Rupai + AP Load)		17		
			At Jogighopa (132 KV Dhaligoan - Jogighopa)		7		
			At Sankardevnagar (132 KV Samaguri - Sankardevnagar)		18		

SN	Name of State	Total Quantum of Load Shedding required	Location where URF installed (Feeder's Name)	Stage	Load in each feeder	Quantum of Load shedding (MW) implemented	Additional quantum of load shedding required
2	Assam		**At Gossaigoan** (132 KV Dhaligoan - Gossaigoan)	**Stage - III (48.8 Hz)**	7	**59**	**0**
			At Rowta (132 KV Depota - Rowta)		18		
			At Chandrapur (132 KV Kahilipara - Chandrapur)		12		
			At Nalkata (132 KV Gohpur - Nalkata)		11		
			At Bokakhat (132 KV Jorhat - Bokakhat)		11		
			At Sishugram (132 KV Sarusajai - Sishugram)	**Stage - IV (48.6 Hz)**	45	**57**	**0**
			At Ledo (132 KV Tinsukia - Ledo)		12		
3	Manipur	**20**	**At Yurembam** (33 KV Yurembam - Leimakhong)	**Stage - I (49.2 Hz)**		**3**	**2**
			To be identified	**Stage - II (49.0Hz)**		**0**	**5**
			To be identified	**Stage - II (48.8Hz)**		**0**	**5**
			To be identified	**Stage - II (48.6Hz)**		**0**	**5**

SN	Name of State	Total Quantum of Load Shedding required	Location where URF installed (Feeder's Name)	Stage	Load in each feeder	Quantum of Load shedding (MW) implemented	Additional quantum of load shedding required
4	Meghalaya	**60**	**At Nangalbibra** (33 KV Mendipathar - Nangalbibra)	**Stage - I** **(49.2 Hz)**	6.5	**15**	**0**
			At Rongkhon (33 KV Garobadha I - Rongkhon)		8.5		
			At Mawphlang (132/33 KV, 20 MVA Transformer)	**Stage - II** **(49.0 Hz)**		**15**	**0**
			At Khliehriat (132/33 KV, 20 MVA Transformer)	**Stage - III** **(48.8 Hz)**	12	**15**	**0**
			At Nongstoin (33 KV Nongstoin - Mairang)		3		
			At Mawlai (33 KV Mawlai - Nongthymmai)	**Stage - IV** **(48.6 Hz)**	7.5	**15**	**0**
			At NEHU (33 KV NEHU - Happy Valley)		7.5		
5	Mizoram	**20**	**At** 132 KV Khawiva (33 KV Khawiva - Sazaikawn)	**Stage - I** **(49.2 Hz)**	2.38	**5.09**	**0**
			At Bukpui (33 KV Bukpui - Chhingchhip)		2.71		
			At Zuangtui (6.3 MVA, 33/11 KV Transformer - I)	**Stage - II** **(49.0 Hz)**	5.31	**5.31**	**0**
			At Zuangtui (6.3 MVA, 33/11 KV Transformer - II)	**Stage - III**	4	**5.1**	**0**

			At Tlangnuam (33 KV Tlangnuam - Aibawk)	**(48.8 Hz)**	1.1	**3.1**	**0**
			At Chawnpui (6.3 MVA, 33/11 KV Transformer - I)	**Stage - III (48.6 Hz)**	3	**5.2**	**0**
			At Zuangtui (11 KV Zuangtui - Chaltlang)		2.2		
SN	**Name of State**	**Total Quantum**	**Location where URF installed (Feeder's**	**Stage**	**Load in**	**Quantum of Load**	**Additional**
6	Nagaland	**20**	**At Mokokchung** (66 KV Mokokchung - Tuli)	**Stage - I (49.2 Hz)**		**6**	**0**
			At Dimapur (33 KV Dimapur - AP -I)	**Stage - II (49.0 Hz)**		**4.5**	**0**
			At Kohima (132 KV Kohima - Wokha)	**Stage - III (48.8 Hz)**		**5**	**0**
			At Dimapur (33 KV Dimapur - Refferal Hospital)	**Stage - IV (48.6 Hz)**		**4.5**	**0**
7	Tripura	**40**	**At Badharghat** (33 KV Badarghat - Bishalghar)	**Stage - I (49.2 Hz)**	8.5	**11**	**0**
			At Badharghat (33 KV Badarghat - Takarjala)		2.5		
			At 66 KV Rabindra Nagar (33 KV Rabindra Nagar - Melaghar)	**Stage - II (49.0 Hz)**	6.5	**10**	**0**
			At 66 KV Rabindra Nagar (33 KV Rabindra Nagar - Kathalia)		3.5		
			At 79 Tilla (33 KV, 79 Tilla - Mohanpur)	**Stage - III**	7.5		

			At 79 Tilla (33 KV, 79 Tilla - Durjoy Nagar)	**(48.8 Hz)**	7	**14.5**	**0**
			At 79 Tilla (33 KV, 79 Tilla - College Tilla)	**Stage - IV** **(48.6 Hz)**		**12.5**	**0**

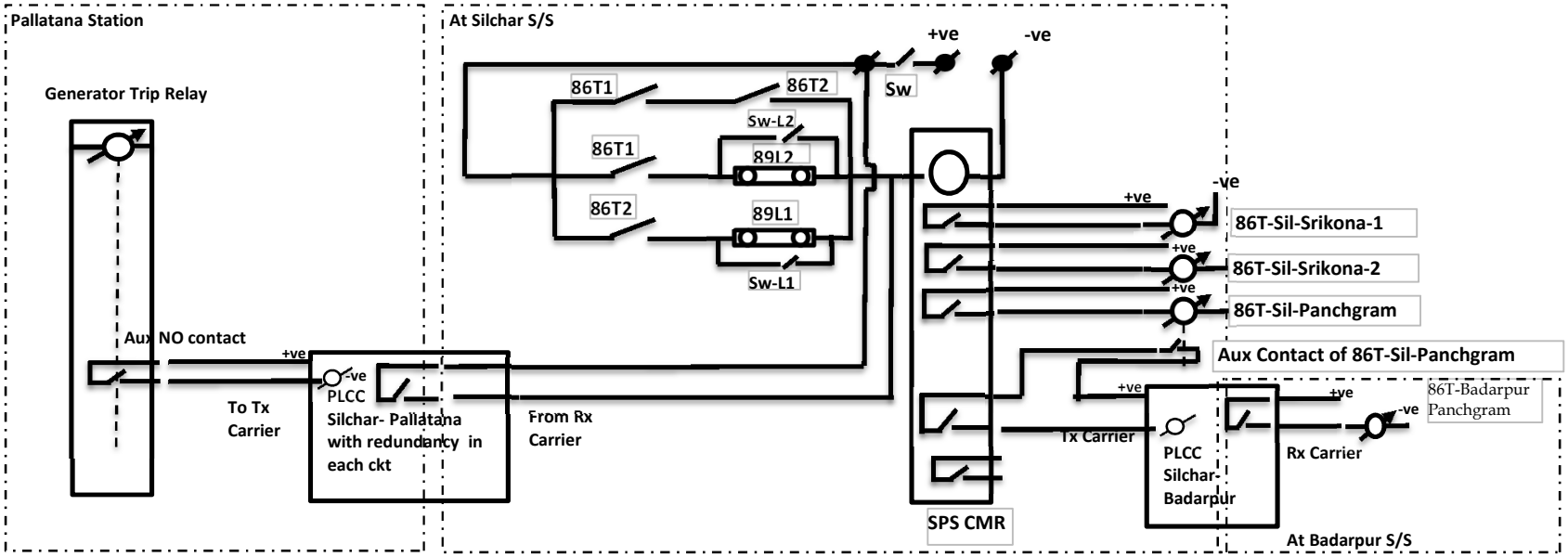
Note: **The inbuilt UFR of existing Numerical Relay at identified locations (at 132 KV level) of Assam, Meghalaya & Tripura can be used for above purpose. Existing UFR can also be shifted to new locations, wherever required.**

In respect of Ar. Pradesh, Manipur, Mizoram & Nagaland: Setting of existing UFR needs to be changed in case they use the same Feeder. (i.e. 48.8 Hz to be set to 49.2 Hz for Stage - I), (48.5 to be set to 49.0 Hz for Stage - II) & (48.2 Hz to 48.8 Hz for Stage - III) Feeder is to be identified at the earliest for remaining quantum of load shedding of other stages of 48.8 Hz & 48.6 Hz.

STATUS OF UFR IMPLEMENTATION IN NER

Stage	Load shed Required	Implemented	To be Implemented
Stage - I (49.2 Hz)	**100 MW**	**98.09**	**1.91**
Stage - II (49.0 Hz)	**100 MW**	**95.8**	**4.19**
Stage - III (48.8 Hz)	**100 MW**	**98.6**	**1.4**
Stage - IV (48.6 Hz)	**100 MW**	**94.2**	**5.8**
TOTAL	**400 MW**	**386.69**	**13.3**

Special Protection Scheme for Grid Security of NER- Case1 &2



86T1 Trip Relay of Silchar-Pallatana ck1 at Silchar End.

86T2 Trip Relay of Silchar-Pallatana ck2 at Silchar End.

89L1 Line Isolator Aux. Contact Silchar-Pallatana ck1 at Silchar End.

89L2 Line Isolator Aux. Contact Silchar-Pallatana ck2 at Silchar End.

SPS CMR High Speed Contact Multiplier relay to be installed & wired at Silchar substation

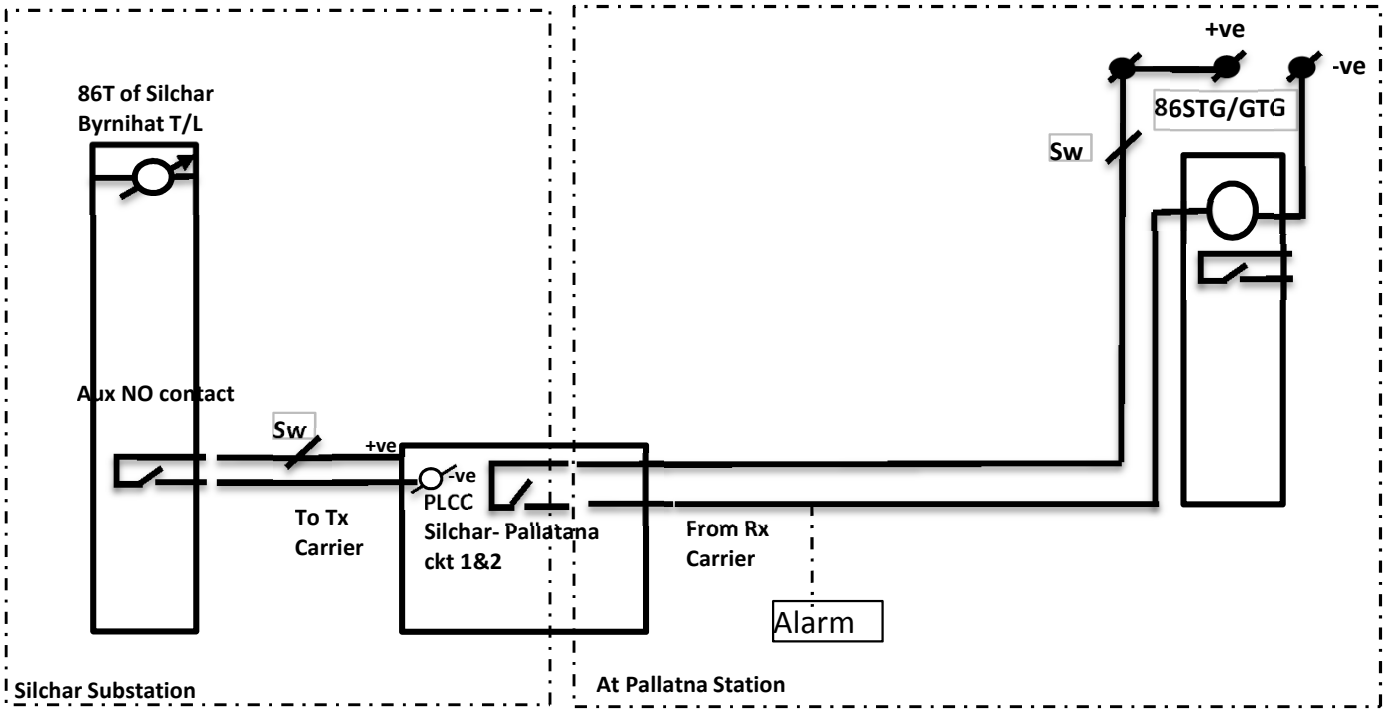
Sw In Out Switch for SPS scheme,

Sw-L1, Sw-L2 SPS in out switch for Line L1,L2. To be kept ON(through) whenever respective Line is Out & to be kept Off when Line is in service.

Scheme Requirement:

i. When generator at Palatana trips or both the ckts of 400 kV Palatana – Silchar lines trip, a signal will be generated from trip relays at Silchar
ii. This signal should trip the CB of 132 kV Silchar – Srikona D/C & 132 kV Silchar – Panchgram lines at Silchar.
iii. Subsequently, tripping of 132 kV Silchar – Panchgram line a signal will be generated from trip relay of 132 kV Silchar –Panchgram line. This signal should trip the CB of 132 kV Badarpur – Panchgram line at Badarpur.

Special Protection Scheme for Grid Security of NER- Case:3



86T Trip Relay of Silchar-Pallatana ck1 at Silchar End.

86GTG 86 Trip relay for GTG at Pallatana

Note: At Present spare channel is not available for Silc-Pallatana PLCC links , can be made availble on procurement.

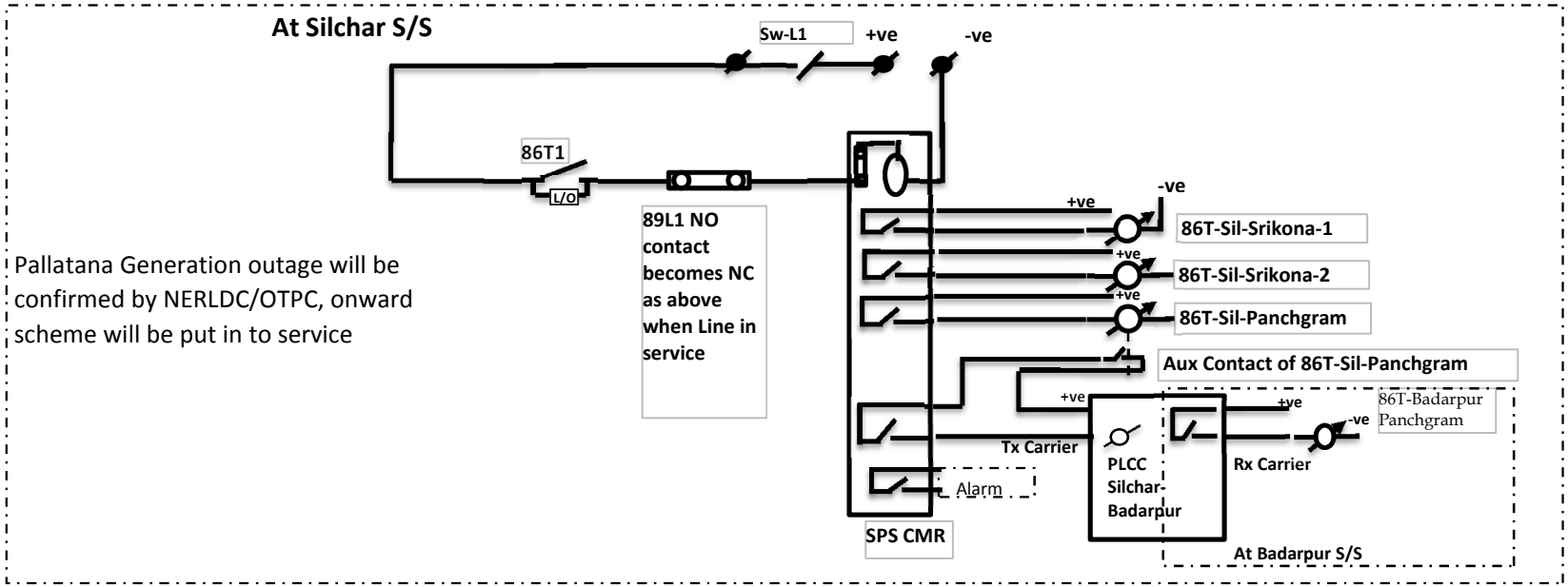
Sw In Out Switch for SPS scheme

Scheme:

i. When 400 kV Byrnihat – Silchar lines trip, signal will be generated from trip relays at Silchar
ii. This signal should trip CB of GTG/STG of at Palatana. But unit will be running in FSNL
iii. A instant relief in line loading of 230/130 MW which will avert the system from cascade tripping.
v. Then manual demand disconnection should be imposed.

By:S.P/DM/OS

Special Protection Scheme for Grid Security of NER- Case4



86T1 Trip Relay of Silchar-Byrnihat Line at Silchar end

89L1 Line Isolator Aux. Contact Silchar-Byrnihat ckt at Silchar End.

NC contact of trip relay to avoid contituous trip com

L/O Lock out contact taken to incorporate unsuccesful AR

SPS CMR **EXISTING** High Speed Contact Multiplier relay to be installed & wired at Silchar substation,

Sw-L1, SPS in/out switch for to be kept **ON**(through) whenever NERLDC asks in case generation is out and Silchar Byrnihat Line is in service

Scheme Requirement:

i. When generation is out (confirmed by NERLDC/OTPC) and Byrnihat–Silchar line trip, a signal will be generated from trip relays at Silchar
ii. This signal should trip the CB of 132 kV Silchar – Srikona D/C & 132 kV Silchar – Panchgram lines at Silchar.
iii. Subsequently, tripping of 132 kV Silchar – Panchgram line a signal will be generated from trip relay of 132 kV Silchar –Panchgram line. This signal should trip the CB of 132 kV Badarpur – Panchgram line at Badarpur.

Prepared by:S. Paul/DM-OS

IMPLEMENTATION OF ISLANDING SCHEME IN NER

(A) ISLAND-1: AT 48.80 Hz, Delay 5 Secs:

SN	Lines required to be opened	Scheme Details	Responsibility
1	220 kV New Mariani (PG) – AGBPP	**Mariani (PG) SS:** UFR of 220 kV Kathalguri feeder (Main-1 & 2) to be activated at 48.80 Hz with 5 sec delay to initiate 3-Ph Trip with DT send to other end.	POWERGRID, Misa.
		Kathalguri (NEEPCO) PH: UFR of 220 kV New Mariani feeder (Main-1 & 2) to be activated at 48.80 Hz with 5 sec delay to initiate 3-Ph Trip with DT send to other end.	NEEPCO
2	220 kV New Mariani (PG) – Misa	**Mariani (PG) SS:** UFR of 220 kV Misa feeder (Main-1 & 2) to be activated at 48.80 Hz with 5 sec delay to initiate 3-Ph Trip with DT send to other end.	POWERGRID, Misa.
		Misa (PG) SS: UFR of 220 kV New Mariani feeder (Main-1 & 2) to be activated at 48.80 Hz with 5 sec delay to initiate 3-Ph Trip with DT send to other end.	
3	220 kV Mariani – Misa	**Mariani (AEGCL) SS:** UFR of 220 kV Misa feeder (Main-1 & 2) to be activated at 48.80 Hz with 5 sec delay to initiate 3-Ph Trip with DT send to other end.	POWERGRID, Misa.
		Misa (PG) SS: UFR of 220 kV old Mariani feeder (Main-1 & 2) to be activated at 48.80 Hz with 5 sec delay to initiate 3-Ph Trip with DT send to other end.	
4	132 kV Dimapur (PG) – Bokajan	**Dimapur (PG) SS**: New DPR for 132 kV Bokajan feeder will be installed before 10.01.2014 and UFR to be activated at 48.80 Hz with 5 sec delay to initiate 3-Ph Trip.	POWERGRID, Dimapur
5	Isolation of 2 Nos of Gas Turbine Generator from 2/3 different modules.	**Kathalguri (NEEPCO) PH**: UFR of Deomali & Tinsukia feeder to be activated at 48.80 Hz with 5 sec delay and Trip out puts to be paralleled for extension of 3-Ph Trip to 2 Nos of Gas Turbines Generators from 2/3 different modules.	NEEPCO & POWERGRID, Misa.

IMPLEMENTATION OF ISLANDING SCHEME IN NER

(B) ISLAND-2 AT 48.50 Hz with 5 Sec delay

SN	Lines required to be opened	Scheme Details	Responsibility
1	132 kV Palatana – Udaipur	**Pallatana (OTPC) PH:** UFR of 132 kV Udaipur to be activated at 48.50 Hz with 5 sec delay to initiate 3-Ph Trip.	OTPC & POWERGRID, Silchar.
		Udaipur (TSECL) SS: UFR of 132 kV Pallatana feeder to be activated at 48.50 Hz with 5 sec delay to initiate 3-Ph Trip.	TSECL & POWERGRID, Silchar.
2	132 kV Palatana – Surjamani Nagar	**Pallatana (OTPC) PH:** UFR of 132 kV Surajmani Nagar to be activated at 48.50 Hz with 5 sec delay to initiate 3-Ph Trip.	OTPC & POWERGRID, Silchar.
		Surajmani Nagar (TSECL) SS: UFR of 132 kV Pallatana feeder to be activated at 48.50 Hz with 5 sec delay to initiate 3-Ph Trip.	POWERGRID, Silchar.
3	132 kV Silchar – Dullavcherra	**Silchar (PG) SS:** UFR of 132 kV Dullavcharra to be activated at 48.50 Hz with 5 sec delay to initiate 3-Ph Trip.	POWERGRID, Silchar.
		Dullavcherra (AEGCL) SS: UFR of 132 kV Silchar feeder to be activated at 48.50 Hz with 5 sec delay to initiate 3-Ph Trip.	AEGCL
4	132 kV AGTPP – Kumarghat	**AGTPP (NEEPCO) PH:** UFR of 132 kV Kumarghat to be activated at 48.50 Hz with 5 sec delay to initiate 3-Ph Trip.	NEEPCO & POWERGRID, Silchar.
		Kumarghat (PG) SS: UFR of 132 kV AGTPP feeder to be activated at 48.50 Hz with 5 sec delay to initiate 3-Ph Trip.	POWERGRID, Kumarghat.
5	132 kV P K Bari – Kumarghat	**Kumarghat (PG) SS**: UFR of 132 kV P K Bari feeder to be activated at 48.50 Hz with 5 sec delay to initiate 3-Ph Trip.	POWERGRID, Kumarghat.

ANNEXURE- D.4 (A)

APPROVED SHUTDOWN OF ELEMENTS FOR THE PERIOD 22.01.2014 TO 15.03.2014

1. Transmission Lines

SL. No.	Name of Transmission Line	Date & Time	Purpose	Areas/Feeders affected
TRANSMISSION LINES				
1	220KV Misa-Mariani(new)	21.01.14 to 22.01.14(7:00 to 15:00 Hrs)	For facilitating shifting ofvulnerable loc.585, 586 & 587 on Pile foundation.	220KV Misa-Mariani(new)
		01.02.14 to 10.02.14(Cont. SD)		
2	220KV Misa-Mariani	11.02.14 to 25.02.14(Cont. SD)		220KV Misa-Mariani
3	132KV Khandong-Khliehriat-II	25.02.14 to 01.03.14(7:00 to 15:00 Hrs)	For providing additional jumpers along the line for enhanced loadability of the line(as per decision of OCC)	132KV Khandong-Khliehriat-II
4	132KV Khandong-Khliehriat-I	02.03.14 to 06.03.14(7:00 to 15:00 Hrs)		132KV Khandong-Khliehriat-I
5	220KV Balipara-Samaguri line	15.02.14 to 18.02.14(7:00 to 15:00 Hrs)	For shifting of conductors from existing line to ERS in connection with diversion work of line section loc.13-16 & loc.22 to 25 for Railway gauge conversion.	220KV Balipara-Samaguri line
6	220KV BTPS-Agia(AEGCL)	23.01.14(7:00 to 15:00 Hrs)	For facilitating stringing of OPGW in the line	220KV BTPS-Agia(AEGCL)
7	220KV Misa-Samaguri-I	24.01.14(7:00 to 15:00 Hrs)	Replacement of Isolator hanger assembly. Isolators are more than 25 yrs old.	220KV Misa-Samaguri-I
8	220KV Misa-Samaguri-II	25.01.14(7:00 to 15:00 Hrs)		220KV Misa-Samaguri-II
9	132 KV Loktak-Imphal-II	22.01.14 to 24.01.14(Cont. SD)	Installation of addl. Tower in between span 113-114 for enhanced ground clearance.	132 KV Loktak-Imphal-II
2. SUBSTATIONS				
SN	**Name of Substation**		**Purpose**	
1	**400KV Misa S/s**			
i	400KV Balipara#2 -Main Bay	8/2/2014 (7:00 to 15: 00 Hrs)	Annual Maintance program	Line shall remain in service through Tie bay
ii	400 KV ICT-1 MAIN BAY	9/2/2014 (7:00 to 15:00 Hrs)	Annual Maintance program	ICT-I shall remain in service through Tie bay
iii	220 KV Bus coupler bay	20/2/2014 9:00(7:00 to 15:00 Hrs)	Annual Maintance program	All feeders shall remain in service
iv	400KV Balipara#1 -Main Bay	21/2/2014 9:00(7:00 to 15:00 Hrs)	Annual Maintance program	Line shall remain in service through Tie bay
v	400 / 220 KV,315MVA ICT#2	5/2/2014 (7:00 to 15:00 Hrs)	Annual Maintance program	400 / 220 KV,315MVA ICT#2
vi	400KV ICT#2 Main Bay	27/2/2014 (7:00 to 15:00 Hrs)	Annual Maintance program	ICT-2 shall remain in service through Tie bay
vii	400KV ICT#2 Tie Bay	28/2/2014 (7:0 to 15:00 Hrs)	Annual Maintance program	ICT-2 shall remain in service through Main bay
2	**400KV Balipara S/s**			
i	400KV, 80MVAR Bus Reactor-II	27.01.14(7:00 Hrs to 15:00 Hrs)	Repacement of existing 390KV Las with 336KV Las in view of change in design parameters	400KV, 80MVAR Bus Reactor-
ii	400/220KV,315MVA ICT	29.01.14(7:00 to 15:00 Hrs)	Annual Maintance program	400/220KV,315MVA ICT

ANNEXURE - D.14

ABSTRACT OF STATEWISE/SYSTEMWISE/CONSTITUENTWISE PEAK DEMAND- vs- AVAILABILITY IN NORTH EASTERN REGION FOR THE PERIOD FROM APRIL-2014 TO MARCH-2015

(ALL FIGURES IN MW & NET)

SL.NO	PARTICULARS	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15
1	ARUNACHAL PRADESH												
	i) NET MAX DEMAND	134	109	132	121	116	139	136	117	113	114	115	116
	ii) NET POWER AVAILABILITY- Own Source	2	2	2	6	6	6	4	4	2	2	2	2
	- Central Sector	122	129	135	135	134	101	132	127	106	100	97	120
	iii) SURPLUS(+)/DEFICIT(-)	-10	22	5	20	24	-32	0	14	-6	-13	-16	5
2	ASSAM												
	i) NET MAX DEMAND	1265	1355	1410	1440	1480	1400	1380	1435	1450	1380	1235	1380
	ii) NET POWER AVAILABILITY- Own Source	211	211	271	271	271	271	271	211	211	211	211	211
	Central Sector	684	723	750	744	734	657	730	691	623	604	600	658
	iii) SURPLUS(+)/DEFICIT(-)	-370	-422	-390	-426	-476	-472	-379	-533	-616	-565	-424	-512
3	MANIPUR												
	i) NET MAX DEMAND (OWN)	110	135	125	130	130	135	140	135	135	150	135	140
	ii) NET POWER AVAILABILITY- Own Source	5	5	5	5	5	5	5	5	5	5	5	5
	- Central Sector	113	119	133	133	133	117	129	124	110	106	105	116
	iii) SURPLUS(+)/DEFICIT(-)	9	-11	13	8	9	-13	-6	-6	-20	-38	-25	-18
4	MEGHALAYA												
	i) NET MAX DEMAND	355	345	355	335	310	310	335	350	345	390	385	360
	ii) NET POWER AVAILABILITY- Own Source	99	129	170	246	257	252	193	102	89	76	61	55
	Central Sector	194	206	215	214	210	191	210	198	177	171	172	187
	iii) SURPLUS(+)/DEFICIT(-)	-62	-11	30	125	158	133	68	-50	-79	-143	-153	-119
5	MIZORUM												
	i) NET MAX DEMAND	72	78	81	81	81	86	82	86	75	73	73	84
	ii) NET POWER AVAILABILITY- Own Source	14	17	20	25	25	25	20	15	15	14	13	12
	Central Sector	68	71	75	74	74	63	72	69	61	58	58	65
	iii) SURPLUS(+)/DEFICIT(-)	9	10	14	19	18	2	11	-2	1	0	-1	-7
6	NAGALAND												
	i) NET MAX DEMAND	95	100	125	130	115	100	130	110	115	120	110	119
	ii) NET POWER AVAILABILITY- Own Source	9	12	15	20	20	20	15	10	10	9	8	7
	Central Sector	86	71	75	74	74	63	72	69	61	58	58	65
	iii) SURPLUS(+)/DEFICIT(-)	1	-17	-35	-36	-21	-17	-43	-31	-44	-53	-45	-46
7	TRIPURA												
	i) NET MAX DEMAND	215	215	230	225	280	260	310	280	250	240	220	260
	ii) NET POWER AVAILABILITY- Own Source	94	109	109	114	114	114	114	114	109	109	109	109
	Central Sector	175	180	187	186	187	171	183	179	168	164	164	174
	iii) SURPLUS(+)/DEFICIT(-)	54	74	66	76	20	25	-13	13	27	34	53	24
8	NORTH EASTERN REGION												
	i) NET MAX DEMAND	2246	2337	2458	2462	2513	2429	2514	2514	2483	2466	2273	2459
	ii) SIMULTANEOUS MAX.DEMAND	2202	2291	2410	2414	2463	2382	2464	2464	2434	2418	2228	2411
	CONSIDERING 1.02 AS DIVERSITY FACTOR												
	iii) NET POWER AVAILABILITY- Own Source	434	485	592	687	698	693	622	461	441	426	409	401
	Central Sector	1442	1497	1569	1560	1545	1363	1528	1457	1306	1261	1253	1385
	SURPLUS(+)/DEFICIT(-)	-370	-354	-297	-215	-269	-373	-363	-596	-736	-779	-610	-673

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ABSTRACT OF STATEWISE/SYSTEMWISE/CONSTITUENTWISE ENERGY REQUIREMENT- vs- AVAILABILITY IN NORTH EASTERN REGION FOR THE PERIOD FROM APRIL-2014 TO MARCH-2015

(ALL FIGURES IN MU & NET)

SL.NO	PARTICULARS	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	TOTAL 2014-15
1	ARUNACHAL PRADESH													
	i) NET ENERGY REQUIREMENT	59	50	57	61	62	64	64	53	56	53	50	48	678
	ii) NET ENERGY AVAILABILITY- Own Source	5	5	4	6	6	6	6	4	4	3	3	4	56
	- Central Sector	40	46	58	73	74	65	52	39	36	34	31	36	584
	iii) SURPLUS(+)/DEFICIT(-)	-13	1	5	18	18	6	-7	-10	-16	-16	-16	-8	-38
2	ASSAM													
	i) NET ENERGY REQUIREMENT	505	605	645	725	735	715	675	600	640	605	505	570	7523
	ii) NET ENERGY AVAILABILITY- Own Source	116	131	158	184	190	184	161	127	99	95	80	89	1613
	- Central Sector	319	353	396	471	476	431	388	337	328	321	291	324	4434
	iii) SURPLUS(+)/DEFICIT(-)	-70	-121	-91	-70	-69	-101	-125	-136	-213	-189	-134	-157	-1476
3	MANIPUR													
	i) NET ENERGY REQUIREMENT	36	48	49	59	59	61	59	60	56	62	48	51	648
	ii) NET ENERGY AVAILABILITY- Own Source	4	4	4	4	4	4	4	4	4	4	4	4	43
	- Central Sector	49	55	62	81	87	79	70	56	50	49	44	50	732
	iii) SURPLUS(+)/DEFICIT(-)	17	10	16	25	32	22	15	0	-2	-9	-1	2	128
4	MEGHALAYA													
	i) NET ENERGY REQUIREMENT	165	165	145	160	150	145	170	175	175	195	175	175	1996
	ii) NET ENERGY AVAILABILITY- Own Source	57	74	98	142	148	145	111	59	52	44	35	32	996
	- Central Sector	90	100	113	137	138	125	113	97	93	91	82	91	1269
	iii) SURPLUS(+)/DEFICIT(-)	-18	10	66	119	136	125	54	-20	-31	-61	-58	-52	269
5	MIZORUM													
	i) NET ENERGY REQUIREMENT	36	36	36	39	37	35	41	41	38	40	35	40	452
	ii) NET ENERGY AVAILABILITY- Own Source	6	10	10	11	11	10	10	7	6	7	6	7	100
	- Central Sector	29	32	37	45	47	42	36	31	29	28	26	29	411
	iii) SURPLUS(+)/DEFICIT(-)	-1	6	11	18	21	17	5	-4	-3	-5	-3	-5	59
6	NAGALAND													
	i) NET ENERGY REQUIREMENT	50	56	54	60	50	60	65	55	50	60	45	50	655
	ii) NET ENERGY AVAILABILITY- Own Source	2	4	10	13	15	16	16	6	4	3	2	2	93
	- Central Sector	37	32	37	45	47	42	36	31	29	28	26	29	419
	iii) SURPLUS(+)/DEFICIT(-)	-11	-19	-7	-1	12	-2	-13	-18	-17	-29	-17	-19	-142
7	TRIPURA													
	i) NET ENERGY REQUIREMENT	100	110	105	120	120	120	120	110	120	125	95	120	1363
	ii) NET ENERGY AVAILABILITY- Own Source	51	55	54	56	56	55	57	52	54	54	48	54	645
	- Central Sector	99	105	110	124	128	119	113	102	101	100	91	101	1294
	iii) SURPLUS(+)/DEFICIT(-)	50	51	59	61	63	54	49	45	36	29	44	35	575
8	NORTH EASTERN REGION													
	i) NET ENERGY REQUIREMENT	950	1069	1091	1222	1213	1199	1195	1093	1135	1140	953	1055	13315
	ii) NET ENERGY AVAILABILITY- Own Source	241	284	336	415	430	419	365	258	222	208	179	191	3547
	- Central Sector	664	722	814	976	996	901	809	692	667	652	590	660	9143
	iii) SURPLUS(+)/DEFICIT(-)	-45	-63	60	169	213	121	-21	-143	-246	-280	-185	-204	-625
	MU/DAY	32	34	36	39	39	40	39	36	37	37	34	34	36

NERPC/LGBR 14-15

ANNEXURE - I

Period from 02/12/13 to 12/01/14

Sl. No.	Name of Transmission Element/Generator Tripped	Owner / Utility	Date of Event	Time of Event	Effect (Loss of Generation/ Load in MW)
A. Multiple / Repeated tripping					
1	132 kV Badarpur - Silchar II	POWERGRID	12/10/2013	2310	-
				2333	
	132 kV Silchar - Panchgram	POWERGRID		2310	
				2333	
2	132 kV Agartala - RC Nagar I	POWERGRID	12/14/2013	1136	Load Loss: 12 Generation Loss: 48
	132 kV Agartala - RC Nagar II				
	132 kV Agartala - Rokhia I	TSECL			
	132 kV Agartala - Dhalabil				
3	400/220 kV, 315 MVA ICT at Bongaigaon	POWERGRID	12/19/2013	1743	Load Loss: 358 Generation Loss: 40
	220 kV Sarusajai - Samaguri I	AEGCL			
	220 kV Sarusajai - Samaguri II				
	220 kV Misa - Samaguri I				
	220 kV Misa - Samaguri II				
	220 kV Balipara - Samaguri S/C				
4	132 kV Aizawl - Kumarghat S/C	POWERGRID	12/24/2013	0923	Load Loss: 36
	132kV Aizawl - Jiribam S/C				
	132 kV Aizawl - Kolasib S/C				
5	220 kV Misa - Brynihat I	MePTCL	12/31/2013	1423	Load Loss: 10 Generation Loss: 174
	220 kV Misa - Brynihat II				
	132 kV Badarpur - Khliehriat	POWERGRID		1426	
	132 kV Haflong - Jiribam				
	132kV Dimapur - Imphal	POWERGRID			

6	132kV Dimapur - Imphal	POWERGRID	1/2/2014	1158	Load Loss: 69 (Manipur)
	132kV Loktak - Imphal				
	132kV Loktak - Ningthoukhong	Manipur			
7	220 kV Misa - Brynihat I	MePTCL	1/9/2014	0016	Generation Loss: 50 (Palatana)
				0247	Generation Loss: 50 (Palatana)
8	220 kV Sarusajai - Samaguri I	AEGCL	1/11/2014	1105	Load Loss: 200 (in Assam)
	220 kV Sarusajai - Samaguri II				
	220 kV Sarusajai - Agia			1110	
	220 kV Sarusajai - Boko				
9	132 kV Loktak - Imphal	POWERGRID	1/12/2014	1446	Generation Loss: 20 (Loktak)
	132 kV Loktak - Ningthoukhong	Manipur			

B. Bus Fault

1	Aizawl (PG)	POWERGRID	12/24/2013	0923	Load Loss: 36

C. Sub-Station Blackout

1	Aizawl (PG)	POWERGRID	12/24/2013	0923	Load Loss: 36

D. Unit tripping

1	Kopilli U#2	NEEPCO	12/8/2013	1925	Generation Loss: 33
2	AGTPP U#3	NEEPCO	12/26/2013	0543	Generation Loss: 22
3	AGTPP U#1	NEEPCO	12/22/2013	0753	-
4	AGTPP U#3	NEEPCO	12/30/2013	0035	Generation Loss: 13
5	Palatana STG#1	OTPC	12/31/2013	1426	Generation Loss: 114
	Palatana GTG#1			1509	Generation Loss: 206
6	Khandong U#2	NEEPCO	1/2/2014	2120	Generation Loss: 19
7	AGBPP U#2	NEEPCO	1/9/2014	1815	Generation Loss: 32
	AGBPP U#7				Generation Loss: 7
8	Loktak U#3	NHPC	1/10/2014	0753	Generation Loss: 35

E. Tripping of critical element					
1	132kV Khandong - Halflong	POWERGRID	12/5/2013	1154	
2	132kV Jiribam - Jiribam (S)	Manipur	12/5/2013	1450	Generation Loss: 3
3	220kV Samaguri - Balipara	AEGCL	12/5/2013	1702	
4	132kV Imphal - Ninthoukong	Manipur	12/9/2013	1232	Generation Loss: 10
5	400kV Balipara - Ranganadi I	POWERGRID	12/10/2013	0833	-
6	400kV Balipara - Ranganadi I	POWERGRID	12/11/2013	1448	-
7	132kV Loktak - Ninthoukong	Manipur	12/11/2013	1830	Generation Loss: 45 Load Loss: 20
8	400 kV Silchar - Palatana I	NETC	12/17/2013	1034	-
9	220 kV BTPS - Agia S/C	AEGCL	12/20/2013	0600	-
10	132kV Loktak - Ninthoukong	Manipur	12/21/2013	0545	-
11	220 kV BTPS - Agia S/C	AEGCL	12/24/2013	2022	-
12	132kV Dimapur - Dimapur S/C	POWERGRID	12/25/2013	0908	Load Loss: 53
13	132kV Dimapur - Imphal	POWERGRID	12/30/2013	1131	-
14	220kV Misa - Brynihat I 220kV Misa - Brynihat II	MePTCL	1/2/2014	1320	Generation Loss: 20 (AGTPP-manually)
15	220kV Misa - Brynihat I	MePTCL	1/5/2014	0551	-
16	220 kV Misa - Brynihat I	MePTCL	1/6/2014	0613	-

JOB NO.	319
STATUS	CONTRACT
DISTRIBUTION	

TO					
NO					
REV	DATE	ALTD	CHKD	APPD	

OWNER: ONGC TRIPURA POWER COMPANY (OTPC) PVT. LTD.
CONSULTANT: FITCHNER CONSULTING ENGR (I) PVT. LTD, CHENNAI
726.6 MW CCPP AT PALATANA,TRIPURA

BHARAT HEAVY ELECTRICALS LTD.
POWER SECTOR
PROJECT ENGINEERIING MANAGEMENT
NOIDA

DEPTT CODE		NAME	SIGN	DATE
I	DESN.	SuN / ATy	-sd-	23-11-13
	CHD.	MAM	-sd-	23-11-13
	APPD.	MAM	-sd-	23-11-13

TITLE:

PROPOSED SPECIAL PROTECTION SCHEME WRITE-UP

DEPTT	SCALE	NTS
SIGN		
DATE		

DOCUMENT NO: **PE-DC-319-145-I730**

27/1/14 (SR Das)

27.1.14

17/01/14 (M. A. Mansoori)

INDEX

23/11/13

1.0 INTRODUCTION:

OTPC Customer on NERLDC requirement requested BHEL to provide Special protection scheme at Palatana CCPP to protect the NER grid upon tripping of 400 KV Silchar-Byrnihat line. In the meeting held between OTPC, NERLDC and BHEL at Shillong on 20/08/2013, NERLDC explained that when 400 KV Silchar-Byrnihat line trips, the associated 132/220 KV lines may get overloaded and Palatana plant should reduce generation as evacuation capacity of the grid will come down. It was also informed by OTPC that in the above event, Palatana plant should reduce Generation below 200 MW.

2.0 SPECIAL PROTECTION SCHEME (SPS):

DESCRIPTION:

2.1 The OTPC Palatana Plant could be running under any of the following operating Configurations:

a) GT#1 + ST#1 + GT#2 + ST#2 all running
b) GT#1 + ST#1 running
c) GT#2 + ST#2 running
d) GT#1 + ST#1 + GT#2 running
e) GT#2 + ST#2 + GT#1 running
f) GT#1+ GT#2 running
g) GT#1 running
h) GT#2 running

In all the above operating configurations, total generation shall be varying from FSNL to 726.6 MW.

2.2 On receipt of redundant signal from NERLDC viz. "400 KV Silchar-Byrnihat line trip", Special Protection Scheme shall open HV Circuit Breaker of GT(s) to reduce the station generation below <200MW. Effected GT (s) shall run on FSNL. After the said event takes place, plant ***Operator shall manually re-synchronize*** the GT (s) as per requirement.

2.3. SPS takes care of various operating conditions as per point 2.1 and decide the following:

(a.) When total generation <= 200 MW, no GT HV Breaker opening/tripping is initiated.

(b.) When total generation exceeds 200 MW, the various operating configurations mentioned above are compared and a running configuration is chosen by opening the required GT / GTs-HV breakers to limit total generation to <=200 MW.

19/1/14

2.4 OTPC / NERLDC to provide Redundant **PF contacts** (Generated using 2 out of 3 logic at NERLDC end) fully wired up to BHEL panel for SPS to initiate. These contact shall be used to open GT / GTs-HV Circuit Breakers to bring the plant Generation <= 200 MW. OTPC / NERLDC to ensure reliability of the inputs.

2.5 Considering signal processing, logic execution, breaker opening time, the unloading of the plant as said above will require minimum execution time of 250 ms from the moment 400 kV Silchar-Byrnihat line trip signal is received at BHEL terminals.

2.6 On SPS initiation after the signal is received from the grid for generation Shedding the plant Generation may go down to a level as per the dynamic condition prevailing on the steam turbine parameters . Thereon plant ***Operator to manually re-synchronize*** the GT (s) as per requirement. Any disturbance in 132/220 kV line, during this transient period, shall be taken care of by corresponding Grid Management.

3.0 REFERENCES:

a. OTPC letter ref. no.: OTPC/UDP/Palatana/13-14/ 556 dated 10.08.13.
b. Brief report on discussions held at NERLDC, Shillong on 20.08.13 with OTPC and NERLDC.
c. OTPC letter ref. no.: OTPC/UDP/Palatana/13-14/ 851 dated 23.10.13.
d. OTPC email dated 20.12.2013-OTPC comments on initial SPS write-up submitted by BHEL-PEM.

PROPOSED SPECIAL PROTECTION SCHEME

JOB NO. 319					
STATUS CONTRACT					
DISTRIBUTION					
TO					
No.OFF					
REV	DATE	ALTD	CHD	APPD	

OWNER	ONGC TRIPURA POWER COMPANY (OTPC) PVT LIMITED
PROJECT	726.6 MW COMBINED CYCLE POWER PROJECT PALLATANA, TRIPURA
OWNER'S ENGINEER	FITCHNER CONSULTING ENGINEERS (INDIA) PRIVATE LTD, CHENNAI
LSTK CONTRACTOR	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA

DEPT CODE		NAME	SIGN	DATE
I	DRN	GA		17.01.14
	DESN	ATy		17.01.14
	CHD	MAM		17.01.14
	APPD	MAM		17.01.14

TITLE

PROPOSED SPECIAL PROTECTION SCHEME

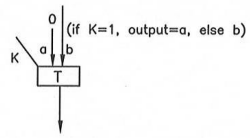
	DEPT. SCALE	DRG. NO. PE-DG-319-145-I230
	SIGN DATE	SHEET 00 OF 05 REV 00

REFERENCES:

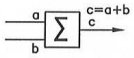
1. OTPC LETTER REF. NO.: OTPC/UDP/PALATANA/13-14/556 DATED 10.08.13
2. BRIEF REPORT ON DISCUSSIONS HELD AT NERLDC,SHILONG ON 20.08.13 OTPC & NERLDC.
3. OTPC LETTER REF. NO.: OTPC/UDP/PALATANA/13-14/851 DATED 23.10.13
4. WRITE UP FOR "SPECIAL PROTECTION SCHEME", DOC NO. PE-DC-319-145-I730

LEGENDS:

1. TRANSFER SWITCH



2. SUMMATION

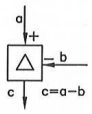


3. LIMIT VALUE MONITORING

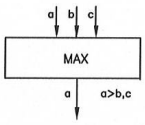
4. AND GATE

5. OR GATE

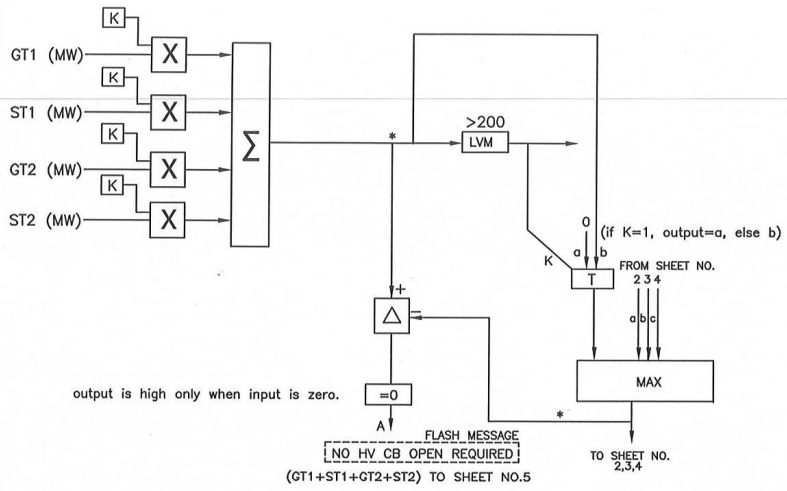
6. DIFFERENTIATOR



7. MAXIMUM

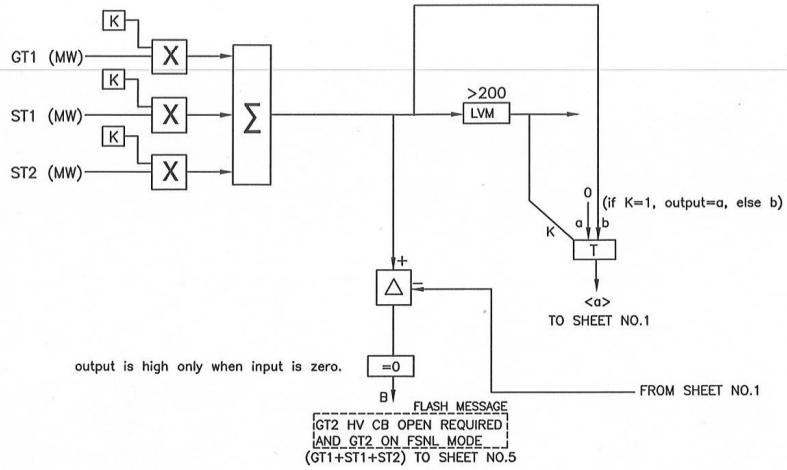


BHEL	OTPC 726.6 MW CCPP PALLATANA TRIPURA	DRG NO.	PE-DG-319-145-I230		
	PROPOSED SPECIAL PROTECTION SCHEME REFERENCES & LEGENDS	REV NO.	00	DATE	17.01.14
		SH. 01A	OF 05		SHS.

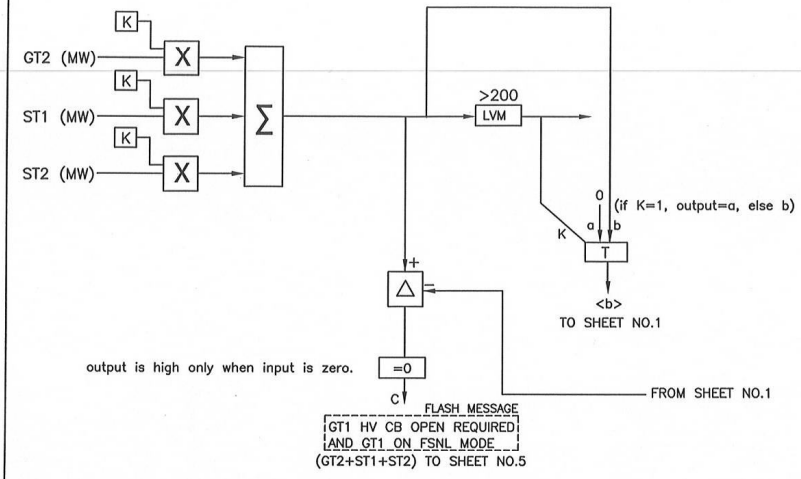


* Both are same timing signals to achieve absolute zero value after subtraction. This shall be applicable for all the configurations.

BHEL	OTPC 726.6 MW CCPP PALLATANA TRIPURA	DRG NO.	PE-DG-319-145-I230		
	PROPOSED SPECIAL PROTECTION SCHEME	REV NO.	00	DATE	17.01.14
	LOGIC FOR (GT1+ST1+GT2+ST2) CONFIGURATION	SH. 01	OF 05		SHS.



BHEL	OTPC 726.6 MW CCPP PALLATANA TRIPURA	DRG NO.	PE-DG-319-145-I230		
	PROPOSED SPECIAL PROTECTION SCHEME LOGIC FOR (GT1+ST1+ST2) CONFIGURATION	REV NO.	00	DATE	17.01.14
		SH. 02	OF 05	SHS.	



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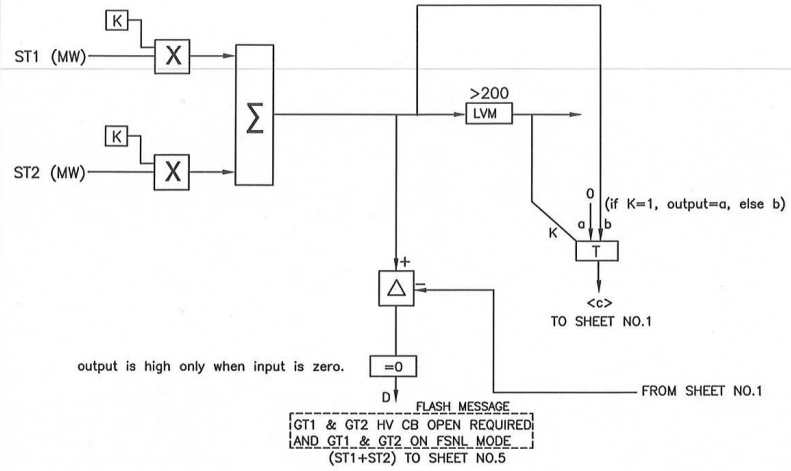
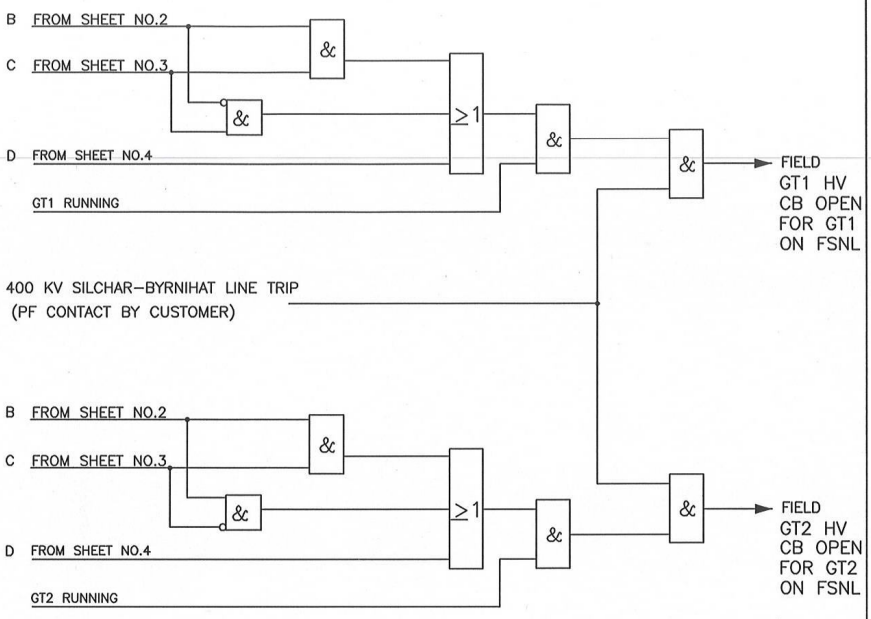
	LOGIC FOR (GT2+ST1+ST2) CONFIGURATION	SH. 03	OF 05		SHS.



BHEL	OTPC 726.6 MW CCPP PALLATANA TRIPURA	DRG NO.	PE-DG-319-145-I230		
	PROPOSED SPECIAL PROTECTION SCHEME	REV NO.	00	DATE	17.01.14
	LOGIC FOR (ST1+GT2) CONFIGURATION	SH. 04	OF 05	SHS.	



BHEL	OTPC 726.6 MW CCPP PALLATANA TRIPURA	DRG NO.	PE–DG–319–145–I230		
	PROPOSED SPECIAL PROTECTION SCHEME LOGIC FOR GT1/GT2 HV CB OPEN	REV NO.	00	DATE	17.01.14
		SH. 05	OF 05	SHS.	